

Preparedness for Management of Medical Emergencies Among Dentists in Udupi and Mangalore, India

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Abstract

Aim: The aim of this study was to assess the preparedness for management of medical emergencies among dentists in the cities of Udupi and Mangalore in India.

Methods and Materials: A self-administered questionnaire was completed by the dental teaching hospital faculty members and private dental practitioners in Udupi and Mangalore, India.

Results: Less than half (42.1%) of the dentists reported having received practical training in management of medical emergencies during their undergraduate and postgraduate education. Only about one-third of the respondents felt competent in performing mouth-to-mouth breathing (39.3%), cardiac compression (35.2%), foreign body obstruction relief (32.8%), and in administering IV drugs (34.5%) or supplemental oxygen (27.4%). The most commonly available emergency drugs in treatment areas were oral glucose (82.2%) and adrenaline (65.8%). However, less than one-fourth of the respondents had the following on hand in their treatment facility: oxygen (24.0%), an AMBU bag (17.1%), pocket mask (13.0%), bronchodilator spray (24.7%), diazepam (20.5%), aspirin (20.5%), and glyceryl trinitrate (17.8%). Less than half (39%) of the respondents reported having clinical staff members trained to assist in emergency recognition and management and only 5.8% carried out emergency drills in their workplace.

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Conclusion: Preparedness for management of medical emergencies was found to be inadequate among the surveyed dentists.

Clinical significance: The results of the study emphasize the need for improvement of the training of practicing dentists in the management of medical emergencies at the undergraduate, postgraduate, and continuing education levels as well as the need for organization of the dental workplace to handle such emergencies.

Keywords: Medical emergencies, dentists, general practice, dental education

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Introduction

There are circumstances and procedures within a dental office having the potential of precipitating a medical emergency. Fear and anxiety in patients seeking dental treatment may cause measurable metabolic changes, which make these patients prone to such emergencies. The chance of a medical emergency increases with the administration of anesthetics and medications, virtually all of which are known to have adverse reactions.¹ Studies done to assess the incidence and nature of medical emergencies in dental practice have reported a significant number of such events.²⁻⁷ Nearly one-third of these emergencies are potentially life-threatening.⁸

Keeping in mind the risk associated with dental treatment, it becomes imperative for the dentist to take appropriate steps for the prevention and management of such emergencies in the dental office. The prevention of medical emergencies should be the primary concern of a dentist. Successful prevention depends on the evaluation of a patient's history and physical condition as well as appropriate treatment modifications.⁸ Adequate preparation for the rapid and effective management of potentially life-threatening situations includes the following four specific actions:⁹

1. Ensuring the dentist's own education regarding medical emergency management is adequate and current.
2. Stocking the dental office with the supplies and equipment necessary for emergency care.
3. Education of the clinical staff in emergency recognition and management.



4. Providing for ready access to other healthcare providers capable of assisting during emergencies.

Studies have been done to assess the preparedness among dentists to manage medical emergencies in Kentucky and Florida (USA),² Australia,^{4,5} and Great Britain.^{10,11} They emphasized the need for improvement in training, office organization, and advanced preparation for the emergency management of patients. In view of the findings of these studies the present study was done to assess the following aspects of preparedness for managing medical emergencies among dentists in the cities of Udupi and Mangalore, India:

1. Training received in the management of medical emergencies.
2. Self-perceived competence to carry out basic emergency treatment measures.
3. Emergency drugs, supplies, and equipment kept in the dental workplace.
4. Clinical staff education in emergency recognition and management.

5. Access to other healthcare providers capable of assisting during emergencies.

Methods and Materials

The state of Karnataka, located in Southern India, has to its credit the largest number of dental colleges in India. Udupi and Mangalore, two neighboring cities in the coastal Karnataka region, were selected for the study. A list of dental teaching hospital faculty members and private dental practitioners in Udupi and Mangalore was prepared based on the information obtained from teaching hospitals and the concerned branch of the Indian Dental Association. The list consisted of a total of 280 dentists.

Consent was granted by the respective deans to conduct the study in their institutions. The listed teaching hospitals and dental clinics were visited over a period of two months.

A structured, self-administered questionnaire (Figure 1) was constructed which sought information on the various aspects of preparedness for the management of medical emergencies. A pilot study was carried out among 30 dentists to test the suitability of the questionnaire. A total of 149 dentists were asked to complete the questionnaire of which 147 dentists responded. The completed questionnaire forms were collected personally. The data from the questionnaires was analyzed using SPSS 10.0 (SPSS, Inc., Chicago, IL, USA) for frequency distribution.

Results

Of the 147 dentists (M=76, F=71) who responded (response rate of 98.65%), 85 were faculty members in teaching hospitals, 62 were private

dental practitioners, 58 dentists were dental graduates, and 89 dentists were postgraduate dentists. Of the dentists with a postgraduate degree, 9 dentists specialized in oral medicine and radiology, 13 in endodontics, 13 in periodontics, 11 in oral and maxillofacial surgery, 14 in prosthodontics, 9 in pedodontics, 10 in orthodontics, 2 in public health dentistry, 2 in oral pathology, and 6 did not state their specialty.

Training received in the management of medical emergencies during undergraduate and postgraduate courses, as recalled by the dentists, is tabulated in Table 1.

Less than half (42.1%) of the dentists reported having received practical training during both undergraduate and postgraduate courses.

The specific aspects of training from undergraduate and postgraduate courses are shown in Table 2. No form of training was received by more than half of the dentists in intravenous (IV) access and intramuscular (IM) access. Practical training in all the specific aspects of training was low (11.0-31.8%). Only 16% of dentists took additional courses in the management of medical emergencies.

More than half of the respondents felt competent (responded either 'very well' or 'well' on the questionnaire) in administering IM drugs and providing inhaled bronchodilators. Only about one-third of the respondents felt competent in performing mouth-to-mouth respiration, cardiac compressions, foreign body obstruction relief, and in administering IV drugs or supplemental oxygen (Figure 2).

Table 1. Training received in the management of medical emergencies during undergraduate and postgraduate courses.

	Total (No.)	No training		Theoretical only		Practical	
		No.	(%)	No.	(%)	No.	(%)
Undergraduate course	145	11	(7.6)	73	(50.3)	61	(42.1)
Postgraduate course	88	20	(22.7)	31	(35.2)	37	(42.1)
<small># n=2 and n=1 did not answer for training received during undergraduate and postgraduate course, respectively.</small>							

Figure 1. Self-administered questionnaire to assess the preparedness for management of medical emergencies.

Study Questionnaire				
Kindly check the appropriate answer in the boxes below. Information provided will be kept confidential.				
Q.1 Was management of medical emergencies part of your curriculum during your				
	No training	Theoretical only	Practical	
Undergraduate Training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Postgraduate Training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q.2 If yes, which of the following were you trained in?				
	No training	Theoretical only	Practical	
Undergraduate Training				
Recognition of emergencies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
CPR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Emergency drug use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IM access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Postgraduate Training				
Recognition of emergencies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
CPR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Emergency drug use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IM access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q.3 Did you take any additional course in management of medical emergencies? Yes <input type="checkbox"/> No <input type="checkbox"/>				
Q.4 How competent do you perceive yourself to				
	Well	Fairly well	Not very well	Not at all
1. Perform mouth-to-mouth breathing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Perform cardiac compressions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Perform maneuvers for relieving foreign body airway obstruction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Provide supplemental oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Administer IV drugs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Administer IM drugs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Provide inhaled bronchodilators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q.5 Kindly check the emergency drugs/equipment kept at your workplace				
1. Oxygen <input type="checkbox"/>	8. Glyceryl trinitrate <input type="checkbox"/>			
2. Pocket mask <input type="checkbox"/>	9. Bronchodilator spray <input type="checkbox"/>			
3. AMBU Bag <input type="checkbox"/>	10. Diazepam <input type="checkbox"/>			
4. Adrenaline 1:1000 <input type="checkbox"/>	11. Aspirin <input type="checkbox"/>			
5. Antihistaminic injection <input type="checkbox"/>	12. Oral glucose <input type="checkbox"/>			
6. Dextrose injection <input type="checkbox"/>	13. Aromatic ammonia <input type="checkbox"/>			
7. Hydrocortisone injection <input type="checkbox"/>	14. Any other (please specify) _____			
Q.6 Are the clinical staff members in your workplace trained to assist in emergency recognition and management? Yes <input type="checkbox"/> No <input type="checkbox"/>				
Q.7 Do you carry out periodic emergency drills in your workplace? Yes <input type="checkbox"/> No <input type="checkbox"/>				
Q.8 Have you made any prior arrangements with a physician or a hospital to obtain assistance in the event of an emergency? Yes <input type="checkbox"/> No <input type="checkbox"/>				
Q.9 Are the emergency telephone numbers placed in a readily accessible location in your workplace? Yes <input type="checkbox"/> No <input type="checkbox"/>				

Table 2. Aspects of training received during undergraduate and postgraduate training.

	No training (%)	Theoretical only (%)	Practical (%)
Undergraduate course			
Recognition of emergencies	20.5	50.0	29.5
CPR	38.4	43.2	18.5
Emergency drug use	28.8	50.0	21.2
IV access	62.3	26.7	11.0
IM access	57.5	27.4	15.1
Postgraduate course			
Recognition of emergencies	42.0	26.1	31.8
CPR	52.3	22.7	25.0
Emergency drug use	44.3	29.5	26.1
IV access	63.6	14.8	21.5
IM access	60.2	13.6	26.1

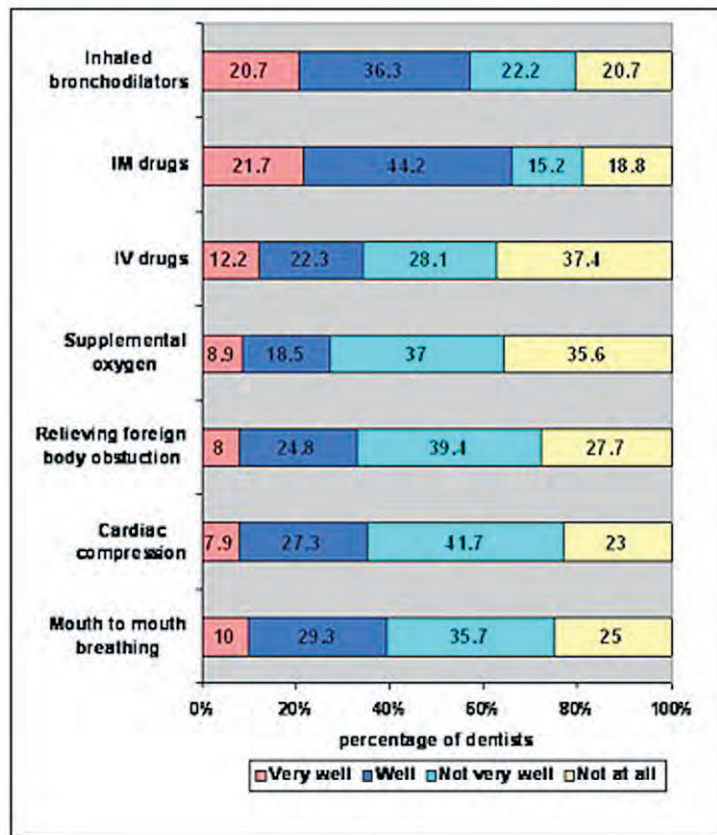


Figure 2. Self-perceived competence to carry out basic treatment measures. (The 'well' and 'very well' responses were combined to signify "competent" and 'not very well' and 'not at all' categories have been combined to signify "not competent.")

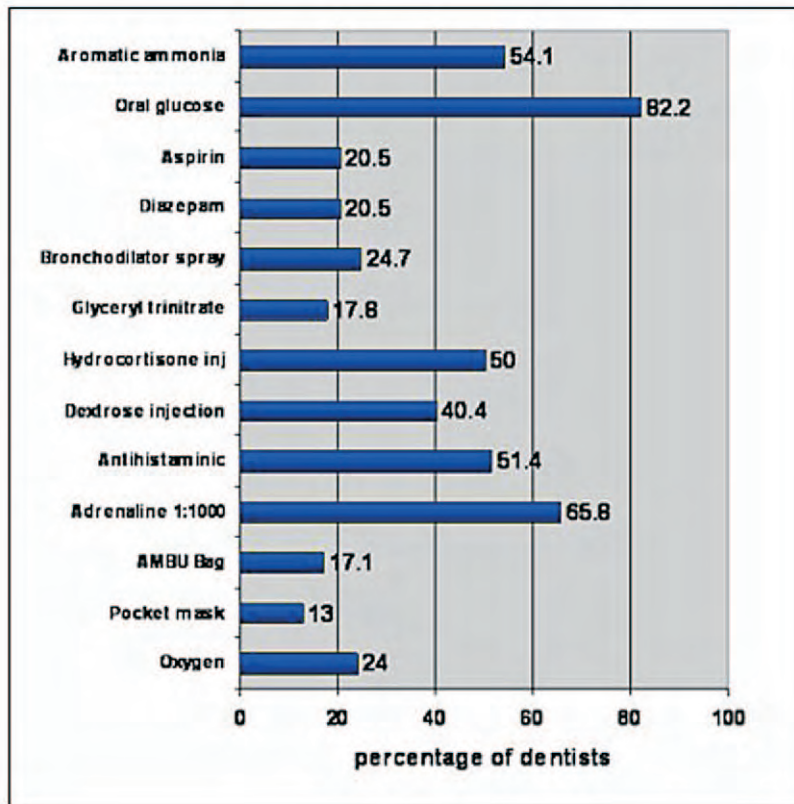


Figure 3. Emergency drugs and equipments possessed by dentists.

Figure 3 shows the percentage of dentists who possessed each of the items of equipment and emergency drugs specifically asked about in the questionnaire. The most commonly stocked emergency drugs were oral glucose and 1:1000 adrenalin. Less than one-fourth of the respondents maintained readily available oxygen, an AMBU bag, a pocket mask, bronchodilator spray, diazepam, aspirin, and glyceryl trinitrate.

About 39% of the respondents reported clinical staff in their workplace were trained to assist in emergency recognition and management. Only 5.8% carried out emergency drills in their workplace, and 75% of the respondents reported having made prior arrangements with a physician or hospital to obtain assistance in the event of an emergency. A majority (85.4%) of the participating dentists had emergency telephone numbers placed in a prominent location.

Discussion

The most important step in the preparation for medical emergencies is training of the dentist

in recognition and management of emergency situations. According to the findings of this study a majority (92.4%) of the participating dentists recalled having received training in management of medical emergencies as undergraduates. However, less than half (42.1%) reported receiving practical training. In a study done by Atherton et al.¹¹ among general dental practitioners in Great Britain, 75.2% respondents indicated they had received training in the management of medical emergencies as undergraduate students. However, the type of training received was not obtained in that study.

In the undergraduate curriculum proposed by the Dental Council of India management of medical emergencies in dental practice is included under the syllabi of general medicine and oral surgery.¹² However, the duration and method of training has not been specified by the Council. The Management of Medical Emergencies in Dental Education guidelines approved by the American Association of Dental Schools (now the American Dental Education Association) recommends

the total instructional unit at the predoctoral level should include a didactic and laboratory component initially and then reinforcement throughout the student's clinical experiences by either real or simulated emergencies.¹³ A 20 year follow up survey of medical emergency education in U.S. dental schools has suggested standardization of medical emergency education.¹⁴ Instruction in the management of medical emergencies in teaching institutions should be standardized in terms of course content, allocation of teaching hours, faculty members responsible, and the method of training. This would enable the student to develop an orderly and confident approach to the diagnosis and management of medical emergencies encountered in dental practice. Also, significance of medical history review and initial patient assessment as essential elements for preventing medical emergencies should be stressed.

Practitioners should seek continuing education in this area, not only to refresh their knowledge but also to learn new concepts in medical evaluation and management of emergencies.⁹ In the study done by Atherton et al.¹¹ 94.8% of respondents sought training in management of medical emergencies since graduation. In a study by Fast et al.² only 30% reported having attended any postgraduate or continuing education courses in emergency management. In the present study only 16% of participating dentists took additional courses in the management of medical emergencies. This finding emphasizes the need to organize more continuing education programs in emergency medicine through such venues as dental schools, dental societies, and other training institutions. As observed in the study by Atherton et al.,¹¹ hands-on courses are the best way to maintain preparedness. Furthermore, mandatory continuing education (CE), an almost universal requirement for re-licensure of dentists in the United States,¹⁵ should also be introduced in other nations.

First and foremost in emergency management is the ability to effectively provide basic life support (BLS).¹⁶ Only 18.5% of the respondents received practical training in cardiopulmonary resuscitation (CPR) during undergraduate courses and 25% of dentists with an advanced postgraduate education received CPR training during their

postgraduate course work. In the study by Atherton et al.¹¹ 93.9% and 98.9% dentists recalled training in CPR during undergraduate and postgraduate training, respectively. A study by Hussain et al.,¹⁷ in which all the candidates failed the practical assessment, concluded more emphasis should be placed on CPR training in undergraduate dental courses and regular update courses are advisable to maintain CPR skills. The American Dental Association (ADA) Council on Scientific Affairs recommends all dental healthcare professionals receive regular training in BLS because these skills are maintained only through repetition.¹⁶

Few participating dentists felt competent to perform basic emergency treatment measures such as CPR, opening an obstructed airway, administration of IV drugs, and supplemental oxygen. This finding again emphasizes the lack of practical training in emergency management.



Emergency drugs and equipment should be readily available in a dental treatment facility for the management of medical emergencies.^{16,18,19,20,21} The ADA Council on Scientific Affairs recommends all dental offices should maintain at least the basic recommended emergency equipment and drugs which include epinephrine 1:1000 (injectable), histamine-blocker (injectable), oxygen with positive pressure administration capability, nitroglycerine, bronchodilator, sugar, and aspirin.¹⁶ In the present study most participating dentists possessed oral glucose (82.2%) and adrenaline (65.8%). However, many of the essential emergency equipments and drugs such as oxygen, an AMBU bag, a pocket

mask, bronchodilator spray, aspirin, and glyceryl trinitrate were stocked by only about one-fifth of the participating dentists. This is in contrast to a survey by Chapman⁵ who found oxygen to be the most common emergency item made available by 63% of responding Australian general dental practitioners (GDPs). Furthermore, a survey of practitioners in Great Britain by Atherton et al.¹⁰ reported oxygen, adrenaline, and an injectable steroid were stocked by about 90% of the respondents and glucose, glyceryl trinitrate, and a salbutamol inhaler by about 80%. In light of the findings of the present study it is suggested there is a need for enforceable regulations requiring an emergency medical kit and the specific items to be kept by dental practitioners.

In the present study less than half (39%) of the responding dentists reported the clinical staff members in their workplace were trained to assist in emergency recognition and management and only 5.8% carried out emergency drills in their workplace. It has been suggested dentists must ensure all dental office personnel are trained to assist in the recognition and management of emergencies. This should include reinforcement by regular emergency drills in the office. Further, the office staff should be pre-assigned specific responsibilities so in the event of an emergency each person knows what will be expected of them.⁸

Dentists should establish a working relationship with an appropriate physician, hospital, or emergency care service for assistance in the event of an emergency and the appropriate phone numbers should be kept readily available.⁹ In the present study three-fourth (75%) of the participating dentists reported having made prior arrangements with a physician or hospital to obtain assistance in the event of emergency. A majority (85.4%) of the respondents had

emergency telephone numbers posted in a prominent location. This is similar to the findings of the survey of dentists in states of Kentucky and Florida in the United States² in which 85% of participating dentists had emergency telephone numbers posted in a prominent location, usually at the reception desk.

The results of the present study should be viewed in light of the following limitations. The study was done on a limited sample of dentists from two cities in Southern India, and further studies are required to be done at state and national levels to determine the degree of preparedness of dentists to manage medical emergencies. A broad interpretation of the term 'medical emergency' by the respondents might have resulted in an increase in the reported lack of preparedness in this study. The intent of the present study was to inquire about the more common medical emergencies encountered in dental practice such as syncope, allergic reactions, angina pectoris/ myocardial infarction, cardiac arrest, postural hypotension, seizures, bronchospasm, and diabetic emergencies.

Conclusion

Preparedness for management of medical emergencies with respect to training received, self perceived competence, drugs, equipment kept, and clinical staff training was found to be inadequate among the dentists surveyed in the cities of Udupi and Mangalore in India.

Clinical Significance

The results of the study emphasize the need for improvement of the training of practicing dentists in the management of medical emergencies at the undergraduate, postgraduate, and continuing education levels as well as the need for organization of the dental workplace to handle such emergencies.

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