

Medical emergencies encountered in dental clinics: A study from the Eastern Province of Saudi Arabia

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ABSTRACT

Objectives: To report the prevalence of medical emergencies in dental clinics and self-perceived competence of dentists in the Eastern Province of Kingdom of Saudi Arabia (KSA). **Materials and Methods:** In this cross-sectional study, a self-administered questionnaire was distributed to a random sample of 198 dentists working in private and government dental clinics in the Eastern Province of KSA. The respondents were approached twice to ensure good participation in the study. **Results:** One hundred and forty-five dentists returned the questionnaires yielding a response rate of 73.2%. Half were male (50.3%) and 56% worked in private dental clinics. About 67% of the respondents reported having encountered any episodes of medical emergencies. Vasovagal syncope was the most common medical emergency experienced by 53.1% of the dentists, followed by hypoglycemia (44.8%) and only 5.5% had faced foreign body aspiration. The responding dentists had encountered 599 episodes of medical emergencies in the last 3 years. Almost 45% of the participants felt competent to perform cardiopulmonary resuscitation (CPR). Most of the participants (74.3%) reported that they had emergency kits in their clinics; more than 70% of the dentists kept oxygen, adrenaline, and glucose. One-third of them were either not confident or did not know how to use the emergency drugs. **Conclusions:** The study findings revealed that dentists quite commonly encounter medical emergency situations during their practice in dental clinics, but a considerable proportion of dentists did not feel competent enough to handle medical emergency conditions.

Key words: Cardiopulmonary resuscitation, dentists, drugs, medical emergency, Saudi Arabia

INTRODUCTION

Dentists encounter medical emergencies in their clinics which can be life-threatening.^[1] Almost 90% of emergency episodes are considered mild, and 8% are regarded as serious.^[2] A cross-sectional study reported 20 deaths resulting from medical emergencies in dental clinic settings.^[3] Patients with medical conditions are more likely to experience emergency situations during dental treatment.^[4] It was observed that approximately 35% of patients who experienced emergency situations had some systemic disease, and cardiovascular disease accounted

for 33% of such episodes. Medical emergencies most commonly occur during and after the administration of the local anesthetic agent.^[2] In addition, the reaction to certain dental materials (resins, latex), and the invasive dental procedure can also increase the risk of emergencies.^[5]

The dental professionals' expertise and skills in basic life support, and the availability of essential emergency drugs and equipment can reduce the morbidity or mortality associated with medical emergencies.^[6] The Resuscitation Council, United Kingdom (UK), requires

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all dental clinics in the UK to have minimal emergency equipment that includes portable oxygen cylinder, oxygen face mask, set of oropharyngeal airways, device for inhaled bronchodilators, blood glucose measuring apparatus, defibrillator, suction and sterile syringes and needles.^[7] Similarly, oxygen, epinephrine, nitroglycerin, diphenhydramine, bronchodilators, aspirin, glucose, and aromatic ammonia are the basic drugs, which should be available in dental clinics.^[8]

A considerable number of dentists in advanced countries are not competent to effectively deal with the commonly occurring medical emergencies. In the UK and New Zealand, studies have reported that almost 20% of dentists were not adequately prepared to manage the emergencies and that basic emergency drugs and equipment were not available in their clinics.^[9,10] Only 54% of dentists were able to perform cardiopulmonary resuscitation (CPR) in Brazil.^[11] Patients receiving dental treatment can experience syncope, allergic reaction, angina pectoris, cardiac arrest, fits and seizures, diabetic crisis, asthmatic attack, orthostatic hypotension, hypertensive crisis, and ingestion of a foreign body.^[2] Studies that have evaluated the prevalence of different medical emergencies indicate that syncope is the most common occurrence.^[12,13]

Information on the prevalence of medical emergencies and the competence of dentists in adequately managing medical emergencies in Kingdom of Saudi Arabia (KSA) is scarce. In order to reduce the adverse medical emergency outcomes, it is extremely important for dentists to keep abreast with the latest knowledge and information, and effectively practice the clinical skills to manage life-threatening situations in dental offices.^[14] The purpose of this study, therefore, was to report the occurrence of medical emergencies in dental clinics, and the self-perceived competence of dentists in the Eastern Province of KSA.

MATERIALS AND METHODS

The cross-sectional research was approved by the Institutional Ethical Review Committee. A list of dentists working in public and private dental clinics in the Eastern Province was obtained from Saudi Dental Society. This list was entered in Excel (MS Office, Microsoft Corporation, 2007), and a random number was generated that was subsequently used to select a random sample of 198 dentists. The questionnaire was prepared and modifications made after consulting experienced faculty members. The questionnaire was pilot tested in a sample of 30 dentists working in private and public clinics in Dammam to check respondents' comprehension of the questions, and avoid errors in its administration.

The objectives of the study were discussed with the participants and informed consent obtained. Self-administered questionnaires were distributed to randomly selected sample of 198 dentists working in private and government dental clinics. Dental practitioners with <1-year of clinical experience were excluded from the study. Dentists from different areas of the province such as Dammam, Al-Khobar, Dhahran, Alhasa, Qatif, Safwa, and Abqaiq were approached, and at least two visits were made to achieve a maximum response rate.

The questionnaire consisted of 13 questions in four sections:

- Section one had five questions (1–5) on demographics: The number of years in dental practice, the type of dental clinic (private or government), and the basic academic qualifications of dentists.
- Questions 6 through 8 were on the frequency and type of medical emergencies encountered by the dentists in their dental practice in the last 3 years. The list included vasovagal syncope, orthostatic hypotension, asthmatic attack, hypoglycemia, heart-related problem, adverse drug reaction, fits or seizures, foreign body aspiration, and any other medical emergencies. The questions also included whether the emergency situation was dealt with by the dentists themselves, whether they sought help from a physician or another dentist or referred the patient to a hospital using an ambulance.
- Questions 9–11 asked about the dentists' competence in performing CPR, the quality of CPR courses offered in KSA and the availability of emergency kits in the clinics.
- Section four, consisting of questions 12 and 13 dealt with the availability of basic emergency drugs in dental practices, and the confidence the dentists had in administering these drugs.

Statistical Software Package SPSS version 22 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) was used to perform statistical analyses. Frequencies and proportions of different responses were calculated for categorical variables. Mean, standard deviation and range of values were determined for continuous variables. Chi-square analyses and cross tabulation were performed to evaluate associations between categorical variables at a significance level of $P < 0.05$.

RESULTS

Out of 198 dentists, 145 returned the completed questionnaires yielding a response rate of 73.2%. The average age of the respondents was approximately

34 ± 7.04 years. The sample comprised an equal number of male (50.3%) and female (49.7%) respondents. About 56% of the dentists worked in private dental clinics and 44% in government dental clinics. The majority of the dentists (72%) had obtained their Bachelor's degree from abroad, and the average experience of the dentists in clinical practice was 9.3 ± 7.2 years.

Almost 67% of dentists reported having encountered any medical emergency in their clinics. A total of 599 medical emergencies had been encountered by the respondents in the past 3 years.

Vasovagal syncope was encountered by 53.1% of the dentists, making it the most common emergency. This occurred 254 times and constituted 42.5% of all the medical emergencies. About 44.8% of the dentists handled hypoglycemia constituting 22% of all the cases and therefore, the second most common emergency, and 5.5% had to deal with foreign body aspiration, the least frequently met emergency (3%) [Table 1].

Of the responding dentists, 62.7% had handled the emergency cases themselves, 26.2% had consulted a physician, 3.5% had called another dentist for help, and 7.6% had called an ambulance [Figure 1]. In response to the question about the evaluation of CPR courses, 13% of the dentists regarded them as excellent; 38% thought they were very good, 40.7% stated that the CPR courses were fair, and 8.3% perceived them poor or very poor [Table 2].

Of the dentists surveyed, 44.8% felt competent to perform CPR. Most of the participants (74.3%) reported that they had emergency kits in their clinics; more than 70% of the dentists kept oxygen, adrenaline, and glucose in their clinics. One-third of dentists were either not confident, or did not know how to use the emergency drugs [Figure 2].

There were no statistically significant differences between male and female, and between government and private dentists in the frequency of medical emergencies and

other variables of the study ($P > 0.05$). However, more dentists working in private dental clinics faced episodes of medical emergencies than those working in government dental clinics.

DISCUSSION

In the present study, the dentists reported medical emergencies as a frequently occurring phenomenon during their dental practice. To our knowledge, this is the first study conducted in KSA that evaluates the types and frequencies of medical emergencies, the preparedness and competence of dentists to manage such situations, and compare medical emergencies encountered between male and female dentists, and government and private dentists. The results of the study show that 67% of the dentists encountered medical emergencies in dental clinics in the Eastern Province of KSA which is quite high.

The most common medical emergency reported in our study was vasovagal syncope. This is consistent with results reported by previous studies.^[12,13,15,16,17] In contrast to a Brazilian study^[13] which identified orthostatic hypotension as the second most common medical emergency, hypoglycemia was the second most commonly reported emergency in our study. A small proportion of the dentists (5.5–11%) observed life-threatening medical emergencies such as foreign body aspiration, adverse reactions, asthmatic attack, and cardiac problems. Nevertheless, there is a pressing need for dentists to be sufficiently trained to manage medical emergencies.

Nearly half of the respondents (44.8%) in the present study were skilled in performing CPR on the patients. Arsati *et al.*^[13] observed that 43% of Brazilian dentists were competent in performing CPR. Similarly, Gupta *et al.*^[18] found that although one-third of Indian dentists had received CPR training, they were not adequately

Table 1: Medical emergencies encountered in dental clinics as reported by dentists

Medical emergencies encountered	N (%)
Vasovagal syncope	77 (53.1)
Orthostatic hypotension	31 (21.3)
Adverse drug reactions	11 (7.8)
Asthmatic attack	16 (11)
Hypoglycemia	65 (44.8)
Foreign body aspiration	8 (5.5)
Seizures	24 (16.6)
Heart-related problems	12 (8.3)
Other medical emergencies	10 (7)

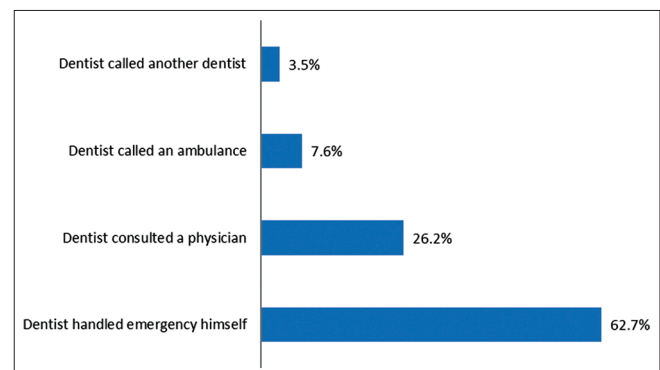


Figure 1: Frequency distribution of how dentists managed medical emergencies in dental clinics

Table 2: Dentists' opinion about the CPR courses they had attended

Rating of CPR* courses	N (%)
Excellent	19 (13)
Very good	55 (38)
Fair	59 (40.7)
Poor	10 (6.9)
Very poor	2 (1.4)

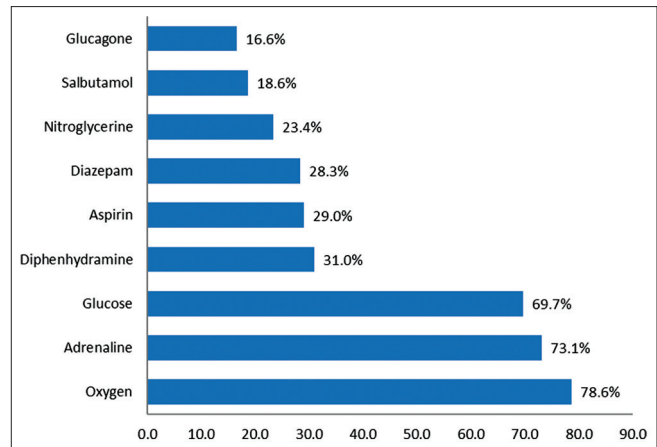
*CPR: Cardiopulmonary resuscitation

prepared to perform it. About 8.3% of the respondents perceived the quality of CPR courses in KSA as poor or very poor, and 40.7% judged them to be fair. The results of our study established that almost one-third of the dentists were unable to handle emergency situations. Similarly, about 20% of British dentists were not well-prepared to manage emergencies.^[9]

Seventy percentage of German dentists kept oxygen,^[16] 63% of Australian dentists had oxygen in storage, and 22% kept adrenaline.^[19] The present study found that 78.6% of the dentists kept oxygen, 73% had adrenaline, and 70% had glucose in their dental offices. However, one-third of them had no confidence in using emergency drugs. Similar to the results obtained by Muller *et al.*,^[16] about 75% of the dentists in our study maintained emergency kits in their dental clinics. Atherton *et al.*^[9] observed that 80% of the general dental practitioners in the UK were likely to possess emergency equipment and drugs.

The possible reason for the lack of competence in performing CPR, managing medical emergency and administering the drug is that most dentists working in KSA had their undergraduate dental qualifications from outside KSA. It is very likely that they had different levels of medical courses and emergency training in their educational institutions. Similarly, those trained at various dental schools in KSA may have taken different courses and acquired varying degree of skills in managing emergency situations. Although it is mandatory for a dentist practicing in KSA to take a CPR course once every 2 years, a considerable number of dental practitioners were not able to deal with emergencies effectively.

A greater percentage of dentists working in private dental clinics encountered emergency situations than those in the public sector. Besides, those working in government clinics might have access to better facilities, advanced courses and/or continuing education courses. Compared with dentists working in private clinics, a higher proportion of public dentists consulted physicians. The reason for this might be the fact that government dental clinics are frequently located in hospitals where physicians may be easily available for consultation for the

**Figure 2: Frequency distribution of availability of various drugs in dental clinics**

management of emergencies whereas private clinics are usually stand-alone dental centers without other medical care providers.

A similar cross-sectional study in the UK which used postal questionnaire reported a response rate of 74%.^[3] In the present research, the respondents were approached twice at their clinics to ensure their maximum participation. Though the response rate was satisfactory, it was slightly lower than expected. This is probably because the dentists were busy in their clinics, or they were not interested in participating in the study. The dentists in our study were asked to mention the emergencies encountered in the last 3 years. This may have resulted in recall bias, though, it allowed for more data to be collected.^[20] The results of the study cannot be generalized to cover fresh dental graduates, dental interns, dental students and to those who work in other provinces of the country.

CONCLUSIONS

The study findings demonstrate that medical emergencies are quite frequently encountered in dental clinics and that a considerable proportion of dentists were not competent to handle emergency conditions. About 67% of the dentists had encountered medical emergencies in the previous 3 years. Only 45% of the respondents felt competent to perform CPR, and about one-third of them had no emergency kits or drugs in their clinics and were not confident in administering emergency drugs. It is recommended that:

- Decision makers in the Ministry of Health should take appropriate measures to ensure the availability of emergency drugs and kits in dental clinics. The dentists should also receive periodic courses on how to use the emergency drugs and medications in their dental practices.

- The quality of CPR courses should be evaluated, and bodies which organize CPR courses should take effective measures to improve the quality and delivery of their CPR courses.
- Dental institutions, educationists, dental and medical faculty members should better plan medical emergency management courses and training in undergraduate dental programs.
- Dental associations should play an active role in providing continuing education courses and seminars on the management of medical emergencies.

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Conflicts of interest

There are no conflicts of interest.

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