



ORIGINAL ARTICLE

Preparedness of dental clinics for medical emergencies in Riyadh, Saudi Arabia



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KEYWORDS

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Abstract *Aim:* To assess knowledge, training of dental staff and the availability of emergency drugs and equipment in dental clinics, Riyadh, Saudi Arabia.

Methods: Cross-sectional survey was conducted in a random sample (N: 325) of governmental and private clinics in Riyadh, Saudi Arabia, between June-December 2016. Questions included Dentist's specialty, age, years of experience, knowledge and preparedness to handle ME (level of training, types of emergency drugs and equipment available).

Results: One dentist from each clinic filled the questionnaire (100% of the sample), 19% of whom were general dentists. Medical history is taken orally by 86% of respondents before dental treatment and 12% take vital signs every visit.

Of the surveyed clinics, 30% didn't have emergency contact numbers available, 78% didn't have an emergency protocol and only 54% have a medical emergency plan with 11% performing periodic office emergency drills.

The most available emergency drug and equipment were Aspirin (53%) and Sphygmomanometer (86%). Oxygen delivery device was not available in 90% of the surveyed clinics.

Conclusion: There is an alarming inadequacy of clinic/staff preparation to deal with ME. Efforts should be made to increase the awareness of dentists to take needed precautions and prepare their clinics.

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1. Introduction

Advances in medicine have made a dramatic increase in the average life expectancy of humankind. As people age, the systematic conditions upsurge and with that, the dentists' are increasingly responsible for treating a growing number of elderly and medically compromised patients. Diseases that compromise the health lead to medical emergencies, which hinders the dental treatment (Maryam et al., 2015; Radfar and Suresh, 2007).

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Fortunately, most of the medical emergencies encountered are not life-threatening (Müller et al., 2008). These medical emergencies usually occur during or after local anesthesia administration, mainly during tooth extraction and root canal treatment (Haas, 2006). Syncope was the most common medical emergency in eastern region of Saudi Arabia followed by Hypoglycemia (Alhamad et al., 2015). A study done in France revealed that 1 in 20 general dental practitioners will have to cope with cardiopulmonary resuscitation at least once during his/her career (Collange et al., 2010).

Medical emergencies arising during dental treatment can be morbid if not handled correctly. In the USA, 17 out of 25 deaths at the dental clinic between 1980 and 2011 were related to the sedation anesthetic (Chicka et al., 2012; Malamed, 2010).

Dentists have the responsibility are responsible for recognizing medical emergencies when they arise, along with being competent in managing them optimally (Haas, 2006; Müller et al., 2008). Unfortunately, a significant number of dentists in Saudi Arabia did not feel that they are capable of handling medical emergency situations (Alhamad et al., 2015).

Prevention of medical emergencies in the dental office starts with obtaining a detailed medical history, including medication use. This medical history must be done through both: a written questionnaire and orally. Moreover, taking vital signs, visual inspection and physical examination of the patient may reveal a hidden condition that the patient may not know existed yet may put them at risk. Moreover, recognizing the patient's distress helps identify a medical emergency, which the dentist can then start with 'PABCD' approach: **P**osition of the patient, **A**irway evaluation, **B**reathing, **C**irculation and **D**efinitive treatment (including diagnosis, drugs and defibrillation) (Haas, 2010).

Invasive procedures that breach the muco-gingival barrier, including scaling and root planning, increase the risk of complications, therefore the dentist must be cautious and must consult the treating physician whenever needed to determine the degree of risk and adjust treatment accordingly (Little et al., 2012; Maryam et al., 2015; McCarthy, 1990).

Developing an action plan in advance for managing medical emergency on the dental chair along with familiarizing all dental staff with the action plan to know their tasks in an emergency, are crucial in an emergency management (Haas, 2010; Maryam et al., 2015). Emergency drills must be done, the contact numbers of appropriately trained emergency care providers must be known and mounted clearly and the emergency drug kit and equipment must be available in the clinic and checked periodically. Goldberger said "When you prepare for an emergency, the emergency ceases to exist." (Atherton et al., 1999).

According to the regulations, the emergency drug kit must contain the following as minimum: histamine-blocker (injectable), epinephrine 1:1000 (injectable), nitroglycerin, bronchodilator, glucose, aspirin and oxygen with positive-pressure, especially considering the fact that the most important part for managing almost all medical emergencies in dentistry is to eliminate hypoxia of the brain or heart (ADA, 2002; Haas, 2010).

The American Dental Association (ADA) had set guidelines for the preparedness of the dental office, which includes: training of all staff members, who also should be updated in Cardiopulmonary resuscitation (CPR). Likewise, the first

clause of article (13) of the Saudi Health institutions law, states that "Emergency drugs and means must be available in the clinic" (Saudi Health institutions law, article (13), n.d.).

There is no study performed in Riyadh, Saudi Arabia, to assess the preparedness of the dental clinics to manage medical emergencies. The aim of this study was to assess the knowledge and the training of dentists and the availability of the emergency drugs and equipment in a sample of dental clinics in Riyadh, Saudi Arabia.

2. Materials and methods

2.1. Study design, setting and participants' recruitment

The present cross-sectional study was conducted between June and December 2016 with a random sample of dental clinics (from the north, south, east and west of the city and from private, governmental and educational institutes) from the capital city of Riyadh, Saudi Arabia. Sample size was calculated by a power calculation on the categorical variables, 5% significance level.

Each clinic was asked for the questionnaire to be filled by one Dentist. The sample included dentists with various areas of specialization who were proficient in English and eligible for practice in Saudi Arabia (i.e., officially registered at the Saudi Commission for Health Specialties, as the licensing examinations are solely conducted in English).

2.2. Data collection and measures

An anonymous, self-administered questionnaire (available on request) was used to collect the data. The questionnaire consisted of 32 closed-ended, multiple-choice questions and was based on the American Dental Association guidelines Kumarswami et al. (2015). The questionnaire was divided into five sections: (1) demographic data: age, gender, highest degree, professional rank, specialty, area of practice, and years of expertise. (2) Medical emergencies prevention measures used: medical history taking and frequency of obtaining vital signs. (3) Preparedness of the dental staff and the dental office, which includes BLS training, emergency courses taken, conducting emergency drills, availability of emergency protocol and if it is clearly posted in the clinic. (4) Essential emergency drug kit accessibility. (5) Necessary emergency equipment readiness.

The questionnaire was pilot-tested among 20 separate dental clinics, which were selected using simple randomization and did not participate in the main study. The questionnaire was distributed by hand, and feedback regarding the language and clarity of questions was obtained from all participants. The questionnaire was then revised in accordance with the comments of pilot-study participants prior to distribution to the main study sample. The main author was assigned to distribute and collect the questionnaires (N = 325) and clarify any ambiguity in the questions during the study period.

2.3. Ethical consideration

The study was approved by the Ethical Committee of the College of Dentistry Research Center (CDRC# FR 0350) at

King Saud University and conducted in accordance with the principles outlined by the World Medical Association in the Declaration of Helsinki. Written informed consent was obtained from all participants prior to their participation in the study.

2.4. Statistical analysis

Data were analyzed using SPSS version 22.0 (IBM, Armonk, New York, NY, USA). Descriptive statistics were used to report sample characteristics. Categorical variables were reported as counts and percentages. cross tabulation was performed to evaluate categorical variables.

3. Results

Three hundred and twenty five dentists from 325 dental clinics in Riyadh, Saudi Arabia, participated in this study, 19% of whom were General Practitioners (GPs) (N: 102).

3.1. Prevention

Eighty seven percent of participants (N: 283) reported that they take medical history orally before delivering the dental treatment, while 12% (N: 39) depend only on the written questionnaire filled in by the patient, and one percent (N: 3) never took medical history before dental treatment (Fig. 1).

Cross tabulation of specialty and taking the medical history revealed that 100% (n = 26) of the Oral and Maxillofacial surgeons (OMFS) and 63% (N: 64) of GPs took medical history orally. Cross tabulation of gender and taking the medical history revealed that 82% (N: 152) of the male dentists take the medical history orally, on the other hand 93% (N: 129) of the female dentists take medical history orally.

Twelve percent (N:39) of the respondents took patient's vital signs every visit, 38% (N: 123) took it during the first visit only and 50% (N: 162) never took it.

Specialty cross tabulation with vital signs showed that 79% of OMFS (N: 20) checked vital signs every visit and 21% (N: 6) of them checked it during the first visit only. Only 48% of GPs (N: 49) took vital signs during the first visit, same number of the GPs never took vital signs and 4% (N: 4) checked it every visit. Other specialties predominantly never took vital signs (Fig. 2).

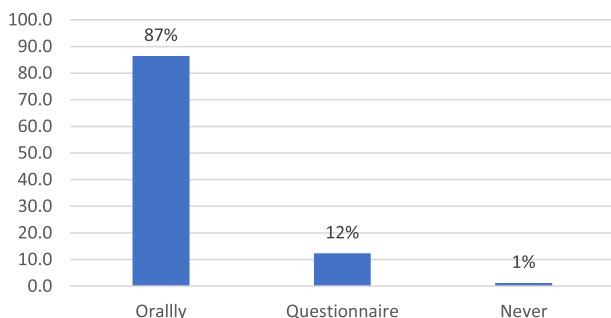


Fig. 1 The percentage of participants who take medical history either orally, using a questionnaire or never take medical history it in the surveyed clinics in Riyadh, Saudi Arabia.

3.2. Staff preparation

All respondents have current basic life support certification and 86% (N: 279) reported they have attended courses in emergency medicine (Periodontists: 93% (N: 13), OMFS: 92% (N: 24), Operative dentist 91% (N: 52), Pedodontist: 91% (N: 30), Orthodontists: 86% (N: 19), GPs:84% (N: 86), Endodontists: 83% (N: 29), Prosthodontists: 81% (N: 25) and preventive Dentists:20% (N: 1)) (Fig. 3).

However, only 77% (N: 250) reported that all their staff have current basic life support certification.

Regarding Dental Clinics, responders reported that 30% (N: 98) did not have emergency contact numbers available and only 22% (N: 72) of clinics have a written emergency protocol clearly posted within the clinic and only 54% (N: 176) have a medical emergency plan with 11% (N: 36) performing periodic office emergency drills (Fig. 4).

3.3. Availability of drug emergency kits

Eighty five percent of respondents (N: 276) reported that they have an emergency drug kit in their clinics but only 55% (N: 179) have checked the emergency drug kit (OMFS: 96% (N: 25), Periodontists: 86% (N: 12), Pedodontist: 76% (N: 25), GPs: 73% (N: 74), Operative dentist: 51% (N: 29), Endodontists: 29% (N: 10), Prosthodontists: 6% (N: 2), Orthodontist: 5% (N: 1) and preventive Dentists:0% (N: 0)) and there were no differences between genders. (Figs. 5 and 6)

Fifty three percent (N:172) reported having Aspirin in their emergency drug kit, which makes it the most available drug. Glucose was available in 40% of the clinics (N: 130), 39% (N: 127) have Nitroglycerin, 39% (N: 127) have Epinephrine, 29% (N: 95) have Bronchodilator, 20% (N: 65) have Antihistamine and only 10% (N:3) have Aromatic Ammonia, which makes it the least available drug (Fig. 7).

3.4. Emergency equipment

Eighty-six percent of clinics (N: 280) have Sphygmomanometer, 41% (N: 133) have Oxygen cylinder, 41% (N: 133) have Stethoscopes, only 15% (N: 49) have bag valve mask, 14% (N: 46) have AED, 14% (N: 46) have Oropharyngeal airway, 10% (N: 3) have an Oxygen delivery device and only 2% (N: 6) have Magill forceps, which makes it the least available emergency equipment (Fig. 8).

4. Discussion

Medical emergency is defined as “serious and unexpected situation involving illness or injury and requiring immediate action”. The incidence of a serious medical emergency in the dental clinic is somewhat rare but they can and do occur (Müller et al., 2008). The present study assessed the preparedness of the dental settings, including staff, to optimally manage the medical emergency if it arises.

In a study done in eastern region of Saudi Arabia, almost 67% of dentists reported that they have encountered medical emergency in their clinics during the past 3 years, with vasovagal syncope the most common emergency (Haas, 2006). However, in the past few years, in different regions of Saudi Arabia,

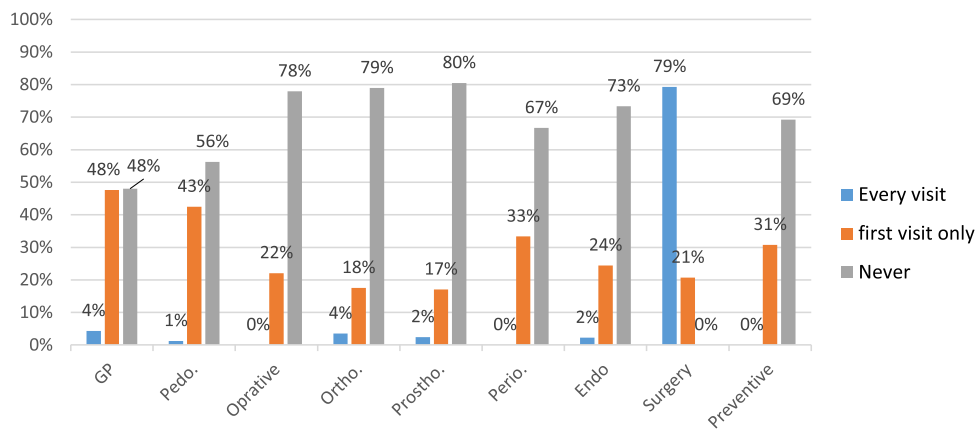


Fig. 2 Cross tabulation of specialty of participants and vital signs taking in the surveyed clinics in Riyadh, Saudi Arabia.

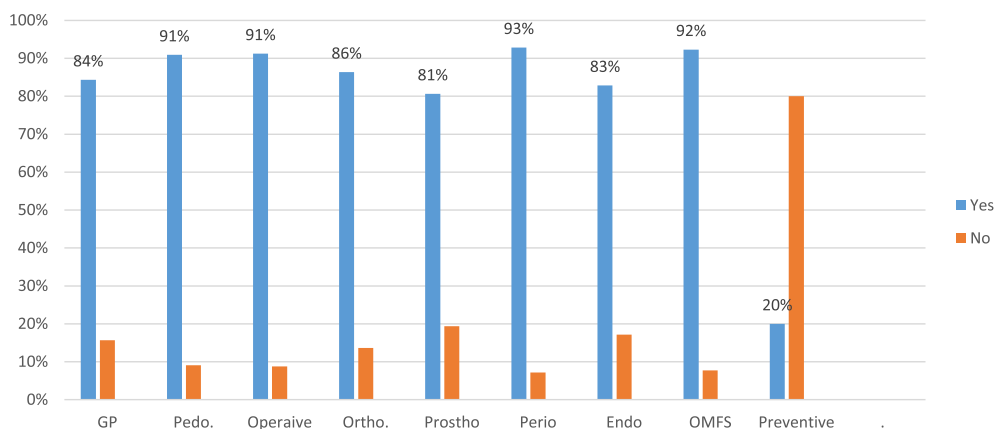


Fig. 3 Cross tabulation of specialty of participants and their attendance to emergency medicine courses in the surveyed clinics in Riyadh, Saudi Arabia.

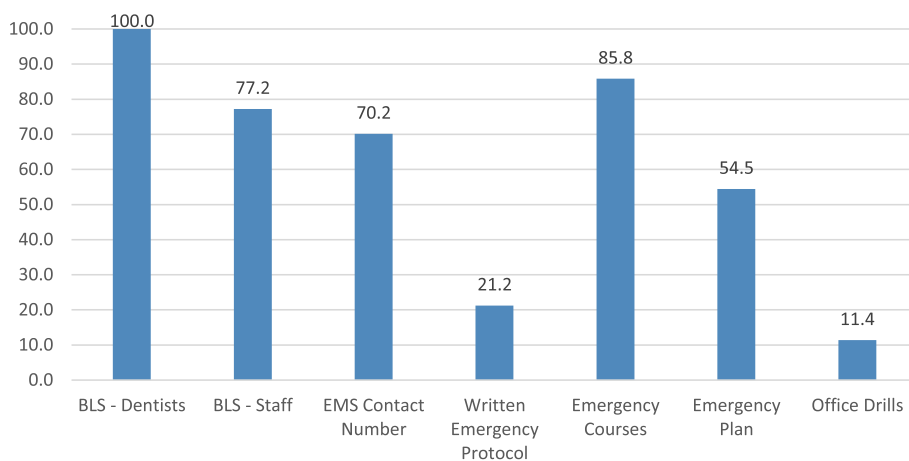


Fig. 4 Dental staff and clinic preparation for medical emergencies in the surveyed clinics in Riyadh, Saudi Arabia.

the death of three cases in the dental office, due to improper dentists' management of the emergencies and lacking of ideal clinic preparation, were reported in the media (Alamer, 2011; Albarqai, 2015).

A qualified dentist should be alert to any clinical emergency situation and manage it properly (Haas, 2006), starting with preventing the medical emergency from occurrence.

The medical history must be updated every visit. In this study, the majority of dentists reported that they take medical history orally before delivering dental treatment, which is consistent with a study done in Jeddah, Saudi Arabia that reported that 92% of dental offices obtained a thorough medical history prior to treatment (Al-Sebaei et al., 2015).

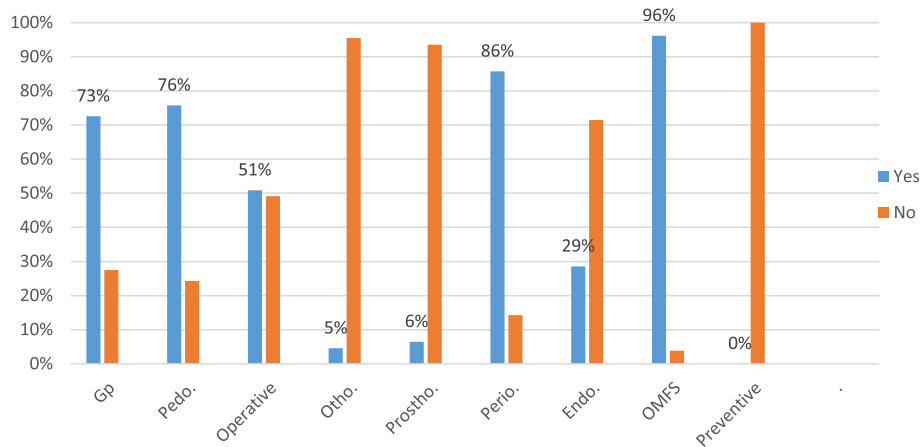


Fig. 5 Cross tabulation of the specialty of participants and emergency drug kit check up in the surveyed clinics in Riyadh, Saudi Arabia.

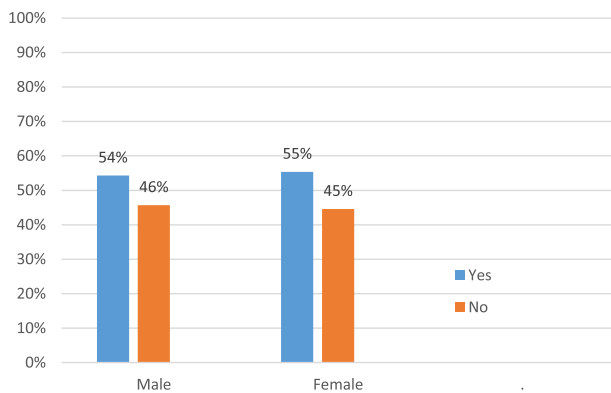


Fig. 6 Cross tabulation of participants' gender and emergency drug kit check up in the surveyed clinics in Riyadh, Saudi Arabia.

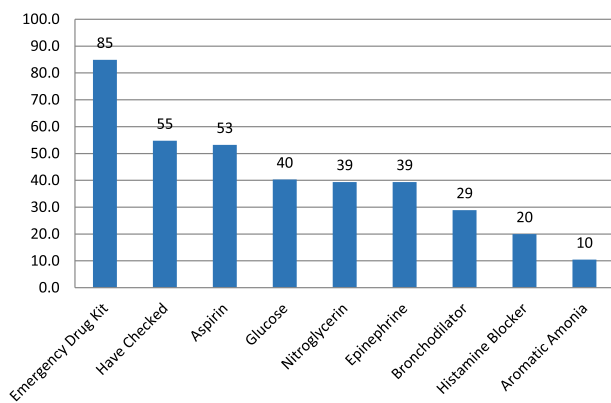


Fig. 7 List of essential emergency drugs and the availability of these drugs in the surveyed dental clinics in Riyadh, Saudi Arabia.

Furthermore, this study revealed that all participating Oral and Maxillofacial surgeons (OMFS) took medical history orally, which could be due to the fact that their treatments are more aggressive and stressful for the patients.

The American Dental Association recommendation is that vital signs should be taken in the first visit for all patient as a base line and taking vital signs every visit for the medically

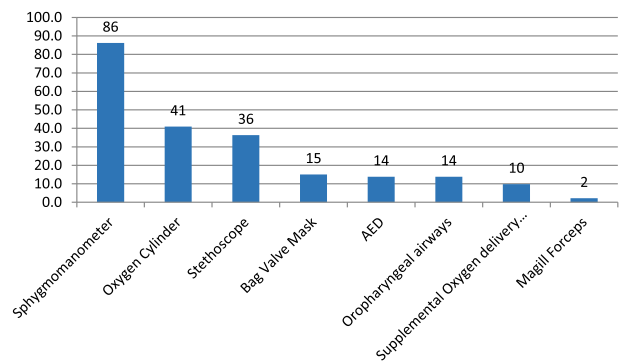


Fig. 8 List of essential emergency equipment and their availability in the surveyed dental clinics in Riyadh, Saudi Arabia.

compromised patients in order to prevent medical complications (Malamed, 2010). However, in this study, only a minority of dentists took vital signs during the first visit, the majority of whom were Oral and Maxillofacial surgeons. Although this finding is in violation of the recommendations, it corresponds to a study done in India showed that 38.4% participants recorded the vital signs of patients before commencing any treatment (KumarSwami et al., 2015).

For the preparedness of the dental office, the following must be checked: All Staff members should be trained and updated in CPR, in this study, all participating dentists reported that they are having current basic life support certification, which is a satisfying number in accordance with the regulations of the Saudi Commission for Health specialties. This is not an international finding as a study done in Brazil revealed that 59.6 percent (n = 297) of the respondents had undergone CPR training.

Only a minority of clinics in this study perform periodic office emergency drills, which coincides with a study done by (Al-Sebaei et al., 2015) in Jeddah, Saudi Arabia, that reported that 12.9% of the respondents reported performing periodic office (mock) drills for medical emergencies. This is an alarming finding that should be taken seriously by health authorities.

The contact number of Saudi Red Crescent Authority (SRCA) should be known by all the dental team, it is worth noting that almost a third of the studied clinics did not have that available in their clinics. This is yet another alarming find-

ing, especially that 40% of the surveyed dentists reported that they don't know what number to dial in case of an emergency. It is worth noting here that there is an application called 'Asefni' developed by the SRCA offered for the smart phones and it enables the user to report any emergency incident easily, which could be of great help to dental clinics.

The most available drug in participating clinics was Aspirin (in half the study sample), which is more than what Alhamad et al. found (29%) (Alhamad et al., 2015). The effect of the Aspirin during an acute myocardial infarction is to inhibit the progression from cardiac ischemia to injury to infarction, Aspirin also lessens the overall mortality from acute myocardial infarction (Haas, 2006).

Regarding the emergency equipment, the majority of clinics have phygmanometer, which is a blood pressure gauge, this could be due to the high prevalence of hypertension in Saudi Arabia, conversely, a study done in the western region of Saudi Arabia reported that only 22.9% have Sphygmomanometer in their clinics (Al-Nozha et al., 2007; Al-Sebaei et al., 2015).

Although 64% (N:208) of clinics reported having oxygen cylinders, after filling the questionnaire by the dentist, the equipment was checked and only 41% (N: 133) of clinics had working and filled Oxygen cylinder, which is less than what was found in Jeddah, Saudi Arabia (Le et al., 2009). This violation of the health and safety should be recognized by health authorities especially that oxygen is used to manage nearly all the medical emergencies except hyperventilation (Alhamad et al., 2015).

Similar studies done in Brazil, India, Nigeria concluded that the preparedness of the surveyed clinics and the dental team to manage medical emergencies situations are unsatisfactory, in accordance of this study (Arsati et al., 2010; Gbotolorun et al., 2012; Kumarswami et al., 2015).

Due to the cross-sectional design of this research, not all dental clinics in Riyadh were assessed, the sample was representative to the city of Riyadh, but results may differ in other cities, which limits the generalizability of the findings.

5. Conclusion

Preparedness of dental clinics in Riyadh, Saudi Arabia is insufficient. There should be more care towards medical emergency management, starting from teaching undergraduate students the basic knowledge of medical emergency as an integral course. There should be a mandatory periodic lectures given to the dentists after graduation, and lastly, the clinic must be prepared optimally to handle all the emergencies and there should be a stricter monitoring of the clinics by the health authorities to make sure they are equipped flawlessly.

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Conflict of interest and sources of funding

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