

Research Article

**Availability of Emergency Drugs and Equipment in Specialist
Dental Settings in Tabriz, Iran**

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ABSTRACT

Medical emergencies occur in dental practice more frequently and managing these emergencies depends on dentist's knowledge and their access to needed drugs and equipments. This study was performed to determine the availability of Emergency Drugs and Equipment in Specialist Dental Settings in Tabriz, Iran. In this descriptive, cross-sectional study 61 dental specialists were evaluated. The data collection was performed with a questionnaire requesting information on demographic information (age, sex, duration of employment and place of employment), the frequency of emergency incidents, and the availability of drugs and emergency equipment in the office. Data was analyzed using descriptive statistical methods and SPSS.21 software. 61 questionnaires were distributed and all of them returned. 70.5% of participants were men. Suction, syringes, oxygen system were Most emergency supplies and lidocaine, oxygen and epinephrine were most drugs were available in office. Only 36.1% of assistants had passed the necessary training courses. 55.7% of the participants were faced with an emergency accident in the last three months. All participants agreed to hold refresher courses. Totally, Emergency equipment and drug in dental office was Unfavorable.

Keywords: Emergency equipment, Dental office, Emergency drugs, Dental specialists

INTRODUCTION:

Medical emergencies can occur more frequently in dental practice and can be alarming to any clinician but these situations are less worrying if proper preparations has been made (1). Syncope (fainting) is the most commonly reported emergency and accounting for at least half of all medical emergencies (2). Other frequently reported emergencies include hypoglycemia, angina, seizures, choking, asthma, and swallowing of foreign bodies (2,3). Fortunately,

serious medical emergencies in dental practice are not common but they are all the more worrying when they happen (4). As reported by the European resuscitation council, sudden cardiac arrest is a principal cause of death in Europe, affecting about 700,000 persons a year (5). Therefore, an effective controlling of an emergency condition in the dental office is the dentist's responsibility and every dental setup should be ready to manage all expected medical

emergencies effectively. Such readiness would include awareness and science of the clinician, training of clinical staff and availability of emergency kits in the dental offices (6).

Malamed has categorized emergency drugs into four groups of critical, noncritical, advanced cardiac life support and antidotal drugs and the equipment into two groups of critical and noncritical equipment (7). Consistent with a study done by Chapman et al in Australia, the most available drugs in dental settings were oxygen and adrenaline; and the most available equipment was manual resuscitators (8). In a study made by Atherton et al in Britain, 90% of the dentists had airway aspirator, oxygen and injectable steroid in their emergency kit (9).

In the study by Mehdizadeh et al in Iran, the frequency of drugs and emergency equipment in dental offices were assessed low to moderate. The most common emergency medication in dental offices was epinephrine and the most available equipment was single-use syringe (6).

Given the importance of emergency kits in prevention and treatment of many emergency cases which are life-threatening, as well as limited and incomplete studies in this field in Tabriz, the evaluation of the drugs and emergency equipment of dental specialist offices in different parts of Tabriz (Central, North and South) seems absolutely necessary. Therefore, in this study the prevalence of drugs and emergency equipment of dental specialist offices in Tabriz were evaluated. It is hoped that feedbacks from the results of this study in educational curriculum of Dentistry doctorate help to reduce the rate of morbidity and mortality caused by emergency events in dental offices.

MATERIAL AND METHODS

In this cross-sectional study, target population was all dental specialists working at city of Tabriz in 2016. Since the dental specialist population in Tabriz is a finite population, the ratio estimation for finite population was calculated for 53 sample using $\alpha = 0.05$,

power 80%, $p=0.5$ and variance 10%. To increase the level of significance, the 61 dental specialists were selected randomly. The investigator explained the purpose of the study to the participants. The data collection was performed with a questionnaire requesting information on demographic information (age, sex, duration of employment and place of employment), the frequency of emergency incidents, and the availability of drugs and emergency equipment in the office. Interview timing was arranged with the approval of the relevant dentist and their name maintained confidential. The data from the study was analyzed using descriptive statistics (mean, standard deviation, frequency - percent) and software SPSS version 21.

RESULTS

All the 61 questionnaires were correctly completed and returned. The participants consisted of 18 women (29.5%) and 43 men (70.5%). Only 22 dental specialists (36.1%) had assistants who acquired the necessary training. Medical history inquiry of the patients at the first visit in 45 cases (73.8) was through questionnaires, 3 cases (4.9%) through an assistant and in 13 cases (21.3%) was through oral question. In the event of emergency incidents, 6 specialists (9.8%) managed the situation through referrals of the patient to medical centers, 1 specialist (1.6%) through a secretary and 38 specialists (62.3%) handled the situation personally. There were 16 non-respondents (23.7%) to this question. 55.7% of the participants were faced with an emergency accident in the last three months.

The results showed that the suction and suction bulb, syringes, oxygen cylinder and serum set was available in more than half of the dental offices. But devices and equipment such as surgical blade, cricothyrotomy needle, angiocath, laryngoscope and blades, oropharyngeal airway, ambu bag, tourniquet, mask and positive pressure ventilation, AED and Magill Intubation Forceps were available in less than 30% of the specialists'

offices. Lidocaine, oxygen, epinephrine, saline and glucose solution and nitroglycerin were the most available drugs in the specialists' offices. In

addition, the most frequent drugs that have been used in the past three months were as follow: oxygen, lidocaine and epinephrine.

Table1. The frequency of emergency equipment in dental specialists' offices in Tabriz

		Available in the office	Unavailable in the office
Suction and Suction bulb	Number (N) Percent %	51 83.6%	10 16.4%
Syringes	Number (N) Percent %	41 67.2%	20 32.8%
Oxygen Cylinder	Number (N) Percent %	38 62.3%	23 37.7%
Serum set	Number (N) Percent %	36 59%	25 41%
Surgical blade with cricothyrotomy needle	Number (N) Percent %	21 34.4%	40 65.6%
angiocath	Number (N) Percent %	14 23%	47 77%
laryngoscope and blades	Number (N) Percent %	13 21.3%	48 78.7%
oropharyngeal airway	Number (N) Percent %	12 19.7%	49 80.3%
ambu bag	Number (N) Percent %	11 18%	50 82%
tourniquet	Number (N) Percent %	10 16.4%	51 83.6%
mask and positive pressure ventilation	Number (N) Percent %	10 16.4%	51 83.6%
Magill Intubation Forceps	Number (N) Percent %	3 4.9%	58 95.1%
AED	Number (N) Percent %	1 1.6%	60 98.4%

Table 2. The frequency of emergency drugs and their use in dental specialists 'offices in Tabriz

		Available in the office	Unavailable in the office	Number of application during last three months
Lidocaine	Number (N) Percent (P)	47 77%	14 23%	8 13.1%
Oxygen	N P	46 75.4%	15 24.6%	9 14.8%
Epinephrine	N P	44 72.1%	17 27.9%	5 8.2%
Saline solution	N P	41 67.2%	20 32.8%	2 3.3
Glucose solution	N P	37 60.7%	24 39.3%	4 6.6
Nitroglycerin	N P	33 54.1%	28 45.9%	4 6.6%
Aspirin	N P	30 49.2%	31 50.8%	1 1.6%
Diazepam or midazolam	N P	28 45.9%	33 54.1%	1 1.6%
Dextrose 50 % or glucagon	N P	27 44.3%	34 55.7%	2 3.3%

Diphenhydramine	N	26	35	0
	P	42.6%	57.4%	0%
Propranolol	N	25	36	2
	P	41%	59%	3.3%
Atropine	N	25	36	2
	P	41%	59%	3.3%
Antihistamines ampoule	N	25	36	1
	P	41%	59%	1.6%
Hydrocortisole sodium succinate	N	20	41	1
	P	32.8%	67.2%	1.6%
Intravenous injectable solution	N	14	47	1
	P	23%	77%	1.6%
Metoclopramide ampoule	N	10	51	0
	P	16.4%	83.6%	0%
Nifedipine	N	10	51	1
	P	16.4%	83.6%	1.6%
Aromatic Ammonia	N	10	51	0
	P	16.4%	83.6%	0%
		Available in the office	Unavailable in the office	Number of application during last three months
Methoxamine/phenylephrine	N	7	54	0
	P	11.5%	88.5%	0%
Albuterol/metaproterenol	N	7	54	0
	P	11.5%	88.5%	0%
Naloxone	N	6	55	0
	P	9.8%	90.2%	0%
Morphine sulfate / meperidine	N	5	56	1
	P	8.2%	91.8%	1.6%

Over half of the participated specialists in this study (34/ 55.7%) have encountered the incidence of emergency orthostatic hypotension within the last three months. Moreover, the specialists have encountered the following emergency incidences as follow: 27 (44.3%) syncope; 9 (14.8%) bleeding; 8 (13.1%) hyperventilation; 6 (9.8%) epilepsy; 5 (8.2%) hypoglycemia; 4 (6.6%) airway obstruction and 1 (1.6%) dysfunction of the thyroid gland. There was no report regarding the occurrence of acute adrenal insufficiency, acute myocardial infarction and brain stroke. All participants in the study (100%) agreed on holding continuing education and practical training courses regarding the management and control of emergency incidents.

DISCUSSION

A large number of people are being subjected to dental care every day. Stress among services recipients, high number of referrals by elderly people, as well as chronic diseases including

heart disease, respiratory diseases, stroke and seizures increases the need for medical emergency preparedness (6). Hence, this study aimed to investigate the frequency of drugs and emergency equipment kits available in dental specialist offices in Tabriz in 1394.

In this study, suction and suction bulb, syringes and oxygen cylinder were the most frequent emergency equipment while the lidocaine, epinephrine and oxygen were the most frequent emergency drugs available in specialists' offices. Moreover, these three drugs were the most common used drugs during past three months. In a study by Hass, it has also been mentioned that oxygen, epinephrine, nitroglycerin, injectable diphenhydramine or chlorpheniramine, albuterol and aspirin should be available in a dental office (10). Dym and colleagues (2008) in their study have reported that the most necessary emergency equipments include a variety of syringes, ambu bag and portable oxygen system while aromatic ammonium, aspirin and nitroglycerin are the

most needed emergency medications (11). Mehdizadeh and colleagues (2013) in a study on general practitioners and specialists in Babol, Iran have shown that epinephrine and single use syringes are the most common emergency drug and equipment available in the dental offices respectively (6). As the emergency equipments are expensive, it might have affected the overall result which causes the number of items and its diversity to be reduced in the emergency kit. Also in this study, about half of the specialists dealt with at least one emergency incident of which the orthostatic hypotension and thyroid disorder had the highest and lowest occurrence respectively. Based on the worldwide studies, the risk of medical emergencies in dental office is between 0.08 to 2.5% and syncope is the most prevalent emergency incident (12-14). In the study conducted by Goodday, incidence rate of dental emergency cases has been estimated 7.5 cases per dentist during a 10-year period. (14). In a study by Jodali et al (2012), syncope and hypoglycemia were the most emergency incident (4). In the study by Atherton et al (9) and Hass et al (2), syncope has been reported the most frequent emergency incident.

In this study, only one third of the specialists' assistants had acquired the necessary training. Most of the specialists evaluated the systemic history of the patients through a questionnaire or oral questions and most of them had personally controlled the patient during an emergency incident. Therefore, it is necessary for dentists to have an accurate and complete knowledge of common emergencies related to their job to be able to save patients' lives by correct determination, fast action and proper use of emergency equipment. Thus, it is important to update dentists' information while planners and education authorities need to implement proper actions to improve knowledge of experienced dentists and to prevent unpleasant incidents. Besides, the educational programs regarding the necessity of emergency equipment and their

proper use at the time of emergency incident seems essential.

Moreover, all the specialist in this study agreed on holding continuing education and practical courses related to the emergency management. It can be concluded from this fact that these people feel they have limited knowledge of how to deal with medical emergencies. Chapman and colleagues in a study have shown that approximately 96 % of the dentists feel they need to learn CPR (8). Atherton et al also reported that most of the dentists need further education in emergency (9).

CONCLUSION

About half of the dental specialist had experienced at least one emergency incident. The orthostatic hypotension and thyroid disorder had occurred with the highest and lowest frequency respectively. Only one-third of specialists' assistants had obtained the required training courses. Most of the specialists had assessed the systemic history of the patients through questionnaires or oral questions and in emergency incidents they had controlled the patient's condition. The most frequent emergency equipment in dental office was as follow: suction and suction head, syringes, oxygen cylinder and serum set while the most frequent available drugs were lidocaine, oxygen and epinephrine. Finally, all participants (dental specialists) agreed on holding the continuing education courses and practical training in emergency management.

REFERENCES :

1. Greenwood M. Medical emergencies in the dental practice. *Periodontology* 2000. 2008;46(1):27-.
2. Haas DA. Management of medical emergencies in the dental office: conditions in each country, the extent of treatment by the dentist. *Anesthesia progress*. 2006;53(1):20-4.
3. Müller M, Hänsel M, Stehr S, Weber S, Koch T. A state-wide survey of medical emergency

- management in dental practices: incidence of emergencies and training experience. *Emergency Medicine Journal*. 2008;25(5):296-300.
4. Jodalli PS, Ankola AV. Evaluation of knowledge, experience and perceptions about medical emergencies amongst dental graduates (Interns) of Belgaum City, India. *J Clin Exp Dent*. 2012;4(1):14-8.
 5. Laurent F, Augustin P, Nabet C, Ackers S, Zamaroczy D, Maman L. Managing a cardiac arrest: evaluation of final-year predoctoral dental students. *Journal of dental education*. 2009;73(2):211-7.
 6. Mehdizadeh M, Nosrati K, Hamzeh M. Availability of emergency drugs and equipment in general and specialist dental settings in babol, iran. *The journal of contemporary dental practice*. 2013;15(6):677-80.
 7. Malamed S. *Medical emergencies in the dental office*. 5th ed. Mosby Elsevier. St Louis, Missouri; 2007:59-104.
 8. Chapman P. *Medical emergencies in dental practice and choice of emergency drugs and equipment: a survey of Australian dentists*. *Australian dental journal*. 1997;42(2):103-8.
 9. Atherton G, McCaul J, Williams S. Medical emergencies in general dental practice in Great Britain. Part 1: Their prevalence over a 10-year period. *Br Dent J*. 1999;186(2):72-9.
 10. Haas DA. Emergency drugs. *Dental Clinics of North America*. 2002;46(4):815-30.
 11. Dym H. Preparing the dental office for medical emergencies. *Dental Clinics of North America*. 2008;52(3):605-8.
 12. D'Eramo EM, Bookless SJ, Howard JB. Adverse events with outpatient anesthesia in Massachusetts. *Journal of oral and maxillofacial surgery*. 2003;61(7):793-800.
 13. Gonzaga HFdS, Buso L, Jorge MA, Gonzaga LHdS, Chaves MD, Almeida OPd. Evaluation of knowledge and experience of dentists of São Paulo State, Brazil about cardiopulmonary resuscitation. *Brazilian dental journal*. 2003;14(3):220-2.
 14. Goodday RH. Preparing for medical emergencies in the dental office. *J Can Dent Assoc*. 1999;65:284-6.