Knowledge and Attitude of General Dentists Regarding Common Emergencies in Dental Offices: A Cross-sectional Study in Shiraz, Iran

Abstract

Background: Medical emergencies are likely to occur in dental offices due to the use of anesthetics, anxiety, and systemic complications of the patient. Since such emergencies are life threatening in many cases, preparedness of the dentist is highly required. Aims: This study was carried out to evaluate the dentists’ knowledge and attitude regarding diagnosis and treatment of medical emergencies in dental offices in Shiraz, Iran. Methods: This cross-sectional study was performed on 150 general dentists in Shiraz with at least 5 years since graduation in 2015. They were asked to complete a validated questionnaire including the dentists’ demographic information and inquiries about their performance and knowledge in emergency situations. Statistical Analysis Used: Independent t-test, one-way ANOVA, and Pearson’s correlation coefficient were used in this study. Results: According to the inclusion criteria, 105 dentists participated in the study. The mean knowledge and attitude of the dentists was estimated 4.98 (±1.50) out of 10. No significant correlation was detected between age, sex, number of patients per day, and working hours with the knowledge of managing an emergency situation (P > 0.05). Out of the number of studied dentists, 49% had attended training workshops and 90% called for re-attending a workshop. The knowledge score of those who had participated in workshops was significantly higher than those who had not (P = 0.016). Conclusion: The results of this study revealed that the dentists’ knowledge about emergency situations was average while the knowledge was higher in those who had attended emergency workshops. Thus, retraining courses and workshops must be considered more often for graduated dentists.

Keywords: Dental office, dentists, emergencies, knowledge

Introduction

Dental therapeutic interventions such as local anesthesia in addition to the stress caused by dental treatment can result in clinical signs, various emergencies, or exacerbated systematic disease in patients.[1] Based on the study conducted by Malamed, the most frequent emergencies before, during, and right after the treatment include hyperventilation, convulsion, and hypoglycemia, followed by vasovagal syncope, angina pectoris, hypotension, hypersensitivity reactions, and adverse drug reactions.[2,3]

Dentists must be aware of the signs and complications of the frequent emergencies as well as the effects and interactions of various drugs.[3,4] Despite being uncommon, if occurred, they are dangerous and life threatening in some cases.[4] Many can be managed by simple strategies such as placing the patient in the supine position or by administering oxygen and glucose solutions.[5] However, accurate diagnosis of more complex cases requires adequate knowledge; particularly now that the increasing number of elderly people, prevalence of systematic diseases, as well as increased drug consumption have raised occurrence of emergencies in dental offices.[3,7,8]

Dentists can prevent medical emergencies up to almost 90% by taking history, careful examination, and sometimes altering the treatment methods.[7,9] As health-care providers, they should be prepared to diagnose and effectively manage medical emergencies in dental offices. How to deal with such emergencies, the treatment and patient care depends highly on the dentists’ knowledge and preparation.[10]

The emergency kit in a dental office must include drugs (diazepam, diphenhydramine, oxygen, nitroglycerin, etc.) and tools (suction, suction tips, tourniquet, surgical

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How to cite this article: Azad A, Talatoff Z, Deilami Z, Zahed M, Karimi A. Knowledge and attitude of general dentists regarding common emergencies in dental offices: A cross-sectional study in Shiraz, Iran. Indian J Dent Res 2018;29:551-5.
blades, angiocath, etc.). The above-mentioned drugs and equipment are necessary in controlling threatening emergencies and must be available in a dental office.\[7,9,11\]

Despite the great importance of this issue, there are limited local studies on the general dentists’ knowledge about the emergencies, the results of which indicate the dentists’ knowledge to be insufficient in this matter.\[7,8,10,12\] Hence, it seems that training for medical emergencies needs to be emphasized.\[7,13\] It is beneficial to evaluate the dentists’ knowledge and performance in regard to dental emergencies in specific geographical regions so that it could be compensated for through academic teaching methods and holding workshops.\[14,15\]

Therefore, the current study was conducted to evaluate the general knowledge of dentists of Shiraz, Iran, in encountering common emergencies so that in case of knowledge insufficiency, they would be provided with recommendations to raise their emergency management knowledge. To the best of our knowledge, this is the first study regarding this issue in general practitioners after at least 5 years of graduation.

**Methods**

The population in this cross-sectional analytical study were the general dentists with a private dental office in Shiraz, Iran, with at least 5 years since graduation in the year 2015, who were selected through census and sampling. Dentists that had attended a fellowship on common emergencies in the past year and the ones who refused to complete the questionnaire were excluded from the study.

Data collection tool was a questionnaire prepared based on articles and reference books. To determine the validity through validity index, nine oral medicine specialists were asked to judge the relevance of the content of the questionnaire with the aim of the study. To determine the reliability using Cronbach’s alpha, the questionnaire was handed to 15 general dentists with a time interval of 2 weeks; the reliability was calculated to be 74%, confirming the questionnaire to be reliable.

The questionnaire consisted of two sections, the first of which included demographic information (age, sex, college from which they were graduated, etc.). The second part included 19 questions regarding the dentists’ knowledge and attitude about medical emergencies in the office. Completing the questionnaire was optional and no name or medical council code was required.

In the section of knowledge and attitude-related questions, cases representing various emergency situations such as hypoglycemic shock, syncope, hyperventilation, orthostatic hypotension, pregnant patients, thyroid storm, adrenal crisis, angina pectoris, faint, and also knowledge about drugs used in emergencies and emergency equipments in the dental office were presented in a four-answer question. Each correct answer had 1 point, and incorrect answers or those left unanswered had 0 point. The minimum and maximum scores that could be obtained were, respectively, 0 and 10. Accordingly, scores ≥7 were considered as good, 4–6 moderate, and ≤3 as poor.

The obtained data were analyzed using the Statistical Package for the Social Sciences (SPSS Inc.; Chicago, IL, USA), version 18. The quantitative data were demonstrated as mean (± standard deviation [SD]) and qualitative data as percent. Spearman’s correlation coefficient was used to assess the relation between the quantitative variables such as age and experience with the knowledge rate. The relationship between the qualitative data such as gender and having or not having attended the workshop was calculated using independent Student’s t-test.

**Results**

In this study, 150 dentists were randomly selected from the numbers existent in the Shiraz branch of Medical (dental) Council. After contacting the dentists, the questionnaires were handed to 105 dentists who were practicing in their office at the time of the survey and were willing to cooperate. After filling the questionnaire, five were excluded because of unreliable answers. Out of 100 participants, 50% were men (n = 50) and 50% were women (n = 50) aged 30–61 with the mean ± SD age of 38.8 ± 8.6.

The maximum and minimum patients visited per day were, respectively, 30 and 2, with the mean of 8.32. The least daily work hours were 3 h, and the most was 14, with the mean of 6.86.

The most frequent drugs available in the offices were oxygen, saline solution, and nitroglycerin. Moreover, suction, suction tips, and surgical blades were the most frequently available tools in the clinics.

Nine out of 100 dentists had encountered medical emergencies in their dental office during the last year (9%), the most and least prevalent of which were orthostatic hypotension and thyroid storm, respectively.

With respect to the questions related to attending medical emergency retraining classes, 81 had taken additional courses of medical emergencies in college years and 49 of the respondents had participated in short courses of medical emergencies or retraining workshops after graduation from college. Yet, 90 dentists showed interest in retraining, regardless of past attendance in medical courses and workshops.

Fifty-nine percent of the dentist had confidence in injecting an intravascular drug in the office and 75% were confident in intramuscular injections.

According to Figure 1, most of the dentists had a moderate knowledge and attitude score for common medical emergencies. The mean (±SD) rate knowledge
and attitude score was calculated to be 4.97 (±1.50). The highest rate of knowledge was about the swelling of the lips or angioneurotic edema, accompanied by acute distress due to injection of anesthetics (88%). After that, adrenal crisis, pregnancy complication, orthostatic hypotension due to hypertensive drugs, angina pectoris, hyperventilation, thyroid storm, seizure, and hypoglycemia had the most rate of knowledge respectively. The dentists evaluated had the lowest knowledge about fainting after anesthesia injection which results in cold sweating, feeling hot, and pale skin, followed by dizziness and weakness (14%) [Figure 2].

No significant relationship was detected between the level of knowledge and the years since graduation ($P = 0.416, r = 0.082$).

Tables 1 and 2 represent the dentists’ mean knowledge based on age, sex, having attended workshops, need for retraining, and the number of patients visited per day and work hours.

Spearman’s test and $t$-test revealed that the relationship between the mean knowledge score and age and sex to be insignificant ($P > 0.05$). Furthermore, no significant relation was detected between the participants’ knowledge and the average number of patients visited per day and mean work hours per day ($P > 0.05$) [Table 1].

On the contrary, the relationship between knowledge/attitude and participating in workshops was significant ($P = 0.016$), i.e., the score of those who had participated in workshops (5.33 ± 1.37) was significantly higher than those who had not (4.63 ± 1.47). The relation was not significant between the knowledge/attitude rate and the desire for retraining ($P = 0.401$) although the group interested in retraining had a higher score of knowledge [Table 2].

Discussion

Medical emergency rarely occurs in the dental office; however, the experience can be bitter and upsetting if the dentist is unprepared since it can jeopardize the patient’s life in many cases. Although no precise statistic is in hand about the casualties of such incidences in Iran, the excessive importance of this issue, as reported by previous studies, indicates that dentists are better to be adequately informed and prepared in advance.

In this study, the rate of knowledge and emergency drugs and equipment preparedness of 72% of the general dentists of Shiraz was moderate in encountering medical emergency in the dental office. An alarming situation of the capability of dentists in dealing with emergency conditions is announced recently.[7] In 2015, Narayan et al.[10] analyzed dental interns and postgraduate students’ knowledge with the similar results, and Khorasani et al.[15] evaluated a group of dental students who also had an average rate of knowledge. They concluded that training courses and revision of the curriculum units are required.[15] The knowledge rate of dental graduates of Belgaum city of India was announced as superficial in another study, and the confidence in using the emergency kit equipment and drugs was low in this group.[13] This is also seen in other

Table 1: Pearson’s correlation coefficient among the knowledge rate based on different variables

| Variable | Correlation coefficient ($r$) | $P$ |
|----------|------------------------------|-----|
| Age      | +0.020                       | 0.844 |
| Patients visited per day | -0.077 | 0.448 |
| Work hours per day         | 0.030                         | 0.768 |

Table 2: Comparing the rate of knowledge based on sex, having attended workshops, and desire for retraining

| Variables | Mean knowledge scores±SD | $P$ |
|-----------|--------------------------|-----|
| Sex       |                          |     |
| Men       | 5.0800±1.46              | 0.454 |
| Women     | 4.8600±1.45              |     |
| Having attended workshops | |     |
| Yes       | 5.3265±1.37              | 0.016 |
| No        | 4.6275±1.34              |     |
| Desire for retraining | |     |
| Yes       | 5.0111±1.47              | 0.401 |
| No        | 4.6000±1.34              |     |

SD=Standard deviation

Figure 1: Knowledge and attitude scores of the dentists

Figure 2: The percentage of dentists with correct answers for each of the defined cases
reports which found that less than one-quarter of the respondents acquired acceptable scores for attitude and practice.[4] This lack of knowledge is also seen in Kerman, Iran, dentists.[12] The only group of dentists studied in literature with awareness of medical emergency conditions was the oral and maxillofacial surgeons.[16] Emergencies occur in dental clinics mostly while performing surgeries and extractions. General dentists are also confronted with such situations as much as surgeons. This shows that the curriculum of postgraduate students of oral and maxillofacial surgery is sufficient in contrast to general students and other postgraduate fields. Moreover, our study evaluates general dentists with at least 5 years since graduation. In addition to studies that emphasize the need for a change in the curriculum, we support the need for mandatory workshops and educational means for graduated dentists.

There are studies that found a positive attitude and confidence in handling any emergency in most of their study population.[7,10] Kumarswami et al. report that “The dentists who were not sure of handling these situations were mainly recent dental graduates who had theoretical knowledge but lacked hands-on experience and required further workshops and training programs.”[7] In addition, most of the participants were unaware about where to go for training.[7]

The dentists of Shiraz had the most knowledge about angioneurotic edema that results from hypersensitivity to anesthetic solutions, but the least knowledge was in regard to fainting after distress due to injections. In contrast to this Khami et al. found that almost 80% of the dentists in Tehran were capable to diagnose a vasovagal syncope but had difficulty in diagnosing and managing hyperventilation and adrenal crisis.[9]

According to the data obtained in our study, most of the respondents were confident in giving various kinds of injections. In other reports, this confidence was as low as 34% for intramuscular and 6.6% for intravenous injections.[7]

In the population of this study, 49% had undertaken a medical emergency training workshop after graduation which is inconsistent with other studies which report a similar rate of 40%–50% by their respondents[8,13] whereas other studies report a low rate of 7.6%.[7] In addition, the relationship between the knowledge rate and attending workshops was significant as found by the present study (P = 0.016). Obviously, those who had taken part in workshops had more knowledge in comparison with those who had not.

In this study, 90% called for retraining courses, and it was in line with the study by Jodalli et al. which revealed that the majority of respondents who were interns of 2 colleges had a desire for further medical emergency trainings.[13]

Based on the studies conducted worldwide, the risk of medical emergency occurrence in dental offices is 0.08–2.5 percent, with syncope being known as the most prevalent.[12,13,15] Furthermore, hyperventilation, convulsion, and hypoglycemia are seen to happen frequently in the dental office.[5] The present study found the occurrence of medical emergencies in dental offices to be 9% over the past year. Furthermore, the most frequent emergency was orthostatic hypotension (85%). It should be considered that a number of dentists might have mistaken syncope for orthostatic hypotension. Furthermore, the difference can be attributed to the dentists’ lack of true understanding of the emergency cases and/or rejecting to treat patients with systematic problems and referring them to medical clinics for further evaluation. This is confirmed by Khami et al. who found that <60% of the participants were knowledgeable about characteristics of hypoglycemic patient, chest pain with cardiac origin, and true cardiopulmonary resuscitation practice.[4]

The current study detected no significant difference between increasing age and rate of knowledge (P = 0.844). Furthermore, no significant correlation was found between work experience and years since graduation and knowledge scores (P = 0.416). Kharsan et al. discovered that awareness was higher among senior and more experienced dental surgeons.[16] On the contrary, a link was found between years since graduation and the systematic decline of a medical history in a new patient which results in less awareness of a complicated situation.[6] The reason for such a result in the present study can be that all age groups of dentists in Shiraz attend the retraining courses equally.

The results of the current study revealed no significant difference between the two sex in terms of knowledge (P = 0.454). This was also confirmed in the studies by Khorasani in 2015 with no significant differences between male and female students’ knowledge and performance scores.[13]

The most frequent emergency equipments in dental offices of Shiraz were suction, suction tips, and surgery blades; the most frequent emergency medications present included oxygen, dextrose-saline serum, and nitroglycerin; it was almost consistent with the study by Gupta et al. who found that the most commonly available emergency drugs in treatment areas were oral glucose and adrenaline.[17] Similar results were obtained in Kumarswami’s study; emergency kits were available with only 24% participants, and the most commonly available emergency drugs in emergency kits were adrenaline, diazepam, oral glucose, ammonia inhalant, and epinephrine.[7] It must be noted that availability of a minimum of emergency equipment and drugs that can be timely used can help manage any unexpected incidence. Moreover, dentists must be educated for the preparedness and use of such kits. Despite the fact that the dentists evaluated in this study had good
knowledge of hypersensitivity reactions, but adrenaline and corticosteroids, the common drugs used in allergic shocks, were not found in most of the offices. This shows that even though there is knowledge of many emergency situations, there is a lack of a protocol which reminds the dentist of the necessary equipments that have to be available in the office. Oxygen, saline solution, and nitroglycerin were found mostly, and this can be due to the first aid kits available generally which address cardiovascular complications. This shows the need to offer a specially prepared kit for dentists in Iran.

It can be concluded that the general dentist of Shiraz with the mean knowledge score of 4.97±1.50 out of 10, need to increase their information, and preparedness by attending training workshops compensated for thorough academic teaching methods. Fortunately, most of the medical emergencies are managed by simple treatments such as placing the patient in a supine position, administering oxygen, and sugar; nonetheless, diagnosing the difficult cases and more precise treatments requires adequate knowledge. Participating in scientific conferences, studying more books, and being more exposed to scientific environment increase the dental specialists’ knowledge undoubtedly. A New Zealand study showed that more than 50% of dentists were dissatisfied with undergraduate teaching for medical emergencies. In addition, in Australia, the medical practitioner is often ill-prepared in the primary management of dental emergencies because of a lack of education in this field of practice. This shows that not just in Shiraz but also in other regions, there is a shortage in the curriculum in regard to education and training principles with medical emergencies and also postgraduate workshops and retraining courses.

Conclusion

In spite of changes in dental curriculums throughout the years, still shortcomings remain in training dentists confronting medical emergencies in a dental office. Emphasis is placed on the need for more medical emergencies training to be offered as workshops or other means, to increase knowledge and confidence of dental graduates in the management of medical emergencies.

Acknowledgment

The authors would like to thank Dr. Mehrdad Vosooghi of the Dental Research Development Center of the School of Dentistry for the statistical analysis. Also this article is based on the thesis by Amir Karimi.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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