

Knowledge of Dental Students and General Dentists about Medical Emergencies

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Objectives Considering the fact that lack of knowledge about medical emergencies is associated with serious consequences for patients, the present study was conducted to compare the knowledge level of dental students and general dentists about medical emergencies.

Methods This descriptive cross-sectional study was performed on senior dental students of Babol University of Medical Sciences in the academic year 2014-2015 and dentists practicing in Babol city. Data were collected by a questionnaire, which included questions regarding the demographic information of participants, their educational experience in this field, and knowledge level. Data were analyzed by t-test, Chi-square test, and Pearson and Spearman's correlation coefficients.

Results Fifty dental students with a mean age of 26.78 years and 50 dentists with a mean age of 37.36 years were evaluated. The mean experience of dentists was 7.46 years. Totally, 11 students (22%) and 39 dentists (48%) had encountered medical emergencies in the past year. Of all, 16 students (32%) and 12 dentists (24%) had received the necessary training in their university. The mean knowledge score was statistically similar in both groups (5.46 ± 1.07 and 5.76 ± 1.30 in students and dentists, respectively; $P=0.2$). The level of knowledge of 48% of dental students and 44% of dentists was poor; 8% of dentists had very good knowledge level.

Conclusion The knowledge of dentists and senior dental students of Babol regarding medical emergencies was similar and generally not satisfactory.

Keywords Students, Dental; Dentists; Emergency Medical Services; Knowledge

Introduction

Dentistry is a healthcare profession that is related to people's health. Moreover, medical emergencies often occur in dental offices, and poor knowledge of dental professionals in this respect can have unpleasant consequences.¹ In the recent years, significant progress has been made in dental profession and especially in management of medical emergencies in the dental office. Medical emergencies threaten the dental profession, and their frequency has increased in the recent years. The factors responsible for the increase in medical emergencies in dental offices include aging of the population, complexity of some novel therapeutic procedures, lengthy treatment sessions, high level of anxiety of most patients, increased prescription of drugs, and negligence of some dentists.²⁻⁴

General dentists should be aware of the symptoms, signs, diagnoses, and treatment of medical emergencies in patients.⁵ On the other hand, with the increased number of the elderly, dental treatments, prescription of topical anesthetics, and stress of dental work can cause clinical signs and symptoms, and lead to various emergencies in patients or even cause exacerbation of their systemic disease. Thus, dentists should have sufficient knowledge about the pathophysiology of diseases, effects of different

medications, and complex mechanisms of the human body. Also, they should be able to make a correct diagnosis, come up with an efficient treatment plan, and precisely monitor the emergency cases.³ As the medical conditions and dental services change, the importance of educating dentists regarding medical emergencies becomes more prominent.⁶ Advanced cardiovascular life support in life-threatening situations is perceived as a basic skill for dental professionals because prevention of medical emergencies is the most basic way to control and decrease their frequency, which can be done by checking the patients' health status before the onset of dental treatment. This can be done by taking a medical history from patient, physical examination, and an oral interview.⁷ Equipment, skills, and being prepared for medical emergencies are the second important factors in management of medical emergencies, after prevention.⁸ Since the safety of patients is the most important factor in any medical and dental procedure, adequate knowledge about the management of medical emergencies is imperative. Despite the significance of medical emergencies, it seems that the level of knowledge of dentists and dental students is not satisfactory in this respect. For example, in a study conducted in Brazil⁹, 41 (58%) students had never received basic life support training. In a study conducted in Croatia⁵, a high proportion (81.3%) of general dentists had never received any basic

life support training during their undergraduate training. De Bedout et al. in India¹⁰, and Hashemipour et al. and Mollashahi et al. in Iran reported similar results.^{11, 12} Similar studies on dentists have been done but no comparison has been made between dentists and students.^{11, 13, 14}

Dental students participate in a workshop on management of medical emergencies in the third year of their dental curriculum. In this study, we assessed the knowledge level of dentists and dental students about medical emergencies. If the level of knowledge of dental students is found to be higher than that of dentists, it would indicate that after graduation, dentists gradually forget this information; therefore, they should participate in continuing education courses to refresh and update their knowledge in this respect. However, if the level of knowledge of dentists is found to be higher than that of dental students, it would show that the educational content in this respect is not sufficient in the dental curriculum; thus, the educational curriculum should be revised. The superiority of our study over other similar studies was that we compared the level of knowledge of oral hygienists and qualifying students (those who had graduated abroad and had to pass some credits in Iran in order to acquire their license) about medical emergencies with other dental students and dentists.

Methods and Materials

This descriptive cross-sectional study was performed at the Department of Oral and Maxillofacial Surgery in the academic year 2014-2015 on dental students of Babol University of Medical Sciences who had passed 10 semesters successfully and on dentists who had 5 to 15 years of clinical experience. After obtaining ethical approval from Babol University of Medical Sciences (MUBABOL.REC.1394.138 2015-9-8), a complete enumeration method was applied for sampling. The number of senior dental students was 53, and 50 dentists were randomly selected from the list of practicing dentists in Babol acquired from the Medical Council. Not answering the questions was considered as an exclusion criterion. A questionnaire with confirmed reliability (Cronbach's alpha coefficient of 76%) and validity (0.7 to 0.95) was used for data collection.¹⁰⁻¹³ The questionnaire consisted of three parts: the first part included questions relating to personal information, which included students' or dentists' age, gender, time of university admission, time of graduation, and type of university entrance. The second part consisted of eight yes/no questions about the educational courses and capabilities; the third part included 11 multiple-choice questions about various subjects of medical emergencies such as hypoglycemic shock, syncope, hyperventilation, orthostatic hypotension, pregnancy, thyroid storm, adrenal crisis, angina pectoris, and fainting. In question #11, the participants were asked which medication from the list is the least available in their office. Also in this section, the participants were asked about the available medications and

equipment in their office in the form of a table. The minimum and maximum scores that could be obtained were 0 and 10, respectively. The questionnaires were distributed among the students and collected after completion. For dentists, they were visited at their office by appointment, and were requested to fill out the questionnaire. One score was given to every correct answer, and 0 score was given to incorrect or no answers. The total knowledge score was calculated and classified as follows: Less than 5 = poor, 6 = average, 7 = good, 8 and higher = very good (12). The collected data were analyzed using SPSS version 18, via t-test and Chi-square test. The significance level was $P < 0.05$.

Results

The questionnaires were administered among 53 students; three questionnaires were not returned. The mean age of the participating students was 26.78 ± 5.07 years. There were 17 males (34%) and 33 females (66%). Of all, 38 students (76%) had been accepted to the university by passing The Iranian University Entrance Exam; there were 9 (18 %) qualifying students and 3 of them used to be oral hygienists (6%). Also, 50 dentists with a mean age of 37.36 ± 3.13 years participated in this study. The number of male dentists was 26 (52%), and 24 (48%) were females. Their mean working hours was 7.02 ± 0.97 h per day. The mean number of patients visited per day was 9.34 ± 2.27 .

Table 1 compares the history of previous training of participants, their self-declaration regarding their needs, and the rate of systemic conditions of patients. Almost half of the participants had not participated in any medical emergency course. Also, there was no statistically significant difference between dentists and dental students in this regard. In both groups, most of the participants claimed that they had received no such training in the university. Almost all of the participants declared that they needed training in this regard. The number of dentists who had encountered emergency situations was significantly higher than the number of dental students ($P=0.006$). Almost half of the dentists had dealt with emergency cases in the past year. Almost all of the participants reported asking questions about the systemic conditions of patients before starting the treatment. In those who had encountered an emergency, the most commonly encountered medical emergencies were vasovagal syncope in 27 (48.2%) cases, followed by orthostatic hypotension in 15 (26.8%), foreign body aspiration, hyperventilation, hypoglycemia and thyroid storm in a total of 8 (14.3%), and asthma and allergic reactions in 6 (10.7%) cases. The mean score of participating students who had passed the Iranian University Entrance Exam was 5.36 ± 1.02 . This value was 5.75 ± 1.21 in postgraduates + oral hygienists and 5.76 ± 1.30 in dentists ($P=0.29$).

Of 100 participants, 35 (24 dentists and 11 dental students) had encountered medical emergencies in the past year. The most common medical emergencies encountered were

vasovagal syncope in 27 (48.2%) cases, followed by orthostatic hypotension in 15 (26.8%).

Table 1- Comparison of the participants' work experience and educational courses

Question	Students	Dentists	P value
Participation in medical emergency courses and workshops	Yes	18 (36%)	0.3
	No	32 (64%)	
Training in the university	Yes	16 (32%)	0.37
	No	34 (68%)	
Need for further training	Yes	47 (94%)	0.18
	No	3 (6%)	
Dealing with emergency cases during the past year	Yes	11 (22%)	0.006
	No	39 (78%)	
Question about patients' systemic conditions	Yes	50 (100%)	0.15
	No	0	

Table 2 compares the participants' knowledge level about medical emergencies. Medical emergency knowledge of both groups was the same and generally insufficient (P=0.14). According to Table 2, almost half of the participants in both groups had a poor knowledge level in

this respect. Although there was no significant difference between the knowledge level of dentists and dental students, no student achieved a very good level, while 8% of dentists had good knowledge level.

Table 2- Comparison of the participants' knowledge level about medical emergencies

Knowledge level	Students Frequency (%)	Dentists Frequency (%)	P-value
Poor	24 (48%)	22 (44%)	0.14
Average	18 (36%)	13 (26%)	
Good	8 (16%)	11 (22%)	
very good	0	4 (8%)	

Assessment of each question individually revealed no significant difference between the two groups. The highest frequency of correct answers was related to hyperventilation [45 dental students (90%) and 49 dentists (98%)] and orthostatic hypertension [42 dental students (84%) and 40 dentists (80%)]. The highest frequency of incorrect answers was related to the field of pregnancy emergencies [40 dental students (80%) and 45 dentists (90%)] and angioedema [36 dental students (72%) and 37 dentists (74%)].

The mean knowledge level of dentists was 5.746 ± 1.30 ; while, the mean knowledge level of dental students who were admitted by passing the Iranian University Entrance Exam was 5.36 ± 1.02 . The mean knowledge level of other dental students admitted by other ways including qualified students and oral hygienists was 5.75 ± 1.21 . Comparison of the level of knowledge of these three groups (Table 3) revealed no significant difference (P=0.29).

Table 3- Comparison of the knowledge level of dentists and dental students

Variable	Group	Number	Mean± standard deviation	P-value
Students who were accepted through the Iranian University Entrance Exam	Males	11	5.54±0.93	0.50
	Females	27	5.29±1.06	
Other students and oral hygienists	Males	6	5.66±1.03	0.82
	Females	6	5.83±1.47	
Dentists	Males	26	5.76±1.27	0.95
	Females	24	5.75±1.35	

To more closely assess the factors affecting the level of knowledge of dentists, variables such as age, years of clinical experience, working hours per day, and the number of patients visited per day were evaluated. According to the Pearson's correlation coefficient, there was no significant correlation between the level of knowledge of dentists and age (P=0.16, $r=0.202$), years of clinical experience (P=0.17, $r=1.193$), working hours per day (P=0.07, $r=-0.252$) or the number of patients visited per day (P=0.27, $r=0.159$).

Discussion

This study showed that the medical emergency knowledge of dentists and dental students was similar, and generally not satisfactory. As the medical conditions and dental services change, the importance of educating dentists regarding medical emergencies becomes more prominent. Unfortunately, most dental students spend most of their time learning clinical tips and they neglect to learn medical contents related to systemically compromised patients.

Perhaps, the reason for this negligence is selection of healthy patients without systemic conditions in the university clinic. Thus, students graduate without a history of encountering systemically compromised patients. Dentists also avoid treating systemically compromised patients in their offices and clinics and prefer to refer such patients. This process leads to confusion of such patients, and they can hardly find a dentist. The problem becomes more complex when a medical history regarding the underlying disease is not properly taken and leads to emergencies in the dental office. Eventually, the dentists will have problems due to not being able to properly manage such cases.

In our study, only 16% of dental students and 30% of dentists had good and higher level of knowledge. Amirchaghmaghi et al. in Mashhad¹³ and Mollashahi et al. in Zahedan¹¹ conducted similar studies on general dentists and showed that only 5.4% and 3% of the participants had good level of knowledge, respectively. But Babaei et al. in Babol¹⁴ showed that 64% of dentists had moderate to good level of knowledge in this regard. One reason for the differences in the results of various studies may be the qualitative definition of poor to very good. In the present study, score 7 or higher was considered as good and very good. In the study by Mollashahi et al. which was conducted on Zahedan dentists, the scores greater than 8 were considered as good; therefore dentists' knowledge level was lower than the present study.¹¹ Although students pass similar clinical training courses, part of students' knowledge about medical emergencies is related to their previous theoretical courses in former a semester that justifies the difference in the level of students' knowledge from poor to very good. Another reason for different results is the different study populations; for example, in the study by Babaei et al.¹⁴ general dentists and specialists filled out the questionnaires while Amirchaghmaghi et al.¹³ and Mollashahi et al.¹¹ only evaluated general dentists.

Inadequate level of knowledge in our study and similar studies revealed the need to reconsider the educational curricula on this critical topic more than ever. To improve the results, the courses on this topic should be improved. Although there was no significant difference in the knowledge level of dentists and dental students, dental students had slightly lower level of knowledge than dentists. These results may be due to inadequate emergency training in dental schools and the fact that dentists may acquire some knowledge in this regard through experience, and trials and errors. Therefore, medical emergency courses especially practical courses should be improved in the educational curriculum. Practical hands-on training courses in hospitals by an emergency medical technician and emergency medicine specialists can improve the quality of education. Comparison of dental students' level of knowledge with qualified students and oral hygienists showed no difference because the qualified students and oral hygienists passed the basic science courses abroad and passed most of the practical courses in dental school in the

same way as did other students.

By evaluating the work experience and educational courses of participants, it turned out that most participants (dentists and dental students) had not participated in medical emergency courses in their dental schools and had not received proper training in this respect. In our study, 86% of dentists and 94% of dental students declared that they needed further training, which was in line with the findings of studies by Mahdizadeh et al, in Babol and Adwole et al, in Nigeria.^{8, 15} In our study, 94% of dentists and 86% of dental students reported dealing with emergency cases during the past year. This rate was 24% in Kerman city and 58% in Zahedan city.^{11, 12} During the past year, the number of dentists who dealt with emergency cases was almost more than double the number of students (48% versus 22%). There are two reasons for this finding: (I) dentists usually visit more patients than students and are more likely to encounter emergency cases; (II) patients referred to dental schools have usually been already examined in the oral medicine department.

Life-threatening medical emergencies may happen at any time in any dental office. Lack of knowledge and misdiagnosis can have serious consequences in dental emergencies. Medical emergency training in dental schools is often not standardized.⁷ Students need more training in comparison with dentists due to having less experience in the university. These findings call for particular attention to improve medical emergency courses for dental students. In the recent years, transfer of dental students to the country has increased; thus, it was imperative to evaluate the knowledge level of these students in comparison with those trained in Iran. Further studies are required to consolidate these findings and their implications in medical emergencies¹⁶, because a medical emergency is an unwanted, unexpected reaction or complication, and only few studies assessed the knowledge and competency of dentists and dental students about medical emergencies.¹⁷

Conclusion

The results of this study showed that medical emergency knowledge of dentists and dental students was similar, and generally not satisfactory. There was no significant relationship between age and years of clinical experience with the knowledge level. This finding highlights the need for a review of dental curriculum as well as some modifications in the delivery style to a practical, hands-on training and simulation of emergency scenarios to enhance the students' skills and self-confidence in management of medical emergencies in a dental setting.

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Conflict of Interest

No Conflict of Interest Declared ■

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