KAP STUDY

The Nature and Frequency of Medical Emergencies in Dental Offices of Karachi, Pakistan

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ABSTRACT

Background: Medical emergencies are an unfortunate part of the dental practice, to which the dentist must have the required knowledge and means to counter them. In this study, we aimed to determine the nature and frequency of medical emergencies occurring in the dental offices of Karachi, Pakistan. We also aimed to ascertain the awareness and preparedness of dentists and their attitude towards training in management of these medical emergencies.

Methods: In this study, 300 questionnaire forms were distributed to dentist at various colleges in Karachi city in the year 2015, out of which 244 complete and valid forms were received and used, giving a response rate of 81%. SPSS version 16.0 was used to compute and analyze the collected data.

Results: Out of 244 respondents, 23% were males and 77% were females. Since, 83% of the dentist had faced a medical emergency at least once in their practice. Highest recorded medical emergency was found to be syncope (faints) being reported by 71% of the dentist. Most of the medical emergencies (89%) took place during an extraction procedure. 55% dentist claimed that they were prepared enough to manage an emergency. Irrespective of their perceived abilities, 100% showed keen interest in the field of improvement through continuing education in management of medical emergency.

Conclusion: Medical emergencies are common in dental practice and a substantial proportion of dentists feel incompetent in handling such situations. This requires better medical emergency management courses and training in undergraduate dental programs as well as continued dental education and training.

Keywords: Awareness; Dentist; Dental Office; Emergency Treatment; Medical Emergencies.

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INTRODUCTION

It is the prime responsibility of all dentists to protect their patients against any harm, and to place their interests primarily. Keeping this in mind, it is the fundamental duty of all dental professionals to be able to recognize and treat medical emergency when it occurs at their place of practice. There are situations and procedures in the dental office that may precipitate a medical emergency such as increase metabolic changes due to fear or anxiety of the treatment, inadequate pain control, old age, poly-pharmacy, long duration of treatment such as multiple implants, invasive procedures, or adverse effects of medications and anesthesia[1, 2].

According to studies performed in UK[3,4], the most common problems occurring at a dental setting are syncope, hypoglycemia, angina, seizures, choking, asthma and anaphylaxis with occurrence rate of around 0.7 case/dentist annually. A recent study performed in Germany concluded that medical emergencies in dental settings occur more frequently than expected with 57% of the dentists

reported up to three emergencies and 36% of the dentists reported up to 10 emergencies in a 12-month period[5]. Out of 1277920 of the patients, treated 42 had severe life-threatening events such as myocardial infarction and cardiopulmonary arrest[5].

A high frequency of medical emergencies in the dental setting was also reported by studies performed in the US. A survey in which 4309 dentists took part, reported a total of 30608 medical emergencies occurring over a 10-years period. Of those, 96.6% answered positively when asked if a medical emergency had occurred in their dental office in the past ten years[6]. Another study done in US showed a 4% increase in number of medical emergencies occurring at dental settings within a 5-years span[7]. In a study conducted in Brazil, presyncope (1.58 cases/dentist/year), orthostatic hypotension (1.79 cases/dentists/year), moderate allergic reaction (0.37 cases/dentists/year), hypertension crisis (0.51 cases/dentists/year), asthma (0.13 cases/dentists/year), and syncope (0.15 cases/dentists/year) were the most occurring emergencies at a dental office[8].

A recent study conducted in Saudi Arabia reported syncope (53.1%), orthostatic hypotension (21.3%), adverse drug reactions (7.8%), Asthmatic attack (11%), Hypoglycemia (44.8%), foreign body aspiration (5.5%), seizures (16.6%), and cardiac (8.3%) in a 3-year period[9]. However, medical emergencies in the dental setting are fortunately a rare occurrence, but it is essential to know that they can happen at any time and hence all the members of the dental team should be prepared to manage them[10].

A dental surgeon must have knowledge to recognize and manage medical emergencies as well be competent in resuscitation methods, proposed by GDC in 2002 in their document "The First Five Years: A Framework for Undergraduate Dental Education". Contrary to this, many dentists are not confident in the management of such conditions[11]. As per American Dental Association (ADA), the components of a sound medical emergency plan for the dental office should include "(a) medical emergency prevention; (b) development of an action plan; (c) recognizing a patient's distress and management of medical emergencies and (d) emergency drugs and equipment"[12].

Expertise in basic life support as well as accessibility of emergency drugs and equipment can greatly decrease the morbidity and mortality in an emergency situation[3,13]. Therefore, dental clinics are required to have emergency equipment that comprises of portable oxygen, oxygen face mask, set of oropharyngeal airways, bronchodilator inhalers, blood glucose measuring device, defibrillator, suction, sterile syringes and needles[14,15,] as well as basic drugs including oxygen, epinephrine, nitroglycerine, diphenhydramine, bronchodilators, aspirin, glucose and aromatic ammonia[16]. In summary, medical emergency can happen in a dental office and inability to cope with such a situation can be lethal. This study aimed to provide an overview of prevalensce of emergencies in the dental office, its awareness and that the dentists are appropriately trained in basic life support measures. It is a necessity that all the dentists should have the knowledge and ability to deal with the medical emergencies occurring in their dental settings.

METHODS

This descriptive cross-sectional study was aimed at evaluating the nature and frequency of medical emergencies. It was conducted in the month of September 2015. Gilder[17] calculated sample size of 180 dentists to achieve a power of 90% and confidence interval of 95%, effect size of 0.279, with degree of freedom 3, using a previous study "Medical Emergencies in General Dental Practice". The questionnaire was anonymous, constructed with closed and predetermined set of questions that serves as a checklist to determine the frequency of medical emergencies and knowledge of dentists regarding medical emergencies. This questionnaire was prevalidated based on Malamed and Fast[18,19].

Ethical approval was obtained from the "Institutional Review Board (IRB) of Dow University of Health and Sciences, reference ID IRB/575/DUHS/Approval/2015", this questionnaire was distributed to 300 dentists comprising of dental house officers and registered dental surgeons working at the selected dental colleges of Karachi, using convenience-sampling technique. The data gathered from the questionnaires was analyzed by SPSS 16.0 to calculate simple frequencies as well as associations between "experience and number of medical emergencies" and "experience and competence" using Chi square test.

RESULTS

A total of 244 complete and valid questionnaires were selected out of 300, giving a response rate of 81%. These respondents comprised of 23% (n = 56) male and 77% (n = 188) female out of which majority belonged to the age group 22-31 years (90%) followed by 32-41 years (7%), 42-51 years (1%) and 52 and above years (2%) (Figure 1a). The largest number of respondents have been working for 1-5 years (88%) followed by 6-10 years (7%), 11-20 years (4%) and > then 20 years (1%) (Figure 1b).

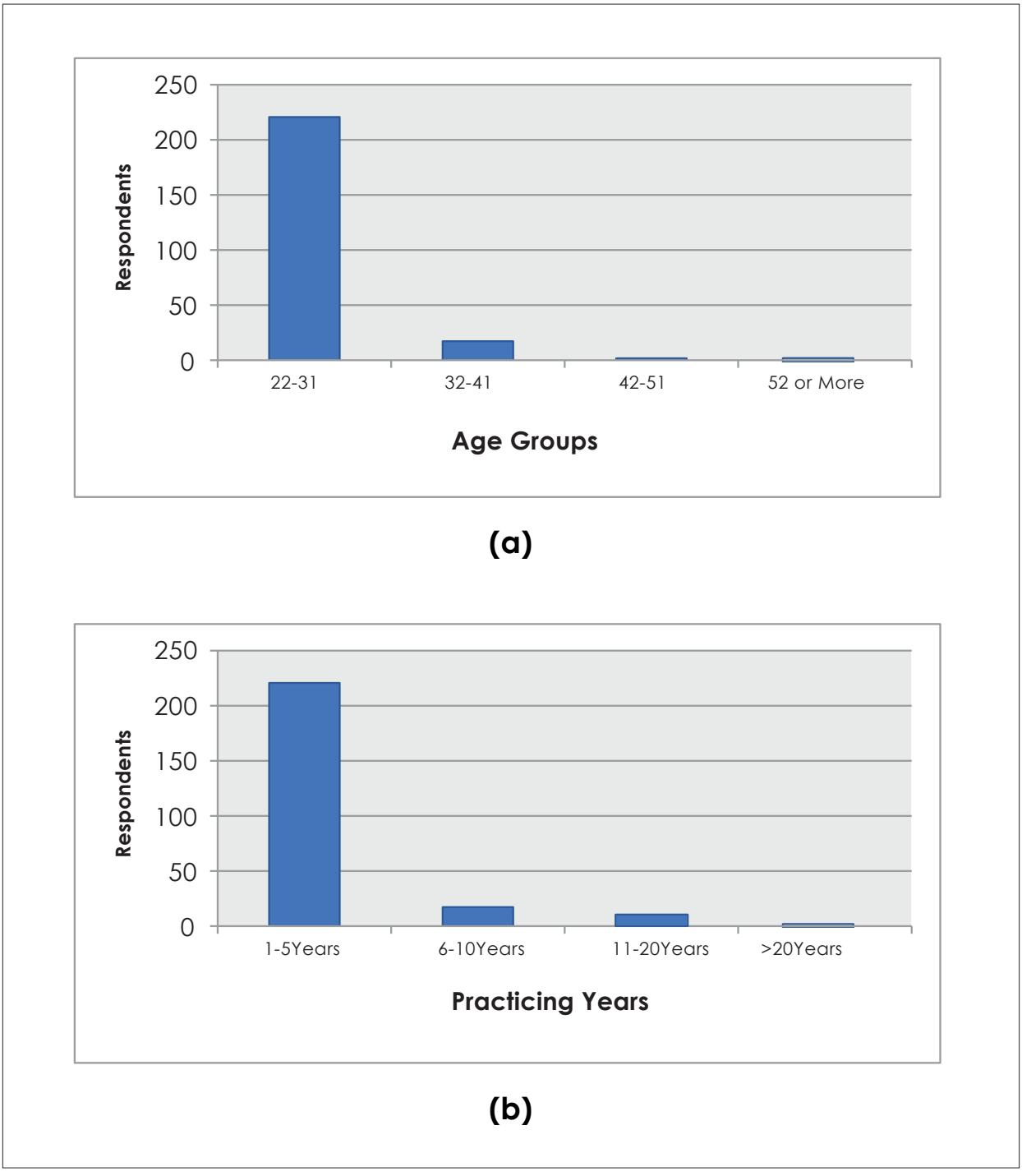

Figure 1: (a) Age Group and (b) Practicing Years.

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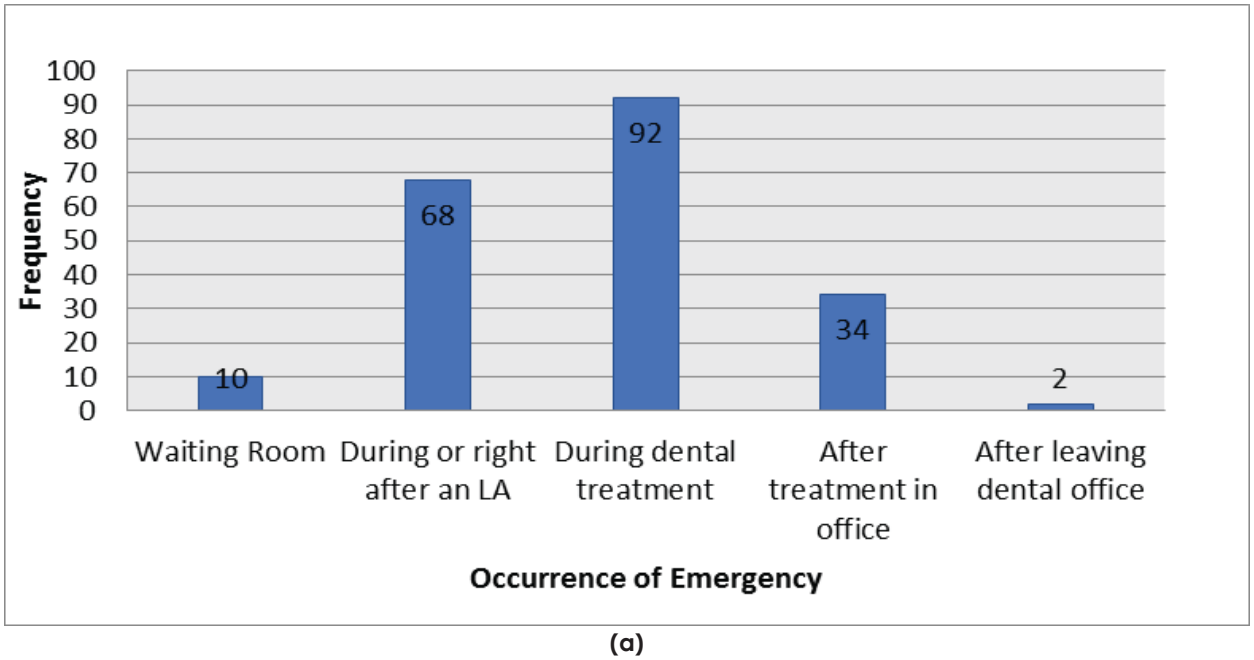
Table 1: Frequency of medical emergencies in dental clinics.

Parameters	No. of dentist reporting emergency	Incidence of emergency
Faints	174	530
Allergic Reaction	58	172
Hypoglycemia	72	184
Hyperglycemia	14	36
Diabetic Coma	4	4
Angina Pectoris	18	28
Postural Hypotension	36	84
Fits and Seizures	62	120
Asthmatic Attack	32	100
Anaphylactic Reaction	18	28
Cardiac Arrest	12	16
Other Emergencies	4	4
Hypertensive Crisis	20	72
Myocardial Infarction	6	6
Adverse Drug Reaction	8	10
Swallowed Foreign Body	16	44
Drug Interaction	2	2
Stroke	8	14
Anesthetic Overdose	6	6
Adrenal Insufficiency	2	4
Thyroid Storm	2	14
Respiratory Depression	10	18
Non - diagnosed Reaction	4	12

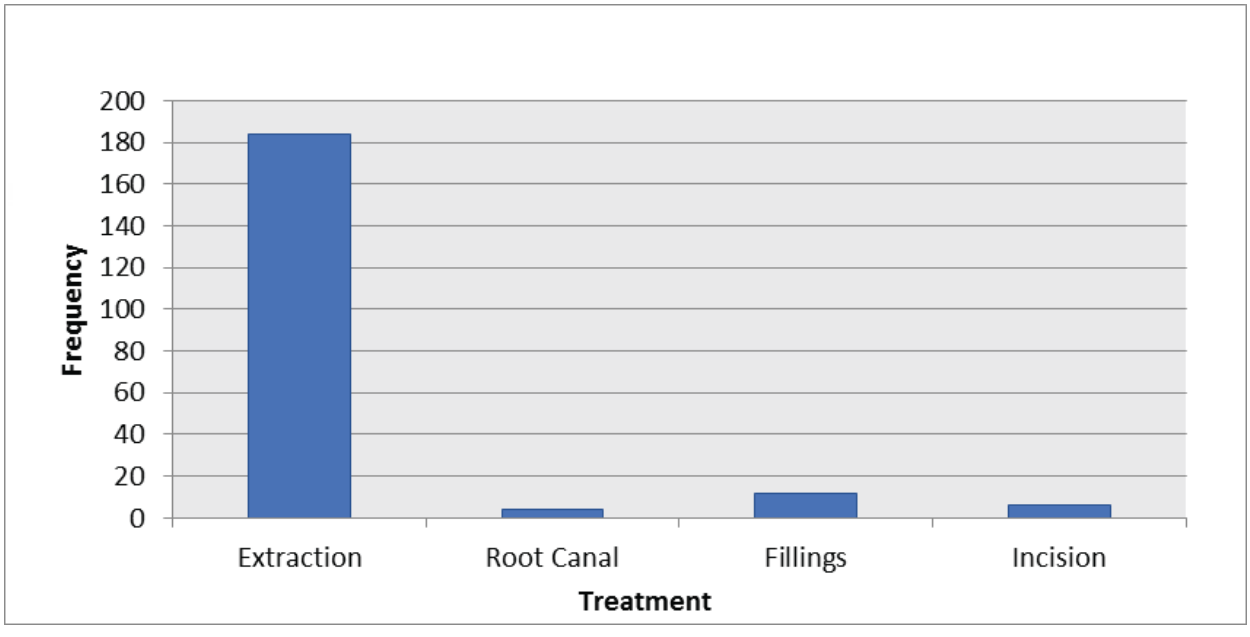
When the dentists were asked if they had had any experience of medical emergency during their dental practice, 83% dentist's response was positive where as 17% had never come across a medical emergency.

The most frequent emergency occurring in the data obtained was vasovagal syncope (faints); 71% of dentists reported a total of 530 patients who experienced an episode of faints. The next most frequent emergencies were hypoglycemia, mild allergic reaction, fits and seizures, asthmatic attack, postural hypotension, having absolute frequencies of 184, 172, 120, 100, and 84 respectively. Whereas, drug interaction, diabetic coma, adrenal insufficiency and myocardial infarction were the least reported emergencies (Table 1).

The results calculated about the patients show that most of the medical emergency occurred during the extraction procedure (89%), during an ongoing dental treatment (38%), during or after getting an LA (28%) and after the treatment procedure (14%) (Figure 2a, b).



(a)



(b)

Figure 2: (a) Place of occurrence of emergency, (b) Treatment being performed at the time of occurrence.

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52% of the dentists who took part in the study, stated that they have an emergency drug kit at their work place, 31% of them kept oxygen cylinder and 68% had taken a course in basic life support. When they were asked if they had received any practical training in managing medical emergencies, only 37% answered yes.

When the candidates were asked if management in medical emergencies has been taught as part of their under- and/or post-graduate curriculum, 73% agreed that they had received theoretical and 18% had received practical knowledge during their under-graduate program, where as 40% had received practical and 22% had received theoretical knowledge during their post-graduation program. Out of these, 9% and 38% admitted of no such training during their under graduation and post-graduation respectively.

A total of 60% dentists agreed that they were confidently prepared to deal with medical emergencies on the basis of their undergraduate training during BDS.

Out of these 244 dentists that participated, 16% judged themselves well prepared, 39% fairly well prepared, 40% not well prepared and 5% not at all prepared in dealing with emergency situations if presented at their work place. This estimates to an overall of around 55% of the respondents being *prepared* while 45% unprepared for such situations (Figure 3).

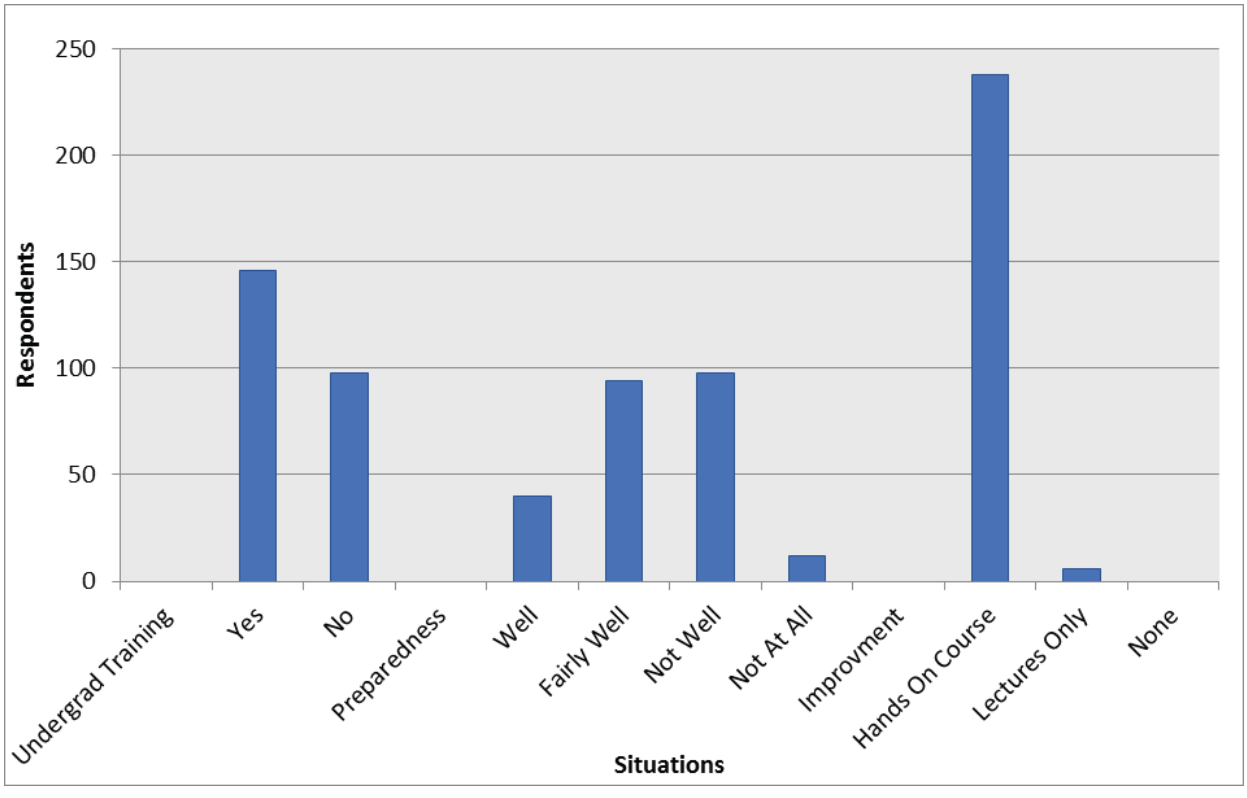

Figure 3: Training, preparedness, and improvement.

Irrespective of their perceived abilities, all the respondents showed keen interest in improving their abilities to manage medical emergencies where 98% requested 'a hands-on course' while the remaining 2% requested 'lecture' based further training in medical emergencies (Figure 3).

DISCUSSION

This study was performed not only to evaluate nature and frequency of medical emergencies in the dental office but also the skill and understanding of the dentist and equipment.

Self-estimation of competence may be biased by social desirability[20]. However, the data collected by us plainly reports lack of experience in training, so it is doubtful that the competence of dentists to treat emergencies is greater than they think.

The 83% result obtained clearly shows that medical emergencies are not uncommon in dental office and may occur with any individual, at any place and time, as well as during or after a dental procedure. This result was higher than the 75% results obtained by a Brazilian study in 2010[8]. Muller from Germany reported 57% dentist who

experienced up to 3 emergencies where as 36% dealt with up to 10 emergencies in a span of 1 year[5]. This requires intense and repeated training in the form of regular drills involving the entire dental team in handling medical emergencies is of utmost importance in order to provide the patient with best care.

The fact that only 68% of dentist had taken a course in BLS means there is quite some room for improvement. This result was higher than the result from Muller`s report stating only 40% of dentist were competent to perform BLS[5], whereas a study conducted in Islamabad Pakistan in 2011 reported only 29% had taken BLS course[21]. Providing BLS is the most important contribution of the dentist towards managing medical emergencies[22]. Being able to perform CPR is an important aspect of BLS, but unfortunately, not all dentists are capable of performing it. So in order to handle emergency situations, the dental education in many countries includes BLS training, hence acquiring its knowledge is important for the dental students[23,24]. Dentists should take part in the academic conferences/lectures/workshops as part of continuing education, not only to refresh their understanding of the previously learned concepts, but also to learn fresh concepts in medical emergency assessment and management.

The result indicates clearly that vasovagal syncope (faints) was the most common unfortunate emergency event, being reported by 71% of dentist occurring in 530 patients, any other emergency being at least half its value. High value of vasovagal syncope was observed in all the similar studies, where Muller reported 83%[5], Gilder reported 73%[3]. Hypoglycemia, allergic reactions, fits and seizures and asthmatic attack were the following most commonly reported events, whereas cardiac emergencies were the lowest of all. Gilder reported myocardial infarction and cardiac arrest as extremely rare emergency conditions, occurring at the rates of 0.003 and 0.002 cases per dentist per year[3].

We found out from this study that only 52% of dentist maintained an emergency drug kit at their work place, which was quite less than Atherton and Muller findings, which were 80% and 75% respectively[4,5]. Seventy percent of Germans[5], 63% of Australians[25] and 78.6% of Saudis[9] maintained oxygen cylinder, whereas only 31% from our study answered positively.

There was an overwhelming 100% positive response of participant dentists for training of practical emergency skills and the management of emergencies, request it to be practical and hands-on. This result clearly shows that our dentists are highly motivated and interested in emergency management. As the number of years working as a dentist increases, so does the confidence to deal with medical emergencies, as a positive association (p value = 0.017) was found between experience and competence in medical emergencies. However, no association was found (p value = 0.334) between experience of the dentist and the number medical emergencies encountered, as our questionnaire aimed at the medical emergencies experience in the past 20 years, whereas this could be calculated by asking about the medical emergencies occurred recently.

The study could have assessed the competence of dentists better, by asking questions on medical emergencies and their management, instead of requesting the participants to self-evaluate. We were unable to evaluate the association of experience of the dentist and frequency of medical emergency, which can be overcome by limiting the emergency encountered in the last 20 years to emergency encountered recently. To compare the experience of dentist with the number of medical emergencies in dental setting, we should inquire about recent occurrence (i.e. three to six months) and compare this with the years of experience of the dentist in order to find the correct association between experience and incidence.

CONCLUSION

Medical emergency is not sufficiently taught at undergraduate level in Pakistan, and there is no PMDC requirement of BLS training or medical emergency management for practicing dentists. It is hoped that outcome of this study will promote a re-evaluation of education in this field that will be able to implement evidence-based training in emergency care, with practical exercise and compulsory continued medical training. Appropriate measures should be taken to ensure that emergency drugs and kits are mandatory in the dental setting. Continued medical education in BLS and management of medical emergency should be made compulsory for dentist throughout their career to ensure that they are well equipped to manage such situations.

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CONFLICT OF INTEREST

There was no conflict of interest among the authors.

ETHICS APPROVAL

Ethical approval was obtained from the "Institutional Review Board (IRB) of Dow University of

Health and Sciences reference ID IRB/575/DUHS/Approval/2015.

PATIENTS CONSENT

Verbal and written informed consent was obtained from all patients.

AUTHOR'S CONTRIBUTION

ATN did sample collection and analysis and wrote the manuscript, ZAA helped in sampling and designing of the project, JZ conceived the idea and overall supervised the project and finalized the manuscript.

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