

# Evaluation of Awareness and Preparedness for Medical Emergencies among Dental Practitioners in Twin Cities of Punjab: A Cross-sectional Study



**Fatima Khattak<sup>1</sup>** BDS, FCPS  
**Syed Zuhair Mehdi<sup>2</sup>** BDS, MCPS, DHPE  
**Arooba Mehmood<sup>3</sup>** BDS  
**Wajeaha Amer<sup>4</sup>** BDS  
**Kanza Murtaza<sup>5</sup>** BDS  
**Alishba Iftkhar<sup>6</sup>** BDS

**OBJECTIVE:** The purpose of this study was to evaluate the awareness of medical emergencies among dental practitioners, to assess the degree of expertise and readiness of dental professionals to handle medical crises in their dental practices and to ascertain if medical emergency medications are offered in dental offices.

**METHODOLOGY:** A prospective study including 208 practitioners were given access to the survey through Google Form, along with information on the study and a consent form. The questionnaire consisted of demographic details, years of experience, and specialty of practitioners and 20 closed-ended questions with 10 assessing knowledge and rest evaluating the competence and preparedness to handle medical emergencies.

An emergency whether medical or dental is a serious, acute, and unexpected event that requires a quick and timely intervention. Since some diseases and their treatments increase the likelihood of a medical emergency during dental treatment. The most often encountered medical emergencies in a dental office are vasovagal syncope, angina pectoris, hypoglycemia, and hypertensive crisis. One of the mainstays of prevention of medical emergencies is by taking a thorough and detailed history, and vital signs monitoring and modifying the treatment plan.

**RESULTS:** A response rate of 96% was achieved by including all 200 of the study's 450 dental professionals. Just 69% of the participants had emergency kits on hand, even though roughly 77.5% of the dentists in the study felt confident in their ability to handle emergencies in the dental office.

**CONCLUSION:** In this study, dental professionals demonstrated a moderate level of understanding in medical situations, and many of them have low to moderate perceived competency in managing medical emergencies. Every dental clinic should have well-communicated emergency protocols in place that should be updated periodically.

**KEYWORDS:** Medical emergency, Dental Practitioner, Emergency kit, BLS, Dental Clinics

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## INTRODUCTION

In the present age, the avoidance of unintended or unexpected harm to patients during the provision of health care has become a priority in dental practice.<sup>1</sup> An emergency whether

medical or dental is a serious, acute, and unexpected event that requires a quick and timely intervention. Some diseases and their treatments increase the likelihood of a medical emergency during dental treatment.<sup>2</sup> According to various studies medical emergencies are faced by most dentist once every year.<sup>3</sup>

Health-related conditions might cause medical emergency, which can make dental treatment more difficult. About one in twenty general dentists will have to deal with cardiopulmonary rehabilitation at some point in their career, according to a study done in France.<sup>4</sup> The dental clinics has a disproportionate amount of medical emergencies, and the professionals there are required to be skilled in managing the same.<sup>5</sup>

One of the studies conducted in Saudi Arabia<sup>6</sup> found that only 4% of the applicants knew the correct management for

1. Senior Registrar, Department of Oral & Maxillofacial Surgery, Dental College HITEC Institute of Medical Sciences, Taxila Cantt, Pakistan.
2. Assistant Professor Department Of Oral Medicine, Frontier Medical and Dental College, Abbottabad, Pakistan.
3. House Officer, Department of Oral & Maxillofacial Surgery, Dental College HITEC Institute of Medical Sciences, Taxila Cantt, Pakistan.
4. House Officer, Department of Oral & Maxillofacial Surgery, Dental College HITEC Institute of Medical Sciences, Taxila Cantt, Pakistan.
5. House Officer, Department of Prosthodontics, Dental College HITEC Institute of Medical Sciences, Taxila Cantt, Pakistan.
6. House Officer, Department of Orthodontics, Dental College HITEC Institute of Medical Sciences, Taxila Cantt, Pakistan.

Corresponding author: "Dr. Fatima Khattak" < fatimakhattak12@gmail.com >

some numerous emergency conditions & 50.5% of applicants were unable to handle the emergency condition in one of the studies in India.<sup>7</sup>

A review of the literature reveals that elderly patients with co-morbidities are regarded as having a higher risk of medical emergencies during a variety of dental treatments.<sup>8</sup> These medical emergencies most commonly occur during or after local anesthesia administration, mainly during tooth extraction.<sup>4</sup> Such emergencies occur more frequently in dental offices due to increased levels of anxiety and stress.<sup>9</sup>

In addition various other reasons such as inadequate pain management, advanced age, prolonged procedures such as multiple implant insertion, invasive operations, and adverse reactions to medicine or anesthesia can also be one of the few reasons that can precipitate emergency situation in a dental setting.<sup>10</sup>

Compared to medical clinics, the frequency of medical emergencies in dental clinics is over 5.8 times higher.<sup>11</sup> 90% of the medical emergencies are deemed mild, while 8% are highly dangerous and life threatening.<sup>12</sup>

The most often encountered medical emergencies in a dental office are vasovagal syncope, angina pectoris, hypoglycemia, and hypertensive crisis. One of the mainstay of prevention of medical emergencies is by taking a thorough and detailed history, vital signs monitoring and modifying the treatment plan.<sup>13</sup>

Few dentists are equipped to handle emergency and urgent episodes that occur in the outpatient department because they lack the necessary expertise. These episodes tend to be impulsive and don't always follow predictable patterns.<sup>3</sup> Each emergency requires a correct diagnosis to be made for effective and safe management.<sup>14</sup>

When treating medical emergencies, dentists should be knowledgeable about the warning signs, symptoms, diagnosis, and strategies to work with emergency physicians. Insufficient training and an incapacity to handle medical emergencies might lead to disastrous consequences and possibly legal action.<sup>15</sup> It is the responsibility of dental professionals to recognize medical emergencies when they occur and to be skilled enough in providing the best care possible.<sup>16</sup>

Despite having completed an official, approved medical emergency training curriculum as part of their undergraduate and graduate degrees, dentists worldwide nevertheless find it difficult to manage similar situations in dental clinic.<sup>5</sup>

The dental team must be constantly aware of the nature of these emergencies, be prepared for them, and know how to handle them properly because they put patient's lives and health in danger and cause emotional stress for the dentists handling them. These emergencies are unpredictable, need to be handled right away.<sup>16</sup>

There are limited local studies on the general dentist

knowledge about emergencies. The results of which indicate the dentist's knowledge and readiness to be insufficient in this matter.<sup>3</sup>

The purpose of this study is to evaluate the awareness of medical emergencies among dental practitioners, to ascertain if medical emergency medications are offered in dental offices and to assess the degree of expertise and readiness of dental professionals to handle medical crises in their dental practices.

## **METHADODOLOGY**

From June 2022 and September 2022, cross-sectional research was carried out at private dental clinics of twin cities of Punjab. With a predicted population percentage of 50%, a degree of confidence of 95%, margin of error 5%, a research power of 80%, and a population size of 450 dental clinics, the minimum necessary sample size was 208 using the WHO sample size calculator. The IRB of Dental College HITEC-IMS (Dental/HITEC/IRB/30) approved the study and gave it its ethical approval. Before having them fill out the questionnaire, research participants gave their consent. The information was gathered via a self-administered questionnaire. The questionnaire was adapted, with a few changes, from a research of a similar nature conducted in the Kingdom of Saudi Arabia<sup>1</sup> by S. AlQahtani. In order to verify the language interpretation, a pilot research with sixteen dental professionals evaluated the face validity of the questionnaire. To capture a variety of viewpoints and experiences, participants with diverse dental specialties (e.g., oral surgeons, orthodontists, general dentists, etc.) were included. Every participant was an assistant professor or higher in title. The questionnaire was filled out by hand by each participant, who also offered comments on the question's language and clarity. The participants understood the questions without any confusion. Before distributing the questionnaire to the whole sample, the questionnaire was then amended in light of the feedback from the pilot-study participants who were not the part of the main study. The questionnaire's internal consistency and reliability was checked via Cronbach reliability test and found to be acceptable (coefficient of reliability = 0.7).

About 208 practitioners were then given access to the survey through Google Forms, along with information on the study and a consent form, and 200 full responses were gathered. The questionnaire consisted of demographic details, years of experience, and specialty of practitioners and 20 close ended questions with 10 assessing knowledge and rest evaluating the competence and preparedness to handle ME (level of training, types of emergency drugs and equipment available).

The data were analyzed by Statistical Package for Social

Sciences (IBM SPSS version 26.0). Using descriptive statistics, the sample characteristics were assessed. Categorical variables were reported using counts and percentages. Chi-square test was used to compare the categorical variables and assess significant associations. The p value < 0.05 was considered statistically significant.

## RESULTS

A response rate of 96% was achieved by including all 200 of the study's 450 dental professionals. The majority (49%) of study participants were under 30 years old, and 59% of them were female. The majority of participants (69.5%) had a BDS qualification. Summary of demographic characteristics is given in Table 1.

Sr.#	Particulars	Responses	Frequency	Percent (%)
1	Age	<30	98	49
		30-35	69	34.5
		35-40	18	9.0
		>40	15	7.5
2	Gender	Male	82	41
		Female	118	59
3	Qualification	G	139	69.5
		PG	60	30
		PhD	1	0.5
4	Area of practice	Rural	46	23
		Urban	154	77
5	Years of practice	<1	21	10.5
		1-2	45	22.5
		2-5	61	30.5
		>5	73	36.5

Table 1: Demographic characteristics of study participants (n=200)

According to the study's findings 57.5% of the practitioners asked about a patient's medical history, including any allergies or medication use. Before starting any therapy, only 40% of them took signed informed consent by the patient, around half of them 52.5% took the patient's vital signs. Around 73.5% reported they are competent enough to treat a pregnant patients while 97% of the practitioners knew how to record BP and blood glucose level. Detailed responses to the knowledge and preparedness questionnaire are given in Table 2.

A significant portion of the participants (83%) knew about CPR and 64% reported to be BLS certified. Just 69% of the participants had emergency kits on hand and roughly 77.5% of the dentists in the study felt confident in their ability to handle emergencies in the dental office. 64.5% participants were confident about administering injections intramuscularly and through intravenous route. Oral glucose,

Sr. no	Questions	Responses	N	(%)
1.	Do you take and document thorough medical history prior to the treatment?	Yes	115	57.5
		No	85	42.5
2.	Do u consult primary care physicians in medically compromised patients?	Yes	175	87.5
		No	25	12.5
3.	Do you inquire about medications taken by patients?	Yes	161	80.5
		No	39	19.5
4.	Do you take vital signs prior to treatment?	Yes	105	52.5
		No	95	47.5
5.	Do you take signed informed consent prior to treatment?	Yes	80	40
		No	120	60
6.	Are you well aware about the medical emergencies and can handle them in your dental setup?	Yes	155	77.5
		No	45	22.5
7.	Do you know how to diagnose medical emergencies?	Yes	145	72.5
		No	55	27.5
8.	Have you faced any medical emergency in your clinic?	Yes	137	68.5
		No	63	31.5
9.	Do you have emergency kit/equipment available in your clinic?	Yes	138	69
		No	62	31
10.	Can you give IM/IV Injection?	Yes	129	64.5
		No	71	35.5
11.	Do you know how to record the BP and BLOOD GLUCOSE level?	Yes	194	97
		No	6	3
12.	Have you performed chair positioning adjustments while facing any medical emergencies?	Yes	169	84.5
		No	31	15.5
13.	Are you well trained if a pregnant patient visits your clinic?	Yes	147	73.5
		No	53	26.5
14.	Is your dental staff trained enough to handle medical emergencies?	Yes	112	56
		No	88	44
15.	Do you know about the drugs of choice for various medical emergencies?	Yes	173	86
		No	27	13.5
16.	Do you know about CPR?	Yes	166	83
		No	34	17
17.	Are you BLS certified or not?	Yes	129	64.5
		No	71	35.5
18.	Do you have an oxygen cylinder at your clinic? If yes, then do you know how to operate it?	Yes	79	39.5
		No	121	60.5

Table 2: Responses to knowledge questionnaire and awareness regarding medical emergencies

saline, adrenaline, aspirin, steroids, avil, and diazepam were the most often found emergency medications in emergency kits as reported by the participants of our study shown in figure 1. Most common medical emergency is vasovagal syncope according to current study as shown in figure 2. In term of gender, there was a significant association found with taking consent from patient prior treatment, trained to deal with pregnant patients and BLS certified. Females were

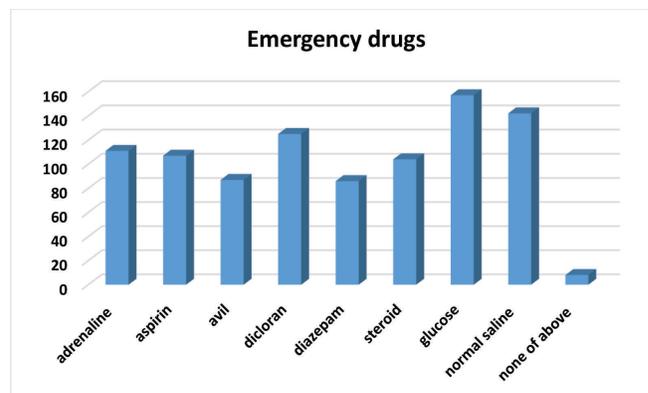
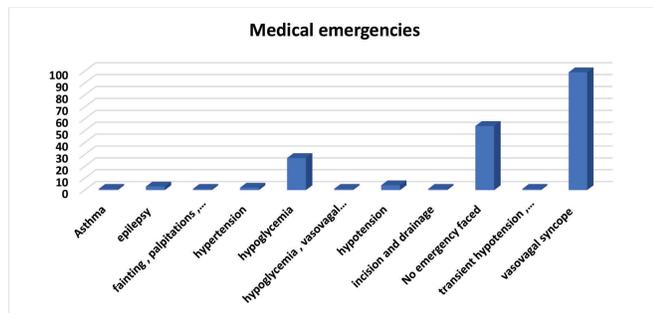


Figure 1: Frequency Of Different Emergency Drugs Available

more likely to take consent of patients prior to treatment as compared to males (61.0% vs 42.7%, p=0.011). Females were more likely to be trained to treat and handle pregnant patients at clinics as compared to males (84.7% vs 58.5%, p<0.001) and more females were BLS certified as compared to males (72.0% vs 52.4%, p=0.005).



**Figure 2:** Frequency Of Different Types Of Medical Emergencies Encountered In Past One Year

In terms of qualification, there was a significant association found with awareness about medical emergencies, having and operating oxygen cylinders, confident to give injections and BLS certified. Higher the qualification, more awareness about medical emergencies was found ( $p=0.001$ ), more likely to have oxygen cylinder at clinics ( $p<0.001$ ), more awareness regarding operating it ( $p=0.002$ ), more confident to give IM and IV injections ( $p=0.035$ ), and more likely to be BLS certified ( $p=0.006$ ).

In terms of years of experience, there were significant associations found with consulting primary physician for medically compromised patients, having oxygen cylinder at clinic, repositioning chair during medical emergencies and BLS certification. Participants with more than 1 year of experience were more likely to consult with primary physician as compared to those with less experience ( $p=0.023$ ), more likely to have oxygen cylinder at clinic ( $p=0.001$ ), more likely to have readjusted chair position during emergencies ( $p=0.002$ ), and having BLS certification ( $p=0.030$ ).

## DISCUSSION

Emergencies do not happen as frequently in a general practice, but when they do, they can be fatal. By identifying "at-risk" individuals and then giving them the proper care, the possibility of an adverse occurrence can be significantly reduced. Recognizing that any dental patient might encounter a medical emergency while undergoing treatment is a crucial first step.<sup>4</sup> The major goal of the current study was to determine if dentists ask about important first steps such as medical history and drug allergy history and record patient's vital signs, which might give an indication of the likelihood that a medical emergency would arise in the dental office. In the current study total 200 dental practitioners were assessed regarding medical emergencies related awareness and preparedness. Among those 200 participants 82 were males 41% and 118 were females which makes 59%. Study by Gupta et al<sup>5</sup> showed 294 females and 207

were males out of 501 participants.

In another study<sup>17</sup> 29.4% were males and 70.6% females make up the study population. In term of gender, there was a significant association found with taking consent from patient prior treatment, and with training to deal with pregnant patients and more females were BLS certified as compared to males.

According to the findings of the current study, only 57.5% of practitioners complete out proformas and document patient history in their record. This is significantly lower than the findings of a Saudi studies by Al Qahtani et al.<sup>4</sup>, Al-Sebaei et al.<sup>18</sup> and Egyptian study by Hussain et al.<sup>16</sup> who discovered that 87%, 92% and 91.17% of participants questioned about the patient's medical history. Just a little more chair time is needed for this. Hence before beginning any therapy, proformas must be given to the patient and correctly filled out forms must be obtained. This allows for the necessary safety measures to be taken to avoid the occurrence of such emergency scenarios.<sup>6</sup>

In our study 52.5% of practitioners noted vital signs. This is higher than a study conducted in Egypt<sup>16</sup> where only 41.82% obtained the vital signs of patients and also higher than a study<sup>4</sup> done in Saudia where 38% took it during the first visit only and 50% never took it. Conversely study by Verma et al.<sup>19</sup> reported about 83.06% record vital signs which is significantly higher than our study. Monitoring vital signs play a critical role in providing indicators, such as elevated temperature induced such by a sickness within the body and increased pulse and respiration caused by stress and fear of treatment. Prior to starting therapy, patients should undergo routine vital sign monitoring as well as a full medical history review and physical examination at the time of admission. The medical histories should also be updated at each visit.<sup>4</sup> Every patient who is considered to be medically complicated at the time of intake should seek consultation with the patient's doctor.<sup>6</sup>

Treatment success and patient compliance are directly impacted by the dental clinician's level of confidence in managing medical emergencies. Nevertheless, the type of the medical emergency condition also has a role in the outcome.<sup>5</sup> Our study's data showed that 77.5% of dentists were confident in their ability to handle any emergency situation in their dental office. This is in line with several studies conducted by Al-Iryani et al.<sup>20</sup>, Seemala Jyotsna et al.<sup>21</sup>, Gupta et al.<sup>5</sup>, Stafuzza et al.<sup>22</sup> which reported significantly higher positive response rates of 82%, 61%, 69.9%, 66% respectively. This is in contrast to other studies<sup>10,13,16,23</sup> where only 46.67%, 49.7%, 48.57%, 43.8%, were confident in dealing with medical emergency themselves.

About 68.5% dentists have faced medical emergencies in our study. This is in accordance with an Italian study in

which 65.2%<sup>24</sup> practitioners encountered at least one emergency event during their professional life. In the current study vasovagal syncope was the most frequent medical emergency encountered by the practitioners followed by hypoglycemia. Vasovagal attack was likewise the most common medical emergency faced by Saudi<sup>4</sup>, Polish<sup>2</sup>, Italian<sup>24</sup>, USA<sup>25</sup>, Jordan<sup>13</sup> and Dutch<sup>1</sup> dentists.

About 69% of the dental practitioners of our study had emergency kit availability in their dental office. This can be related to dentist's interest in being ready for medical emergencies. The current conclusion, however, is a substantially larger percentage compared to the results of a studies conducted by Hussein et al.<sup>16</sup> (49.35%) and Al Ghanam et al.<sup>13</sup> (37.8%). This could be because of a variety of factors, including a lack of training in their use, an underestimation of their importance, the high cost of the equipment and a lack of laws and regulations requiring the provision of life-saving equipment in dental offices in these studies. But our reported percentage is lower than findings of the studies done in India<sup>19</sup> and Saudi<sup>5</sup> where 82.72% and 85% had emergency kit available at their clinic.

Only 39.5% participants of our study had an oxygen cylinder at their clinic and they have the skills to confidently operate it while majority (60.5%) do not have it in their clinics. This is in line with a study done in Polish dentists<sup>2</sup> where only 41% practitioners have oxygen source at their clinics but much higher percentage than a Jordanian study<sup>13</sup> where only 9.4% dentists had oxygen supply at their clinics.

According to the data we gathered for our study, the majority of respondents felt comfortable administering intramuscular and intravenous injections (64.5%). This is in accordance with an Iranian study<sup>26</sup> where level of confidence was 72%. This confidence was as low as 16%, 30.9%, 27.9%, 34%, 6.6% for intramuscular and intravenous injections in other studies<sup>9,17,26</sup> compared to the current study.

Amiri et al.<sup>1</sup> suggested that dental clinics stock six critical medications. These are aspirin, nitroglycerin, albuterol/salbutamol, antihistamine, oxygen, and epinephrine. Oral glucose (78.5%) normal saline (71%) adrenaline (62.5%) were the most readily available emergency medication in our study. These findings are consistent with those of Hussein et al.<sup>16</sup> Gupta et al.<sup>5</sup>, Al Qahtani et al.<sup>4</sup> Al Ghanam et al.<sup>13</sup>

In our study 64.5% practitioners were BLS certified and 35.5% participants were not certified and so not aware of importance of basic life support. This is in accordance with a studies conducted by Tarmidzi et al.<sup>17</sup> Sudeep et al.<sup>23</sup> while much lower than findings of an Indian<sup>27</sup> and Saudi<sup>4</sup> study where 94.4% and 100% dental practitioners had knowledge regarding how to perform basic life support and first-aid and all of them had current BLS certification. Our findings indicates that emphasis on BLS training in our region needs

to be updated and improved. In order to create a large number of basic life support responders, it is crucial to implement basic life support programs throughout the country.

The dentist is ultimately in charge of effectively handling an emergency scenario in the dental clinic. Lack of training and the incapacity to handle medical crises can have disastrous results and occasionally even legal action.<sup>2</sup> Hence, legislation and regulations governing the supply and periodic updating of emergency medical kits are urgently needed.

The key limitations of the study are its cross-sectional design and self-reporting, which make it difficult to assess in-depth the factors causing participant differences. Another limitation is that it was only conducted at private dental offices in twin cities which may limit the applicability of the findings to all dental practitioners in Pakistan working in tertiary care hospitals.

## CONCLUSION AND RECOMMENDATIONS

In this study, dental professionals demonstrated a moderate level of understanding in medical situations, and many of them have low to moderate perceived competency and preparedness in managing medical emergencies. After graduation, dentists should be encouraged to attend lectures and workshops biannually for effective management strategies. The preparedness of all practicing dentists when tragic emergency situations arise can be ensured by a standardized national guidelines from governing bodies that covers all the typical medical emergencies in dental settings.

## CONFLICTS OF INTEREST

Nil.

## ACKNOWLEDGEMENT

Nil

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