

A QUESTIONNAIRE-BASED SURVEY ON MANAGEMENT OF MEDICAL EMERGENCIES COMMONLY ENCOUNTERED IN DENTAL PRACTICES.

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Abstract:

Background: Medical emergencies in dental settings can arise due to patient anxiety, posing risks to both patients and practitioners. Inadequate preparedness among dental professionals may lead to severe consequences, including legal implications.

Objective: The objective of this study was to evaluate the knowledge of dental students and interns regarding managing these medical emergencies.

Material and Methods: This was a cross-sectional questionnaire-based study, conducted at University of Lahore from Jan-March 2022. The survey involved 163 participants, including dental students in their clinical years and interns completing house jobs. Out of 163 participants, 112 completed and submitted the structured questionnaire, which was analyzed using SPSS version 27.

Results: The results showed that only 42% of participants were confident in handling medical emergencies. However, enquiring about medical history was a common practice in 98.2% of participants, and taking vital signs before any procedure was a habit of 84.4% of participants. Moreover, 82.1% of dental students knew about emergency dental kits. Syncope was identified as the most common medical emergency that can be encountered in dental practices, and 71.4% of participants knew how to manage it.

Conclusion: Based on the findings of this study, it is recommended that student awareness programs or clinical workshops for managing medical emergencies should be made compulsory as part of the yearly curriculum.

Keywords: Emergencies, Students, Dental, Vital signs, Anxiety

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Introduction:

The only emergency a dentist can encounter is "toothache" is a so-called myth. Dentists do need to handle life-threatening emergencies, where any delay or mismanagement of the situation can lead to disaster. Fortunately, these emergencies are not frequent but not rare either, with an incidence of 164 events per million dental visits^{1,2}. Usually, dental procedures require a long duration, involve the use of local anesthetic injections, heavy instruments with occasionally annoying sounds, and bleeding, which can induce fear of dental procedures in patients³. Most emergencies in dental clinics arise due to the clinician's failure to recognize the patient's anxiety and

ineffective use of stress reduction protocol⁴. Effective strategies include early morning appointments, friendly communication, and scheduled breaks during treatment⁵. Pre-procedure explanations can also reduce anxiety⁶. Aging patients with comorbidities and certain medical conditions further increase the risk of emergencies^{7,8}. A thorough medical history aids in identifying potential risks and modifying treatment plans accordingly^{9,10}. However, despite preventive measures, emergencies can still occur¹¹, necessitating proper knowledge and training among dental students. Many countries conduct training workshops to equip practitioners with

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essential emergency management skills. In contrast, Pakistan lacks structured educational programs in this domain. This gap may be due to limited data on emergency incidence and inadequate assessment of dental students' knowledge and skills in handling such crises.

This study aims to compile literature-supported evidence on the frequency of medical emergencies in dental practice and evaluate dental students' knowledge through a structured questionnaire.

Material and Method:

Study design:

This cross-sectional questionnaire-based study was conducted at the University College of Dentistry,

Setting and duration:

The University of Lahore, Punjab, Pakistan, from January to March 2022. Ethical approval was obtained from the Ethics Review Committee (ERC APPROVAL NO: UCD/ERCA/2110aa). The study included third-year, final-year BDS students and house officers. Sample size was calculated as 110, with 80 % power and 95% confidence interval.

The questionnaire, developed collaboratively by all authors, was validated by 10 senior faculty members before distribution. It consisted of two sections:

Inclusion criteria:

(1) demographic data (age, gender, and education level) and (2) 16 questions assessing knowledge and perception of managing common medical emergencies, including syncope, foreign body aspiration, spontaneous bleeding, anaphylaxis, epileptic seizures, and angina pain. Additionally, participants' awareness of emergency kits and management protocols was evaluated. Questions were structured as multiple-choice, with some allowing multiple responses.

Exclusion criteria:

After taking informed consent from participants, we distributed 163 questionnaires. Finally, 112 fully completed questionnaires (68 females, 44 males) were included in the analysis, while 51 were excluded due to incomplete responses.

Sample size:

The sample comprised 53 house officers, 34 final-year students, and 25 third-year students.

Data analysis:

Data analysis was performed using IBM SPSS version 27, with descriptive statistics used to summarize demographic data and participant responses. Chi-square test was applied to compare results among groups. P value less than 0.05 was considered significant.

Results:

Out of 112 participants 68 were females and 44 were males. Maximum number of participants were in their house job i.e., 53 followed by final year and 3rd year students which were 34 and 25 respectively. Upon enquiring about medical history 110 i.e., 98.2% of participants ensured about their habit of always taking medical history from every patient. Out of all only 2 (1.8%) of the participants have given their response in

negative. Regarding vital signs recording, the response of 95(84.4%) participants was positive whereas, 17 participants (5.2%) gave a negative response. According to questionnaire only 47 i.e., 42% of participants considered themselves confident enough to handle any medical emergency whereas, 65(58%) doubted their abilities to handle such situations (Table 1).

EMS: Emergency Medical Services, CPR: Cardiopulmonary resuscitation, IV: Intravenous, MI: Myocardial Infarction

On investigation 82.1% of the individuals guaranteed the availability of complete medical kits in their clinical setup. However, 7.9% individuals denied it. About 89.2% of participant revealed that most commonly available drug is adrenaline followed by anti-histamine, hydrocortisone and atropine respectively. Whereas 80.3% of participants believe that most common emergency in dental care setup is syncope, and 22.3% considered anxiety as the most common emergency. Hypoglycemic shock, myocardial infarction and seizures are the most commonly encountered emergencies on a dental chair according to 16.9%, 10.7% and 12.5% of dental care providers respectively. According to 74.1% of participants most appropriate treatment option for syncope is Trendelenburg position & ammonia inhalation. While 13.4% considered upright chair position will alleviate patient's situation, and 11.6% has absolutely no idea about handling of such patient. 21.4% of participants thought Heimlich maneuver is the most appropriate management in case of foreign body aspiration. Ask the patient to cough and examination of the mouth and local area is the treatment choice for 8.9 % and 3.6 % of individual. However, 66.1% marked all of the above treatment choices. In case of an unresponsive patient 68.8% of the participants marked CPR as the best treatment choices. Regarding inquiry for the location of chest compression in CPR 50% of the individuals marked mid chest as exact location. A total of 80.4% participants had appropriate knowledge regarding compression-ventilation ratio to CPR procedure. In case of spontaneous bleeding after extraction the immediate management marked by 56.3% participants was bite on gauze for 30 minutes. Drug of choice for anaphylactic shock was adrenaline according to 57.1% participants. Whereas, 18.8% of the participants believed antihistamines as the best choice of treatment. The primary chair side management of episodic seizures was to change the patient's position towards the lateral side according to 53.6% participants. Followed by administration of intravenous Diazepam by 39.3% participants. Nitroglycerine was marked by 86.6% as the drug of choice in the management of angina. However, upon comparing among different years residents, there was no significant difference in their knowledge, accept in compression-ventilation (Table. 2).

Table 1: Questionnaire based responses recorded by the study participants.				
S. NO	Questions	Response	Total	Percentage
1	History	Yes	110	98.2
		No	2	1.8
2	Vitals	Yes	95	84.8
		No	17	15.2
4	Confident to handle medical emergency	Yes	47	42
		No	65	58
5	Availability of emergency kit	Yes	92	82.1
		No	20	17.9
6	Most readily available emergency drugs	Adrenaline	100	8.2
		Anti-Histamine	82	73.2
		Atropine	67	59.8
		Hydrocortisone	80	71.4
7	Immediate treatment given to the patient of syncope	Make Patient Up-right	15	13.4
		Trendelenburg Position & Ammonia	83	74.1
		Unable to handle	14	12.5
8	Clinician response in case of foreign body aspiration	Ask the patient to cough	10	8.9
		Attempt Heimlich Maneuver	24	21.4
		Examine mouth & Local area	4	3.6
		Not sure	74	66.1
9	Immediate action to manage unresponsive patient	Call EMS	20	17.9
		Observe	2	1.8
		Keep patient in recovery position	13	11.6
		Start CPR	77	68.8
10	Location of chest compression in CPR	Left side	18	16.1
		Mid chest	56	50
		Right side	12	10.7
		Xiphisternum	26	23.2
11	No of chest compressions and rescue breaths in case of single rescuer (in each CPR)	10 compressions and 1 rescue breath	9	8
		30 compressions and 1 rescue breath	11	9.8
		30 compressions and 2 rescue breaths	90	80.4
		Not sure	2	1.8
12	Primary management of spontaneous bleeding after extraction	Local anesthesia	1	0.9
		Bite on gauze for 30 mints	63	56.3
		Gelatin sponge with suturing	2	1.8
		Cold application	1	0.9
		Tea bag placement	10	8.9
		Suturing the extraction site	1	0.9
		Suturing and gauze placement	1	0.9
		Tranexamic acid	1	0.9
		All of the above	32	28.6
13	Drug of choice in anaphylaxis	Adrenaline	64	57.1
		Anti-histamine	21	18.8
		Steroid	19	17
		Vasodilators	8	7.1
14	Primary Rx in case of epileptic event (chair side)	IV Diazepam	44	39.3
		Make Patient to lie in lateral position	60	53.6
		Unable to handle	8	7.1
15	Drug of choice in case of angina pain	Adrenaline	7	6.3
		Nitroglycerine	97	86.6
		Unable to handle	8	7.1
16	Perception of the participants about most common emergencies they can encounter in dental practices	Syncope	90	80.3
		MI	12	10.7
		Hypoglycemic Shock	19	16.9
		Anxiety	25	22.3
		Seizures	14	12.5
		Not sure	2	1.8

Table 2: Year wise response of knowledge and attitude of the participants regarding the common protocols.					
Parameters	Third year BDS	Final year BDS	House officers	Total numbers	Significance
MEASURING VITAL SIGNS					
Yes	23	30	42	95	0.274
No	2	4	11	17	
TREATMENT OF SYNCOPE					
Trendelenburg & Ammonia	17	25	41	83	0.891
Upright position	4	5	6	15	
Unable to handle	5	4	5	14	
ASPIRATION OF FOREIGN BODY OBJECT					
Heimlich Maneuver	8	7	9	24	0.107
Ask the patient to cough	2	3	5	10	
Examine mouth and Local area	3	1	0	4	
Not sure	12	23	39	74	
COMPRESSION VENTILATION RATIO					
10 compressions/ 1 breath	6	1	2	9	0.005
30 compressions/ 1 breath	5	3	3	11	
30 compression/ 2 breaths	13	30	47	90	
Not able to answer	1	0	1	2	
DRUG OF CHOICE FOR ANAPHYLAXIS					
Adrenaline	17	21	26	64	0.068
Antihistamine	3	9	9	21	
Corticosteroids	2	2	15	19	
Vasodilators	3	2	3	8	

Bold indicates statistically significant p value at <0.05.

Discussion:

Although medical emergencies in dental practice are infrequent, they are not impossible. Several factors, including patient anxiety, advanced age, fear of dental procedures, and lengthy appointments, can significantly increase the likelihood of such incidents. The primary goal should be prevention, with a key measure being a thorough medical history before any dental procedure, regardless of its complexity¹². Our study found that most dental care providers adhered to this protocol, aligning with other studies that highlight its role in identifying risks and modifying treatment plans accordingly¹³.

Vital signs serve as essential indicators of a patient's physical and mental well-being, providing a baseline for monitoring changes^{14,15}. Recording vitals, such as temperature, blood pressure, pulse, and respiratory rate, should be a routine practice for all healthcare providers. In our study, 84.8% of participants reported taking vital signs before initiating treatment, while 15.2% neglected this practice. The comparison among different year residents did not yield significant differences.

Pakistan needs structured training workshops on emergency management. Such workshops should be a mandatory component of the third and final-year curriculum, as many students lacked confidence in handling medical emergencies. The preparedness of a dental clinic is reflected in its emergency management protocols, with an emergency kit being a crucial component¹⁵. Our findings show that 82.1% of respondents were aware of the availability of emergency kits. Most had adequate knowledge regarding the use of adrenaline, antihistamines, and hydrocortisone. However, awareness of atropine was insufficient. Institutions must emphasize emergency pharmacology in clinical training, as proper drug knowledge can be lifesaving¹⁶.

Syncope emerged as the most frequently reported emergency, followed by anxiety, aligning with studies published in 2021^{17,18}. Prompt diagnosis and management are crucial in such cases. A significant number of respondents knew the correct patient positioning to alleviate symptoms. However, knowledge levels did not significantly vary across different year groups.

Accidental ingestion of dental instruments and prostheses has been documented worldwide¹⁹. Literature suggests that the Heimlich maneuver or abdominal thrust should be performed immediately in such cases. While most participants in our study were familiar with the Heimlich maneuver, awareness of the abdominal thrust technique was lacking. No significant difference in knowledge was found among different groups.

In cases of cardiac arrest, the American Heart Association (AHA) recommends immediate activation of Emergency Medical Services (EMS) to improve patient outcomes²⁰. Alarming, only 17.8% of respondents were aware of EMS, though 68.7% had a fair understanding of CPR. Regarding the correct chest compression site, 50% marked mid-chest and 23.2% identified the area above the xiphisternum, consistent with AHA guidelines²¹. Notably, interns demonstrated a significantly higher knowledge level in this aspect compared to other groups, perhaps due to a BLS training workshop.

Spontaneous bleeding is the most common post-extraction complication. Literature emphasizes that vasoconstriction, achieved by applying gauze to the wound with firm biting pressure, is the first-line approach²². Most respondents were familiar with this technique, but fewer were aware of adjunctive measures such as gelatin sponges and local anesthetic agents.

For anaphylaxis management, most respondents correctly identified adrenaline as the first-line drug, followed by antihistamines and steroids. However, a few

mistakenly selected vasodilators, despite literature supporting adrenaline as the drug of choice for acute anaphylaxis²³.

Regarding epileptic seizures, 86.6% of respondents correctly identified the standard protocol—turning the patient to their side to prevent aspiration of secretions or foreign objects, with intravenous diazepam as a secondary measure if the seizure persists²⁴. Similarly, for angina, the majority correctly selected sublingual nitroglycerine as the preferred drug, consistent with literature²⁵, while others demonstrated inadequate knowledge in this area.

Overall, our findings highlight significant gaps in emergency preparedness and reinforce the urgent need for standardized training programs in Pakistan's dental curriculum.

Conclusion:

Although dental students and interns in our study had the basic knowledge for the management of medical emergencies. This knowledge was not enough to boost their confidence in handling such situations, for which they need hands-on workshops. Moreover, there is no statistically significant difference in the level of knowledge between the Third year, Final year, and interneers.

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