



## Preparedness And Awareness About Handling Medical Emergencies In Dentistry

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### Abstract

#### Aim

To assess the awareness of various medical emergencies experienced and the management protocols undertaken by the dental undergraduate and postgraduate students.

#### Objectives

##### The Objectives are as Follows

1. To determine self-perceived competence among dental students about the basic procedures that aid in handling medical emergencies
2. To analyze the attitude of dental students towards handling of medical emergencies
3. To evaluate the knowledge of dental students regarding prevention and management of medical emergencies and their training experience.

#### Material and Methods

A cross-sectional study was conducted and a total of 200 dental undergraduate and postgraduate students of a Dental College and Hospital in North India participated in the study. The students were asked to fill an electronic self-administered two-part questionnaire comprising of questions on personal information like age, gender, position (student or faculty), years of experience, and number of working hours per day. In addition, the students were tested on their knowledge of the various medical emergencies encountered by a dental professional and their prevention and management protocols.

## **Results**

24.7% of the dental students that participated in the study have encountered a medical emergency during patient procedures. With 76% of the participants admitting to having received no practical training in the management of medical emergencies there is a widespread need for inclusion of separate medical emergency management programs and workshops within their curriculums. Most students are willing to undergo proper training to handle emergencies and also support the addition of separate ALS and BLS courses.

## **Conclusion**

Dental students should be well trained in handling medical emergencies. There is an overall room for improvement regarding self-estimation of competence in emergency management and need for reforms in the dental education curriculum. This should include regular participation in life support courses as well standardisation of courses specially designed for dental students.

## **Keywords**

Medical emergencies, dental undergraduates and postgraduates, competence

## **Introduction**

Medical emergencies can and do occur in a dental practice setting. The dentist has responsibility to

recognise them and initiate primary emergency management procedures in an effort to reduce morbidity and mortality when such adverse events arise. The risk can be reduced by ensuring that basic emergency equipment and medications are in place and the dental students are appropriately trained in basic life support measures. This article aims to provide an overview of the knowledge about the basic emergency drugs and equipment that should be present in dental practices, and to discuss specific responses to some of the more common adverse medical events that can be encountered while providing dental treatment. The incidence of emergency events seen in the general practice setting is rare but when an emergency does occur it can be life threatening. The more common problems include vasovagal syncope (faints), hypoglycaemic episodes, angina, seizures, choking, asthmatic attack and anaphylaxis. [15] It has been reported that medical emergencies occur in dental hospital practice more frequently but in similar proportions to those in general dental practice [3].

## **Emergency Drugs In The General Dental Practice**

To manage the more common medical emergencies encountered in general practice, the following drugs should be available

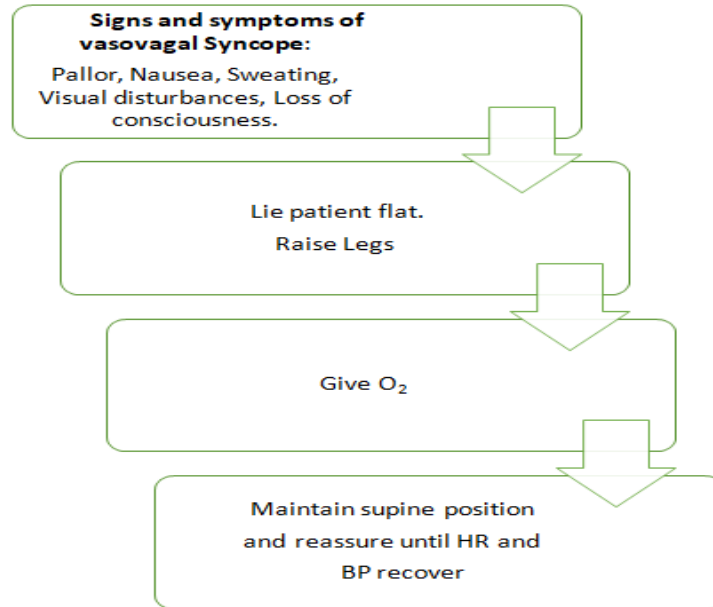
1. Oxygen
2. Oral glucose solution/ tablets/gel/ powder
3. Glucagon injection 1mg IM.
4. Salbutamol aerosol inhaler (100 micrograms/ actuation).
5. Adrenaline IM injection (1:1000, 1mg/ml)
6. Glyceryl trinitrate (GTN) sublingual spray (400 micrograms/dose)
7. Aspirin dispersible (300mg)
8. Midazolam 5mg/ml or 10 mg/ml (buccal or intranasal)

## Specific Responses To Emergency Situations

### Vasovagal Syncope

Syncope is defined as sudden, transient loss of

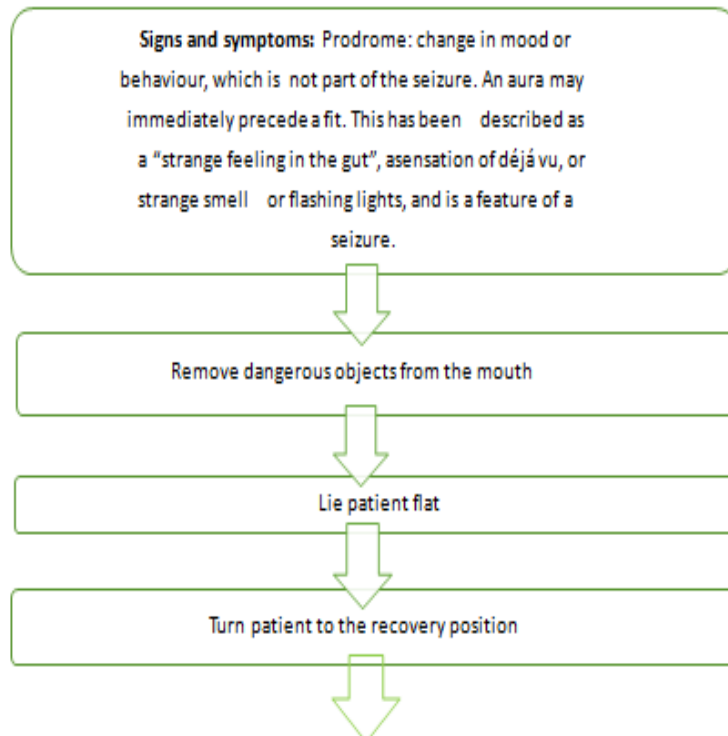
consciousness, with spontaneous recovery. This is a neutrally mediated response and is commonly provoked by emotion, pain, fear or standing for long.

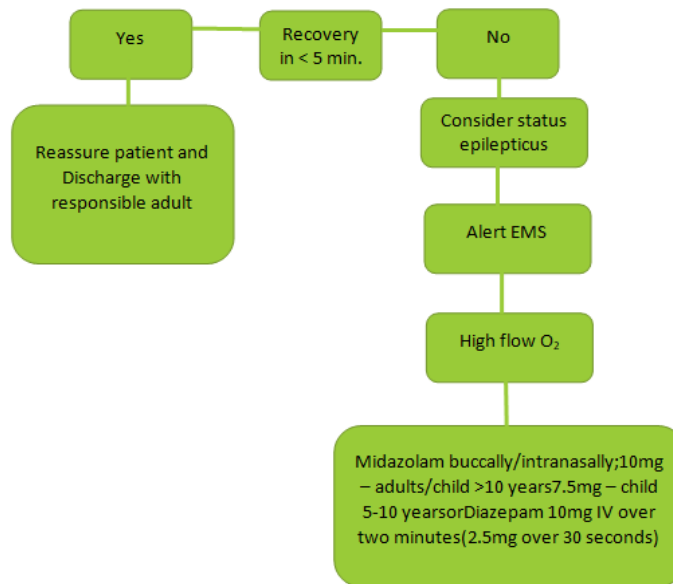


### Epilepsy

This is a recurrent tendency to spontaneous, intermittent, abnormal electrical activity in a part of the brain, manifesting as seizures. [16] Seizure types are

characterised firstly according to whether the source of the seizure within the brain is localised (partial or focal seizure) or widely distributed (generalised seizures).

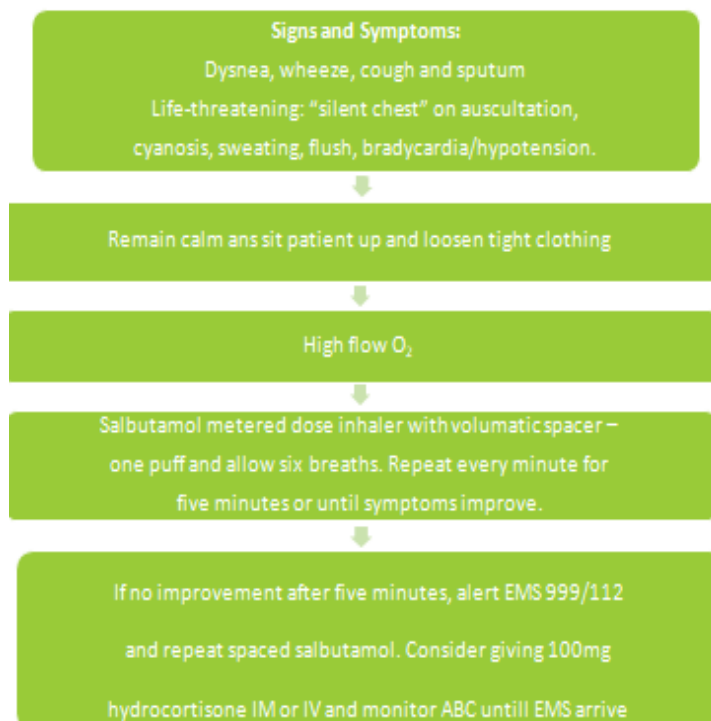




### Asthmatic Attack

Asthma is characterised by recurrent episodes of dyspnoea, cough and wheeze caused by reversible airway obstruction. It is the most common respiratory disease in

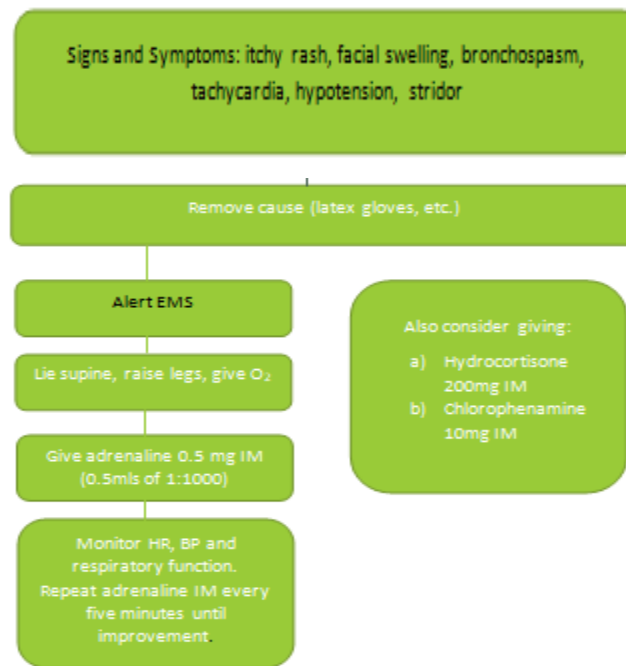
adults; approximately 80 people die in Ireland every year from it – this is more than one death per week and 30% of these are under 40 years of age. [17]



### Anaphylaxis

Anaphylaxis is a generalised immunological condition of sudden onset, which develops after exposure to a foreign substance. It ultimately results in the

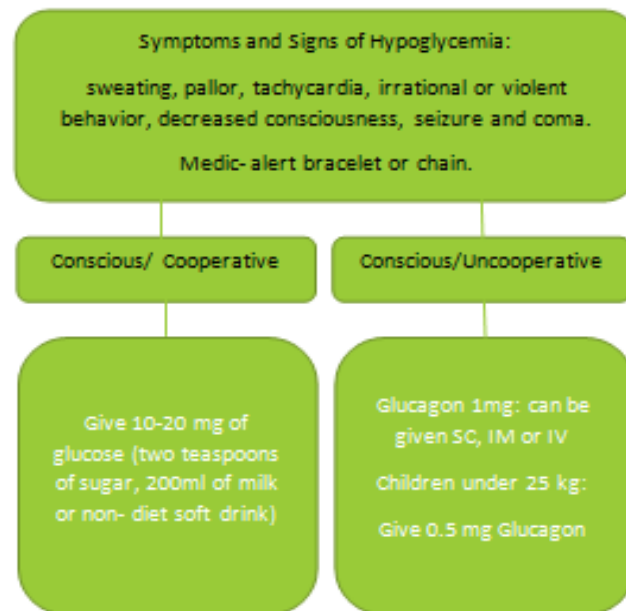
release of inflammatory mediators (histamine, prostaglandins, thromboxanes, platelet-derived growth factors and leukotrienes) producing clinical manifestations.



### Hypoglycaemia

Plasma glucose is normally maintained at levels between 3.6 and 5.8mmol/l. Cognitive function deteriorates at levels <3mmol/l. In people with

diabetes, the most common cause is a relative imbalance of the administered versus required insulin or oral hypoglycaemic drugs.



To ensure that the response to emergency situations is maximised, it is advised that regular audits be conducted in the practice. Emergency medical drugs and equipment need to be checked on a weekly basis. Response times of staff during training sessions need to

be appropriate. Any emergency events that occur require recording and debriefing. Where deficiencies are identified, steps need to be taken to implement improvement

## Materials and Methods

The present study was a descriptive cross-sectional (questionnaire) study. The study population consisted of dental undergraduate and postgraduate students. The study was conducted among 200 dental students from November 2020 to January 2021 and the duration of the study was three months.

## Questionnaire Survey

The main instrument to collect information was an online questionnaire using google forms. The questionnaire was designed to measure knowledge and awareness about the different medical emergencies encountered in dental schools and hospitals. The dental student's attitude and competence in handling medical emergencies in clinical set up was assessed. The survey was a structured multiple-choice questionnaire divided into two sections. Section I included an informed consent statement that described the participation was voluntary and by clicking on the "YES" option, participants were informed that they were consenting to complete the survey. Section II comprised of 26 questions

depicting demographic analysis (age, gender, qualification, workplace), and awareness regarding the medical emergencies (competence in handling medical emergencies, performing basic life support and cardiopulmonary resuscitation, knowledge of emergency drugs and their routes of administration, patient medical record maintenance etc).

The questionnaire delivered to the study subjects was handed over personally and via social media platforms. All data was collected and analysed by multiple logistic regression analysis using SPSS software, version 20 ( $\alpha=0.05$ ).

## Results

A total of 150 questionnaires were returned, representing a response rate of 75.0%. Rest of the subjects either didn't participate or didn't complete the questionnaire. This study included a total of 150(111 females and 39 males) dental students. Their age ranged from 15-35 with 72% in the age group of 20-25 years. The participant's characteristics are shown in Table 1. 90% of the dental students were undergraduates and 10% postgraduates.

**Table 1:** The characteristics of the 150 dental students enrolled in the study.

Variable	Dental Students	n(%)
Age Group		
15-20 yrs.	24	16%
20-25 yrs.	108	72%
25-30yrs.	18	12%
30-35 yrs.		
Gender		
Male	39	26%
Female	111	74%
Position		
Undergraduate	135	90%
Postgraduate	15	10%

## Awareness About The Medical Emergencies Among Dental Students

Table 2 illustrates awareness among dental students about the various medical emergencies encountered in a dental school or hospital. Majority of the participants knew how to correctly diagnose a medical emergency. When asked if they were aware of the common medical emergencies encountered in a

dental college and hospital, 92% answered yes. 80% of the participants were aware of the common drugs and materials that are known to precipitate allergic reactions. A mixed response was reported when asked if the participants considered themselves competent in handling medical emergencies. 66.7% were aware of conditions that will require antibiotic prophylaxis before endodontic or invasive dental procedures.

**Table 2:** Awareness about the medical emergencies among dental students

Questionnaire	Dental Students	n%
1. Awareness of the common medical emergencies seen amongst patients in a dental setting		
Yes	138	92%
No	12	8%
2. Competent in diagnosing medical emergencies		
Yes	77	51.3%
No	73	48.7%
3. Awareness of the common drugs and materials in dentistry that can precipitate an allergic reaction		
Yes	120	80%
No	30	20%
4. Proper awareness about the commonly used emergency drugs and their routes of administration		
Yes	92	61.3%
No	58	38.7%
5. Awareness of conditions that will require antibiotic prophylaxis before endodontic or invasive dental procedures		
Yes	50	33.3%
No		

## Incidence And Knowledge About Medical Emergencies Among Dental Students

66% participants admitted to have received theoretical training in handling medical emergencies whereas 24% received practical training in the handling the same. A majority (75.3%) reported to have never encountered a medical emergency while performing a dental procedure. 64.7% correctly identified syncope as the most common medical emergency encountered by a dentist. A mixed response was received when asked

about the first line of action while performing CPR, with the majority picking the incorrect choice. Whereas a majority were aware that the immediate line of action during a dental procedure if a patient suffers from syncope was to place the patient in the Trendelenberg position. With only 20.7% having attended a proper workshop pertaining to the management of medical emergencies, 100% participants showed willingness to undergo proper training to handle them and supported the addition of separate ALS and BLS courses.



**Table 3:** Knowledge about different medical emergencies among dental students

Questionnaire	Dental Students	n%
1. Type of training received for handling medical emergencies		
Theoretical	99	66%
Practical	36	24%
None	15	10%
2. Encountered a medical emergency while performing a dental procedure		
Yes	37	24.7%
No	113	75.3%
3. The most common medical emergency encountered by dentists		
Syncope	97	64.7%
Airway obstruction	13	8.7%
Anaphylaxis	23	15.3%
Asthmatic attack	2	1.3%
Hemorrhage	7	4.7%
Seizures	8	5.3%
4. First line of action while performing CPR		
Call the emergency services	47	31.3%
Check the patient's responsiveness	27	18%
Open the airway and check for breathing	55	36.7%
Deliver rescue breaths and chest compressions	21	14%
5. Immediate line of action during a dental procedure if a patient suffers from syncope		
-Sit the patient in an upright position	39	26%
-Place the patient in Trendelenberg position	103	68.7%
-Ask the patient to stand up and walk around	8	5.3%
6. Find the training received in handling medical emergencies adequate		
Yes	72	48%
No	78	52%
7. Willingness to undergo proper training to handle medical emergencies		
Yes	150	100%
No		
8. Attended any workshops pertaining to medical emergencies and their management		
Yes	31	20.7%
No	119	79.3%

### Attitude Of Dental Students Towards Medical Emergency Management

Table 4 demonstrates the attitude of dental students towards handling of medical emergencies. 100% of the dental students that participated in the study agreed that they should be well versed in handling medical emergencies. 81.3% reported that it is important

to record a patient's vitals during history taking. A vast majority (98%) strongly agreed that a thorough medical history record including medication and allergies is important before any dental procedure. 95.3% of the participants reported that a separate BLS and ALS program should be part of a dental student's curriculum.



**Table 4:** Attitude of dental students towards handling of medical emergencies

Questionnaire	Dental Students	n%
1. Dental students should be well versed in handling medical emergencies		
Yes	150	100%
No		
2. Patient's vitals must be recorded before treatment during history taking		
Yes	122	81.3%
No	28	18.7%
3. A thorough medical history record including medication and allergies is important before any dental procedure		
Yes	147	98%
No	3	2%
4. A separate BLS and ALS program must be there for dental students		
Yes	143	95.3%
No	7	4.7%

### Self-Perceived Competence About The Basic Procedures That Aid In Handling Medical Emergencies

Table 4 shows the self-perceived competence among the participants about a few basic procedures that aid in handling medical emergencies. Majority of

the undergraduate students were in adept in giving intravenous and intramuscular injections. Whereas, a higher percentage of post graduates knew how to administer them. Most students consider themselves confident in performing basic life support, cardiopulmonary resuscitation and the heimlich man oeuvre.

**Table 4:** Self-perceived competence about the basic procedures that aid in handling medical emergencies.

Questionnaire	Dental Students	n%
1. Can give an intravenous injection		
Yes	45	30%
No	105	70%
2. Can give an intramuscular injection		
Yes	49	32.7%
No	101	67.3%
3. Can perform basic life support		
Yes	89	59.3%
No	61	40.7%
4. Can perform Heimlich manoeuvre		
Yes	44	29.3%
No	106	70.7%
5. Can perform cardiopulmonary resuscitation		
Yes	74	49.3%
no	76	50.7%

## Discussion

This survey evaluates medical emergencies and emergency management in a dental college and hospital in North India. The occurrence of medical emergencies in dental practice is a subject which has received scant attention in the dental literature during the past 20 years. This study is one of the questionnaire-based studies dealing with medical emergencies in dental practice. The importance of achieving adequate response rates in online questionnaire studies is to avoid bias. Dental graduates and post graduates have to deal with large number of patients and are likely to encounter medical emergencies during their practice. In a previous study conducted to evaluate the incidence of emergencies in dental practices in Germany over a 12-month period, 57% of the dentists reported up to 3 emergencies and 36% of the dentists reported up to 10 emergencies.[1] In another study conducted over a 10-year period, an emergency event was reported, on average, for every 4.5 years in England and 3.6 years in Scotland.[2] Our data shows that medical emergencies in dental practice are not frequent, with an incidence of 2.8 events per dental professionals per year. Also, significantly higher number of post-graduates have knowledge about emergency drugs and materials precipitating allergic reactions in patients, as compared to undergraduates. As shown in our study more than 50% of the dental students were confident in diagnosing medical emergencies and had proper knowledge about the commonly used emergency drugs and their routes of administration. Not surprisingly, we found that the most frequent emergency encountered by dental surgeon is vasovagal reaction, which is in accordance with previous studies [4] according to Collange et al. [5] We found a correlation between the experience of practitioners and the occurrence of vasovagal syncope. The lack of data about medical emergencies in dental practice perpetuates unnecessary habits in equipment and in the education of

dental surgeons. Self-confidence is the first step, necessary but not sufficient, to the competence in the management of medical emergencies. A large majority of respondents felt unable to administer intravenous and intramuscular injections. The competency to administer IM (43.8%) and IV (49.4%) injections was reported to be higher among the participants of Shenoy et al. [8] study as compared to our study. However, it seems normal that students feel capable of handling a situation they meet regularly and feel less comfortable with a situation they have probably never met. [6]

In the present study, though most of participants have received theoretical training to handle medical emergency, but they lack practical training. A study conducted by Ehigiator et al.[7] among Nigerian dental students showed that 8.1% of the participants had received only practical training, 21.8% had received only theoretical training, 28.2% had received both type of training whereas 41.9% had received no training at all.

During medical emergencies, BLS is a key component which improves the chances of survival as it prevents CNS from undergoing irreversible damage due to hypoxia or anoxia. Thus, providing BLS to patients is certainly an important step before definitive treatment is planned. [8,9] Present study showed that only one-fourth of participants have practical training to handle medical emergencies. In study by Jodalli et al. [10], it was found that only 57.1% participants have received BLS training. Therefore, it is evident that there is an alarming need for a separate and thoroughly planned BLS and ALS programme for dental professionals.[11]

A survey study by Morgan and Westmoreland [13,12] showed that 22% of junior doctors who were members of a cardiac arrest team did not feel competent to perform cardiopulmonary resuscitation

Although, the result of this study shows that post-graduates are better trained and more confident about handling of medical emergencies as compared to undergraduates, still both the groups lack adequate skill, training and knowledge to handle medical emergencies efficiently.

In the conducted study, the absolute number of returned questionnaires is higher than in previous studies on emergencies in dental practice. [14] This high number of questionnaires gives us an insight into emergency management in dental practice. The long questionnaire was used to evaluate not only the incidence of emergencies but also the attitude, training experience equipment and self-estimation of knowledge. Self-estimation of competence may be biased by social desirability.[16] However, our data clearly show a lack of training experience, so it is unlikely that the competence of dentists to treat emergencies is much higher than they think.

### **Conclusion**

Dental students should be confident and prepared to deal with medical emergencies arising during their practice. However, the data from our study and other recent studies showed lack of competence and confidence among them to deal with medical emergencies. This is pointing towards an alarming situation that should be dealt by Dental Councils around the globe. Reforms in the dental curriculum and thorough training of dental students at an initial stage will help to increase their confidence and competence to deal with medical emergencies. There is an overall need for improvement regarding self-estimation of competence in emergency management. This should include regular participation in life support courses as well as standardisation of course especially designed for dentists.

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