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Knowledge and ability to manage medical emergencies among dental students

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ABSTRACT

Aim: An emergency can be encountered anytime and anywhere. Minimal knowledge about medical emergency and their etiology, primary protocol for management must be known to avoid potential consequences. Hence, the present study was undertaken to compare the knowledge, and ability to handle the medical emergencies among the dental students.

Materials and Methods: A cross-sectional survey was conducted among 100 randomly selected dental students (post-graduate students and interns) comprising of two groups of students those who had underwent training and those who did not. The data obtained was analyzed using the SPSS for windows version 22.0 released 2013.

Statistical Analysis: Independent chi square test was used for comparison of responses and independent student t-test was used for the comparison of mean scores. The significance level was set at $p<0.001$.

Results: The average mean knowledge and ability score was 68% & 61.4% respectively among the participants. On further comparison of mean knowledge & ability scores between the participants with & without basic life support training, participants with BLS training showed better knowledge than those without training and the difference was statistically significant between the two groups ($p<0.001\%$).

Conclusion: The study found deficiencies in the knowledge and ability of untrained graduates to deal with medical emergencies as compared to trained.

1. Introduction

Medical emergency can be encountered anytime and anywhere. It is a medical condition requiring immediate attention and treatment. A medical emergency or complication may range from a syncope to an acute anaphylactic shock which have been proven to be life threatening. Medical emergencies in dental practice are generally recognized as being rare. Nonetheless, recent studies have shown that such incidents occur on a regular basis.

The average incidence of emergencies in dental practice is 7.5 per dentist over a period of 10-years and this warrant for the need of basic knowledge to identify, access and manage emergency situations in one's practice.[1] Medical emergencies are 5.8 times more likely to occur in dental offices than in medical offices.[2] Stressful environment, that the patient has to go through, may be considered as one of the reason.

Efficient management of an emergency situation in the dental office is ultimately the dentist's liability. The lack of training and ability to cope with medical emergencies can lead to tragic consequences and sometimes legal complications.[2] Minimal knowledge about medical emergency and their etiology, primary

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protocol for management must be known to avoid potential consequences among dentists.

The purpose of the present study was to assess the knowledge and ability of the dental graduates and post graduates to manage medical emergencies and to determine the association between knowledge and ability among trained and untrained dental students in handling the medical emergencies in dental office.

2. Materials and Methods

A cross-sectional questionnaire survey was conducted among interns and postgraduates of Dental course at our institute. The sample was selected since they are taught about medical emergencies in dental office in their curriculum. Sample was divided into 2 groups (i.e trained and untrained) based on whether the participants have regularly attended the Basic Life Support (BLS) training during their curriculum. All participants were asked to report about their gender, age and year of study.

A self-administered structured closed-ended questionnaire (Annexure 1 & 2) was prepared with few questions adopted from the study conducted by Mohan M et al.[3] This questionnaire which consisted of eighteen objective questions was distributed among 100 randomly selected postgraduate students and interns. A comparison of knowledge and ability was made between the students who had undergone medical emergency training and those who did not.

The questionnaire consisted two sections of questions

1. Knowledge of participants related to medical emergencies (twelve close-ended questions).
2. Ability of participants to manage medical emergencies (six close-ended questions).

For every correct answer, a score of 2 was assigned and a score 0 for every incorrect answer. The total score for each participant was obtained adding the score of each answer for knowledge and ability separately. Score of 75% and above, between 50-75%, between 25-50% and score less than 25% was considered as excellent, good, average and poor knowledge respectively.

Score of 75% and above, between 50-75% and score less than 50% for ability to manage the emergency were graded as more confident, moderately confident and not confident respectively.

The data obtained was analyzed using the SPSS for windows version 22.0 released 2013. Armonk, NY:IBM Corp. Independent chi square test was used for comparison of responses and independent student t-test was used for the comparison of mean scores. The significance level was set at $p<0.001$.

3. Result

The survey was conducted on 100 dental students out of which 60 (60%) participants were interns and 40 (40%) were post graduates. The age of the participants ranged from 21-30 years out of which 23% were in between 26-30 years and 77% were between 21-25 years and male to female ratio was 1:1 (Table 1). Out of 100 participants 43 had undergone regular Basic Life Support training & 57 were who did not receive training.

The average total mean knowledge score was 68% (good knowledge) among the participants, interns exhibited average knowledge with 41.5% as compared to postgraduates who exhibited excellent knowledge with 82.4% (Table 2). On comparison of mean knowledge scores between the participants with & without basic life support training participants with BLS training showed better knowledge than those without training and the difference was statistically significant between the two groups ($p<0.001\%$)(Table 3). The maximum score (97.7%) was for the question "Rate of chest compression in adults and children during CPR" by the trained students and the minimum score (5.3%) was for the question "C.P.R should be given when you suspect" by the untrained students (Table 4). Among 43 trained participants 42 (97%) correctly answered for the order of approach to manage medical emergencies and 41 correctly answered for locating the area of chest compression (Table 5).

Table 2: Distribution of Knowledge among study subjects

Participants	Knowledge
Interns (77)	41.5 % (31)
Post Graduates (23)	82.4% (20)

The study showed that the overall average mean score for ability to perform BLS was 61.4% (less capable) among the participants, while most of the interns were not confident to perform BLS (39.2%) as compared to postgraduates who showed more confident ability to manage medical emergencies (79.4%) (Table 6). On comparing the mean ability scores between the participants with & without Basic life support training, a significant difference was noted among the two groups which was found to be statistically significant ($p<0.001\%$) (Table 7).

About 93% of the trained students have responded that they can handle any emergency condition but only 5.3% of the untrained students responded they can handle the emergency confidently (Table 8).

4. Discussion

The results of our study revealed several remarkable facts regarding the knowledge, and ability of dental graduates to manage medical emergencies. Our study showed an overall good knowledge of the students about medical emergencies

Table 1: Age and Gender distribution among study subjects

Variables	Category	n	%	Age Range (21 – 56 Yrs)	
Age	21-25 yrs	77	77%		
	26-30 yrs	23	23%	MEAN	SD
Sex	Males	50	50%	23.89	1.90
	Females	50	50%		

Table 3: Comparison of mean knowledge scores between the participants with & without BLS training using Independent Student t Test

Domain	BLS	n	Mean	SD	Min	Max	Mean Diff	P-Value
Knowledge	Yes	43	8.49	1.01	6	10	4.79	<0.001*
	No	57	3.70	1.87	0	7		

* -Statistically Significant

Table 4: Questionnaire : knowledge of medical emergencies

	Trained 43 (%)	Untrained 57 (%)
1. If A=airway, B=breathing, C=circulation, D=definitive care, P=position. What should be the order of your approach to handle emergency situation?	42(97%)	18(31%)
2. Which maneuver can be used to open the airway	40(93%)	18(31 %)
3. C.P.R should be given when you suspect?	34(79%)	3(5.3%)
4. What is the location for chest compression in CPR (in adults)?	41(95.3%)	8(14%)
5. Rate of chest compression in adults and children during CPR	42(97.7%)	10(17.5%)
6. Do you think compression-ventilation ratio is same for adults and children	43(99%)	30(52.6%)
7. When you find someone unresponsive on the road, which among the following should be activated?	41(95.3%)	19(33.3%)
8. Defibrillator should be used when...	31(70%)	15(26.3%)
9. In case of anaphylaxis which is the single most essential drug to be administered?	39(90%)	24(42.1%)
10. If the patient has sudden chest pain on the dental chair, what will be your first step?	28(65%)	13(22.2%)

Table 5: Comparison of responses between the participants with & without BLS training using Chi Square Test

Questions	Responses	Yes	%	No	%	c2 Value	P-Value
Order of Approach to handle emergency Situation	B>A>C>D>P	0	0.0%	2	3.5%	45.238	<0.001*
	A>B>C>D>P	0	0.0%	33	57.9%		
	P>A>B>C>D	42	97.7%	18	31.6%		
	D>P>A>B>C	1	2.3%	4	7.0%		
Location for chest compression	Centre of chest of the subject	41	95.3%	8	14.0%	65.965	<0.001*
	Left side of the chest	0	0.0%	25	43.9%		
	Over the Xiphoid region	2	4.7%	12	21.1%		
	Any of the above	0	0.0%	12	21.1%		

Table 6: Distribution of Ability percentage among study subjects

Participants	Ability
Interns (77)	39.2%
Post Graduates (23)	79.4%

Table 7: Comparison of mean Ability to Manage emergency scores between the participants with & without BLS training using Independent Student t Test

Domain	BLS	n	Mean	SD	Min	Max	Mean Diff	P-Value
Ability	Yes	43	3.56	1.18	1	6	2.84	<0.001*
	No	57	0.72	0.82	0	3		

* -Statistically Significant

Table 8: Comparison of responses between the participants with & without BLS training using Chi Square Test

Questions	Responses	Yes		No		X2 Value	P-Value
			%		%		
Handle any emergency condition	Yes	40	93.0%	3	5.3%	77.018	<0.001*
	No	3	7.0%	54	94.7%		
Immediate plan of action	Rapid defibrillation	8	18.6%	20	35.1%	21.734	<0.001*
	Activation of emergency system	31	72.1%	15	26.3%		
	Put in recovery position	4	9.3%	21	36.8%		
	Observe	0	0.0%	1	1.8%		
First response on Spot	Give black blows	8	18.6%	27	47.4%	22.584	<0.001*
	Give chest compression	1	2.3%	11	19.3%		
	Give abdominal thrusts	33	76.7%	17	29.8%		
	None of the Above	1	2.3%	2	3.5%		
First response on Spot is colleague is a Pregnant	Give abdominal thrusts	8	18.6%	25	43.9%	21.274	<0.001*
	Give Chest compression	21	48.8%	5	8.8%		
	Don't know	11	25.6%	20	35.1%		
	Give back blows	3	7.0%	7	12.3%		
Ability to maintain patent airway in unconscious patients	Very confident	13	30.2%	1	1.8%	59.207	<0.001*
	Less confident	30	69.8%	13	22.8%		
	Don't know	0	0.0%	43	75.4%		
Ability to perform CPR	Very confident	15	34.9%	0	0.0%	64.119	<0.001*
	Less confident	27	62.8%	11	19.3%		
	Don't know	1	2.3%	46	80.7%		

in dental office. The total mean knowledge in our study was found to be 68.1%, where as Baduni et al[4] and Sangamesh N C et al[5] in their study reported a mean knowledge score of 45.95% and 48.5% respectively. The reasons for this variation could be due to difference in the target population studied and sample size. Majority of the post graduate students showed higher level of knowledge about medical emergencies as compared to the internees. The level of knowledge was associated significantly with the year of study (p<0.001%). This may be attributed to the improved knowledge acquired as one progresses through the curriculum. On comparison of knowledge percentage between the trained and untrained students, the trained students showed excellent knowledge as compared to the untrained students. In the present study 52% of the responders answered the rate of chest compression as 100/minute, Chandrasekaran et al[6] and Bindu AS et al[6] noted 35% and 23.2% of the participants with similar response respectively. More than half of the participants (51%) did not know the exact location of chest compression in the present study which was more prevalent among untrained participants. Chandrasekaran et al[6] and Bindu AS et al[7] also reported lower percentage of students correctly answering the location of chest compression. Majority of the participants who did not have a prior training in BLS showed very poor knowledge regarding CPR maneuver.

The present study showed that the overall mean score for ability to perform BLS was 61.4%. Kumaraswami S et al[8] reported a significantly higher ability score of 86% in their study comprising of dental practitioners who might have a first hand experience on exposure to these kind of emergencies. In the present study, it was noted that trained interns and post graduates were more capable to manage medical emergency as compared to the untrained interns and post graduate students and the difference was statistically significant (p<0.001). In the present study none of the untrained student showed the ability to maintain patent airway in an unconscious patient.

Based on the studies conducted worldwide, the risk of medical emergency occurrence in dental offices is 0.08–2.5 percent, with syncope being known as the most prevalent.[9–11]

Although inevitable emergencies occur in dental office, the dentists should be aware of such incidents in terms of patient assessment and management. Hence, all the medical and dental academic institutions should give an immense value in training all the students and faculties in the simple procedures collectively known as BLS.

As found by Chaudhary et al,[12] there was a significant improvement in the knowledge and skills among the medical and paramedical staffs at the end of their BLS training session as compared to the pre-training session. It was reiterated that regular BLS training & update is essential for the retention of skills and to maintain the competency, which is also perceived from the findings of our study.

Since the present cross-sectional survey was conducted among students studying in a single dental school, the observations cannot be generalised. Also our study did not assess the practical skills of the participants in order to have

any conclusion on their clinical ability to perform BLS. Hence we propose that a similar study be conducted on a large sample comprising of not only the students but also the private practitioners in order to know the level of the problem existing among the dental surgeons in handling the medical emergency.

5. Conclusion

The survey shows that the dental graduates are not adequately prepared to handle medical emergency arising during dental treatment. The study found deficiencies in the knowledge and ability of untrained graduates to deal with medical emergencies as compared to trained. As they say – "Be prepared for the emergency and the emergency seizes to exist". We suggest that all the dental students should be regularly exposed to the practical sessions in dealing with a medical crisis. Every dental institution should incorporate a skill laboratory for such learning purpose and updating the knowledge.

Annexure 1

Knowledge of medical emergencies among dental students

1. Have you undergone any medical emergency and/or Basic Life Support training?
   (a) Yes
   (b) No
2. If A=airway, B=breathing, C=circulation, D=definitive care, P=position. What should be the order of your approach to handle emergency situation?
   (a) B→A→ →C→D→P
   (b) A→ →B →C→D→P
   (c) P→A →B→C→D
   (d) D→P→A →B→C
3. Which maneuver can be used to open the airway
   (a) Sweep finger in mouth
   (b) Head tilt – chin lift
   (c) Chin tilt – head lift
   (d) Chest compression method
4. C.P.R should be given when you suspect?
   (a) Angina
   (b) Myocardial infarction
   (c) Cardiac arrest
   (d) Syncope
5. What is the location for chest compression in CPR (in adults)
   (a) Centre of the victims bare chest between the nipples
   (b) Left side of the chest, over the apex-beat.
   (c) Over the xiphoid region
   (d) Any of the above
6. What is the depth of compression in adults during CPR?
   (a) About 2 inches
   (b) 21/2 – 3 inches
   (c) Less than 2 inches
   (d) According to your comfortable level.
7. Rate of chest compression in adults and children during CPR ?
   (a) At least 100/min
   (b) At least 90/min
   (c) At least 80/min
   (d) At least 70/min
8. Do you think compression-ventilation ratio is same for adults and children?
   (a) Yes
   (b) No
9. When you find someone unresponsive on the road, which among the following should be activated?
   (a) Effective medical services
   (b) Emergency management services
   (c) Emergency medical services
   (d) External medical services.
10. Defibrillator should be used when. . . ..
    (a) Patient feels breathless
    (b) Patient is unconscious and the carotid pulse is felt
    (c) Patient is conscious and the carotid pulse is felt
    (d) Patient is unconscious and the carotid pulse is not felt
11. In case of anaphylaxis which is the single most essential drug to be administered?e
    (a) Adrenaline
    (b) Antihistaminics
    (c) Oxygen
    (d) Steroids
12. If the patient has sudden chest pain on the dental chair, what will be your first step?.
    (a) Provide aspirin and provide nitro-glycerin.
    (b) Call for emergency help
    (c) Position the patient in supine position
    (d) Make the patient inhale spirit of ammonia.

Annexure 2

Abilty to manage medical emergencies among dental students

1. Do you think you can handle any emergency condition

(a) Yes
(b) No

2. If any adult person after accident is not responding to you even after shaking and shouting at him, what will be your immediate action plan?

(a) Rapid defibrillation
(b) Immediate recognition of cardiac arrest and activation of emergency response system
(c) Put him in recovery position
(d) Observe

3. If you and your colleague are eating food and suddenly your colleague starts symptoms of choking. What will be your first response on the spot?

(a) Give back blows
(b) Give chest compressions
(c) Give abdominal thrusts
(d) Any of the above

4. If you and your colleague are eating food and suddenly your colleague starts symptoms of choking. What will be your first response? (if your colleague is pregnant/obese)

(a) Give abdominal thrusts
(b) Give chest compression
(c) Give back blows
(d) None of the above

5. How will you rate your ability to maintain patent airway in unconscious patients?

(a) Very confident
(b) Less confident
(c) Don't know

6. How will you rate your ability to perform CPR?

(a) Very confident
(b) Less confident
(c) Don't know

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7. Conflict of Interest

The authors declare no conflict of interest.

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