

DENTAL STUDENTS' PERCEPTION IN MANAGING MEDICAL EMERGENCIES: A CROSS-SECTIONAL STUDY

Lamea Afnan¹, Sunnypriyatham Tirupathi^{2*}

¹Department of Public Health Dentistry, Dr. D. Y. Patil Dental College & Hospital, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India.

²Department of Pediatric Dentistry, Dr. D. Y. Patil Dental College & Hospital, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India. dr.priyatham@gmail.com

<https://doi.org/10.51847/jGY3w0Bu4c>

ABSTRACT

A cross-sectional questionnaire survey was conducted to assess the perception of dental students in managing medical emergencies. Descriptive analysis for the questions on knowledge, attitude, practice, and self-perceived competency was undertaken. Analysis of Variance (ANOVA), Post Hoc test, and Spearman Correlation were applied and results with a p value < 0.05 were considered. The response rate was 100%. Analysis of Variance (ANOVA) test shows that there is a significant association between the academic year and the knowledge, attitude, practice, and self-perceived competency of the students. Post Hoc analysis shows that there is a statistical significance from 4th BDS to postgraduates with regard to the knowledge, attitude, practice, and self-perceived competency. Spearman's correlation depicts a positive correlation between knowledge (+0.263), attitude (+0.294), practice (+0.190), and self-perceived competency (+0.692) and the academic years. Efforts should be made for further improvement in the knowledge, attitude, practice and self-perceived competencies of the students. The medical emergency management training programs like Basic Life Support (BLS), Cardio Pulmonary Resuscitation (CPR) training along with classroom lectures, workshops, Continuing Dental Education (CDE) programs, practical/real-time situations training should be reinforced periodically and repeatedly and skills assessment should be carried out.

Key words: Cross-sectional studies, Dental Office, Dental students, Medical emergency.

Introduction

Dentistry is a branch of medical sciences that involves active clinical practices that could be invasive involving injections, surgeries, extractions, and some long-standing tedious procedures. In the event of these procedures, there are possibilities that some complications leading to a medical emergency could be apprehended. The incidence of these medical emergencies in a dental practice, although not very frequent, is not insignificant [1]. During a dental procedure, the stress-induced could lead to medical emergencies, also the increasing age and reduced general health status could be a possible contributory factor [2]. The various medical emergencies that could be encountered in a dental setup include syncope, foreign-body airway obstruction, heart attack, anaphylactic reaction, convulsions, asthmatic attack, and in rare instances sudden cardiac death [3].

Medical emergencies could befall at any time, in any environment, including within a dental practice. On an average, a dentist experiences at least one medical emergency in two years [4]. The incidence of medical emergencies has been reported by Anders *et al.* at 164 events per million dental visits [5]. A report by Atherton *et al.* has concluded that a dentist who practices for 40 years will be exposed to between nine and eleven emergency events throughout their career [6, 7].

This necessitates the need for dentists to be able to identify the medical emergency in the early stages and manage it. But, most dental students and even recent graduates lack enough knowledge, confidence, and preparedness in managing such emergencies. This could be attributed to the fact that they wouldn't have obtained a training course in the management of medical emergencies or it was not effective enough. Even though training for medical emergency management has been provided to the students in various ways and techniques all across the globe, the students have gained a varying amount of knowledge and it is not satisfactory [8-11].

A dental teaching hospital situated in the northern parts of Karnataka state, India provides mandatory Basic Life Support (BLS) to both undergraduate and postgraduate students. So, this study was conducted to assess the perception of dental students in managing medical emergencies through a questionnaire study.

Materials and Methods

This is a cross-sectional questionnaire study that was carried out amongst the final year BDS students, interns, and postgraduates at a dental teaching hospital, Karnataka. Twenty questions to check the knowledge, attitude, practice, and self-perceived competency in the management of medical emergencies were framed. Face validity and content validity of the questionnaire were checked. The reliability of

the questionnaire was checked. Cronbach Alpha value of 0.80 was obtained, which is good. Sample size was calculated using G*Power3.1.9.4 software (Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany). With an effect size of 0.3 and an alpha error of 5%, the sample size was estimated to be 220. However, a total of 300 subjects were recruited. The study duration was of two months. Before participating in the study, the subjects were informed about the study details regarding the purpose of the study, the procedure followed, and the extent of anonymity and confidentiality and were asked to provide a voluntary written informed consent.

Statistical analysis

The data that was collected from these study participants was then entered on an excel data sheet (Microsoft; Inc, Redmond, Wash). The data were subjected to statistical analysis using the Statistical Package for the Social Sciences (SPSS) software version 21.0 (IBM; Chicago, IL). Frequency and percentages were calculated for the domains of knowledge, attitude, practice, and self-perceived competency of the questionnaires. The overall knowledge, attitude, practice, and self-perceived competency were represented by mean. Analysis of Variance (ANOVA) was carried out to demonstrate the association between the academic year and the knowledge, attitude, practice, and self-perceived competency of the students. Post Hoc Analysis was conducted. Spearman Correlation was applied to record if there was any significant correlation between the academic years and the overall knowledge, attitude, practice, and self-perceived competency of the students. The statistical significance was recorded at a p-value less than 0.05.

Results and Discussion

The response rate was 100%. 34% of the study population comprised males while the majority of them were females accounting for 66% of the population. The results of the questionnaires on knowledge regarding management of medical emergencies in a dental setup are illustrated in **Figure 1**. The knowledge about the management of syncope was higher than in any other medical emergency procedure. This may be because syncope is the most commonly encountered medical emergency [12, 13], and this might have helped the students acquire better knowledge with practical experience as well.

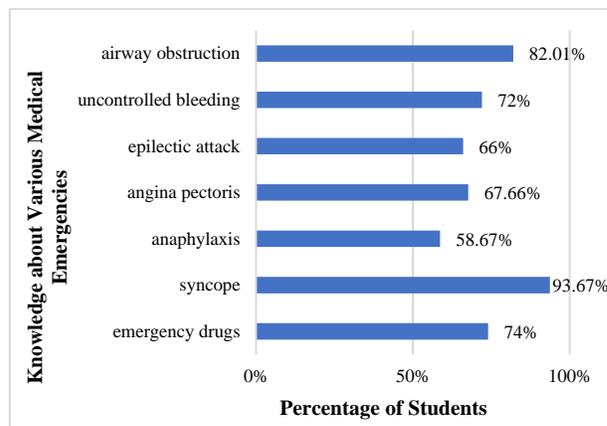


Figure 1. Questions related to Knowledge

89.67% reported that they have received some form of training or the other in the management of medical emergencies. Of which, 80.29% received both theoretical and practical training, while 7.88% received only theoretical training and 11.83% received practical training. The institute provides both theoretical and practical training in accordance with the Dental Council of India (DCI) curriculum. Theoretical knowledge is provided as per the DCI syllabus, and for practical training, the BLS training program is mandatorily delivered to the students as a part of the college curriculum in order to achieve the competency as stated by DCI. **Figure 2** demonstrates the reason for not receiving any form of training. These reasons could probably be further linked with absenteeism. So, bearing in mind the need and importance of students receiving this training, it should be taken into consideration that not a single student misses out on any form of training in medical emergency management.

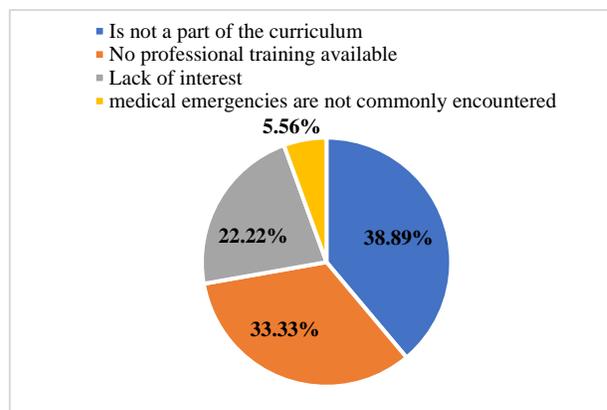


Figure 2. Reasons for not receiving the training in medical emergency

100% of the students believed that recording a proper case history can prevent the occurrence of medical emergencies. Prevention is always better than cure. Likewise, being prepared is also important. Any medical emergency can occur at any given point of time in the clinical operator. So, recording a precise and elaborate medical history is important as this could indicate any underlying conditions

and the need for apprehending medical emergencies and preparedness. Further, 96.67% had a perception that they were skilful in their ability to manage a medical emergency in a dental practice, and yet 75.70% reported that they would be reluctant in performing any medical emergency procedure. **Figure 3** demonstrates the various reasons for their reluctance in performing any medical emergency procedure. This indicates that there is a need for further training of dental students in the management of medical emergencies.

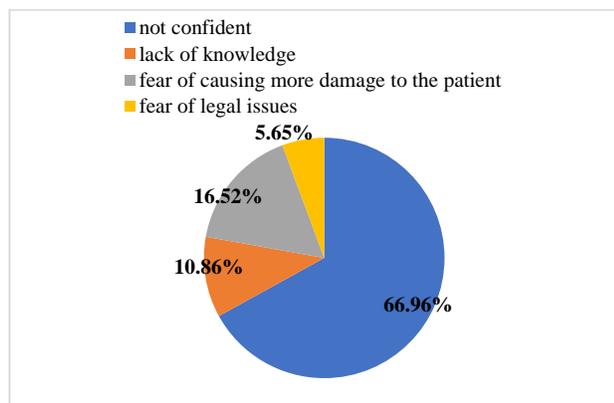


Figure 3. Reasons for reluctance

Self-perceived competencies in performing various medical emergency procedures are demonstrated in **Table 1**. The results specify that the students need further training and their competency in performing the various emergency procedures should be assessed time and again. The overall mean, ANOVA and Post Hoc analysis for knowledge, attitude, practice and the self-perceived competency with respect to the academic years has been demonstrated in **Table 2**. **Table 3** depicts a positive correlation (Spearman correlation) between knowledge (+0.263), attitude (+0.294), practice (+0.190) and self-perceived competency (+0.692) and the academic years.

Table 1. Distribution of percentages of competency in performing various medical emergency procedures

Sl. No.	Procedure	Very Well	Not Very Well	Not At All
1	Give artificial respiration	41%	43%	16%
2	Perform a Heimlich manoeuvre	19.01%	38.66%	42.33%
3	Give cardiac compressions	34.33%	44.67%	21%
4	Give an IV injection	29.33%	29.33%	36.99%
5	Give an IM injection	29.33%	38%	32.67%
6	Give a subcutaneous injection	34.67%	34.67%	28.6%
7	Use a defibrillator	5.68%	35.45%	58.86%

Table 2. Tabulation of the means, ANOVA test and the Post Hoc test of the study subjects based on their academic years and the overall knowledge, attitude, practice and the self-perceived competency

Questions Based On	Mean			Anova		Post Hoc Test		
	4 th BDS	Interns	Post graduates	F Value	p Value	U vs I	U vs P	I vs P
Knowledge	4.80	4.95	5.67	11.92	0.000*	1.00	<0.001, S	<0.001, S
Attitude	2.03	2.24	2.34	13.37	0.000*	0.003, S	<0.001, S	0.005, S
Practice	1.67	1.71	1.97	4.64	0.010*	1.00	0.01, S	0.04, S
Self-Perceived Competency	4.12	8.60	10.44	151.22	0.000*	<0.001, S	<0.001, S	<0.001, S

Where, U = 4th year BDS; I = Interns; P = Post graduates; S = Significant

Table 3. Tabulation of correlation between the academic years and the overall knowledge, attitude, practice and the self-perceived competency of the study subjects using Spearman correlation

	Spearman Correlation	P Value
--	----------------------	---------

Academic year (4 th BDS, Interns & PGs)	Knowledge	0.263	<0.001, S
	Attitude	0.294	<0.001, S
	Practice	0.190	<0.001, S
	Self-perceived competency	0.692	<0.001, S

Where, S = Significant (2 tailed)

The overall means of the questionnaires on knowledge is highest amongst the postgraduates (5.67) in comparison with the interns (4.95) and the 4th-year BDS students (4.80). ANOVA showed statistical significance. Spearman's correlation displayed a positive correlation between knowledge and academic years. Post Hoc analysis showed that the knowledge regarding the management of medical emergencies in a dental setup did not increase from the 4th year BDS to internship but it did increase from the internship to post graduation and from 4th year BDS to post graduation. This could be explained by the fact that as the academic year increases the knowledge regarding any subject would increase in the respective fields. Also, this could be linked to the training received, since knowledge about any topic can be imbibed and increased by adequate and systematic training [14]. Postgraduates followed by the interns are exposed to more training than the final year students. Overall, this study showed that the students have adequate knowledge regarding the management of medical emergencies in a dental setup. Knowledge was variable across the available studies [9, 15-21]. Most of the studies did not evaluate the relationship between knowledge and academic year except for one which showed a varying percentage of knowledge for each of the procedures and that the knowledge was better amongst the interns in comparison with other lower academic years [9].

Also, the overall means of the questionnaires on attitude were almost the same among the three academic years, with being highest amongst the postgraduates (2.34) in comparison with the interns (2.24) and the 4th year BDS students (2.03). ANOVA showed statistical significance. Spearman correlation showed a positive correlation (0.294) between the attitude and the academic years. Post Hoc analysis showed that the attitude towards the management of medical emergencies in a dental setup showed that as the academic year increased their attitude also improved, i.e., from 4th BDS to internship, from internship to post graduation, and also from 4th BDS to post graduation. The obvious explanation for this could be that, as the academic year increases, the students tend to gain more knowledge and thus their attitude towards it gets better and more positive.

The means of the questionnaire on practice/training with respect to the academic years were almost the same with slightly higher in postgraduates (1.97) than in interns (1.71) in comparison with the 4th year BDS students (1.67). ANOVA test showed statistical significance. Spearman correlation displayed a positive correlation (0.190) between

the academic years and the questionnaires on practice/training. The Post Hoc test showed that there was no statistical significance between the 4th BDS students and the interns but there was statistical significance between the interns to postgraduates and 4th BDS to postgraduates. That is, as the academic year increases, the training/practice also increases. With an increase in academic years, there is a possibility of exposure to the training multiple times, and this could have contributed to the statistical significance amongst the interns and postgraduates.

But the overall means of the questionnaires on self-perceived competency showed that the overall mean was highest for the postgraduates (10.44), then the interns (8.60) followed by the final year BDS students (4.12). ANOVA showed statistical significance. Spearman correlation showed a positive correlation (0.692) between self-perceived competency and academic years. According to Post Hoc analysis, the self-perceived competency towards the management of medical emergencies in a dental setup showed that as the academic year increased their self-perceived competency also improved, i.e., from 4th BDS to internship, from internship to post graduation, and also from 4th BDS to post graduation. With the increase in the academic year, the knowledge also improved, and so did the attitude as a result of this, even the overall self-perceived competency must have improved significantly.

100% of the study subjects believed that they require more rigorous training in the management of medical emergencies in the dental setup. The knowledge and training in this area is a continuous process, and every dental practitioner should be updated from time to time. The need for reinforcement of these training and a refresher program has been stressed by many authors in their studies [9, 15-19, 22-24]. This study can be generalized to dental students across the nation as a majority of the students receive similar training. Understanding and assessing the perception of the teaching and the non-teaching faculty towards the management of medical emergencies at the dental institutes and how they could have an impact on the perception of dental students could be an interesting topic for further research.

Conclusion

The overall knowledge of the students in the management of medical emergencies in the dental setup is adequate. The attitude of the students is also positive. The self-perceived

competency of the students in managing medical emergency procedures was very high. Yet, efforts should be made to make sure there is a further improvement in their knowledge, attitude, and self-perceived competency in the management of medical emergencies. The training in the form of both theory and practice has to be made mandatory in the curriculum and efforts should be made so that 100% of the students benefit from it. The medical emergency management training programs like Basic Life Support (BLS), Cardio Pulmonary Resuscitation (CPR) training along with classroom lectures, workshops, Continuing Dental Education (CDE) programs, practical/real-time situations training should be reinforced periodically and repeatedly and skills assessment should be carried out. Teacher training programs should be carried out at the institutional levels time and again so they are assessed, revised, updated, and trained in the topic and further educate and inculcate the same among the dental students.

Acknowledgments: The authors are grateful to Dr. Ravi Shirahatti, Professor, Department of Public Health Dentistry, SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India for his valuable insight and guidance.

Conflict of interest: None

Financial support: None

Ethics statement: The study participants provided a written informed consent prior to the start of the study and the data regarding the knowledge, attitude, practices and self-perceived competencies was kept confidential among the participants.

References

- Vaughan M, Park A, Sholapurkar A, Esterman A. Medical emergencies in dental practice - management requirements and international practitioner proficiency. A scoping review. *Aust Dent J.* 2018;63(4):455-66.
- Huang CL, Yeh IJ, Lin YC, Chiu CF, Du JK. Analysis of adult dental emergencies at a medical center in southern Taiwan. *J Dent Sci.* 2022;17(3):1314-20.
- Smereka J, Aluchna M, Aluchna A, Szarpak L. Preparedness and attitudes towards medical emergencies in the dental office among Polish dentists. *Int Dent J.* 2019;69(4):321-8.
- Jevon P. Medical emergencies in the dental practice poster: revised and updated. *Br Dent J.* 2020;229(2):97-104.
- Anders PL, Comeau RL, Hatton M, Neiders ME. The nature and frequency of medical emergencies among patients in a dental school setting. *J Dent Educ.* 2010;74(4):392-6.
- Atherton GJ, McCaul JA, Williams SA. Medical emergencies in general dental practice in Great Britain. Part 1: Their prevalence over a 10-year period. *Br Dent J.* 1999;186(2):72-9.
- Obata K, Naito H, Yakushiji H, Obara T, Ono K, Nojima T, et al. Incidence and characteristics of medical emergencies related to dental treatment: a retrospective single-center study. *Acute Med Surg.* 2021;8(1):e651.
- Atherton GJ, McCaul JA, Williams SA. Medical emergencies in general dental practice in Great Britain. Part 3: Perceptions of training and competence of GDPs in their management. *Br Dent J.* 1999;186(5):234-7.
- Broadbent JM, Thomson WM. The readiness of New Zealand general dental practitioners for medical emergencies. *N Z Dent J.* 2001;97(429):82-6.
- Albelaihi HF, Alweneen AI, Ettish A, Alshahrani FA. Knowledge, Attitude, and Perceived Confidence in the Management of Medical Emergencies in the Dental Office: A Survey among the Dental Students and Interns. *J Int Soc Prev Community Dent.* 2017;7(6):364-9.
- Collange O, Bildstein A, Samin J, Schaeffer R, Mahoudeau G, Féki A, et al. Prevalence of medical emergencies in dental practice. *Resuscitation.* 2010;81(7):915-6.
- Hutse I, Coppens M, Herbelet S, Seyssens L, Marks L. Syncope in Dental Practices: A Systematic Review on Aetiology and Management. *J Evid Based Dent Pract.* 2021;21(3):101581.
- Sorenson AD, Marusko RM, Kennedy KS. Medical emergencies in the dental school setting. *J Dent Educ.* 2021;85(7):1223-7.
- Dweck C. Mindset-updated edition: Changing the way you think to fulfil your potential: Hachette UK; 2017.
- Mohideen K, Thayumanavan B, Krithika C, Nazia R, Murali B, Pravda C, et al. The Knowledge and Awareness of Medical Emergencies and Management among Dental Students. *J Pharm Bioallied Sci.* 2021;13(Suppl 1):S741-s7.
- Al-Iryani GM, Ali FM, Alnami NH, Almashhur SK, Adawi MA, Tairy AA. Knowledge and Preparedness of Dental Practitioners on Management of Medical Emergencies in Jazan Province. *Open Access Maced J Med Sci.* 2018;6(2):402-5.
- Alhamad M, Alnahwi T, Alshayeb H, Alzayer A, Aldawood O, Almarzouq A, et al. Medical emergencies encountered in dental clinics: A study from the Eastern Province of Saudi Arabia. *J Family Community Med.* 2015;22(3):175-9.
- Al Ghanam MA, Khawalde M. Preparedness of Dentists and Dental Clinics for Medical Emergencies in Jordan. *Mater Sociomed.* 2022;34(1):60-5.
- Azad A, Talattof Z, Deilami Z, Zahed M, Karimi A. Knowledge and attitude of general dentists regarding common emergencies in dental offices: A cross-sectional study in Shiraz, Iran. *Indian J Dent Res.* 2018;29(5):551-5.
- Gazal G, Aljohani H, Al-Samadani KH, Nassani MZ. Measuring the Level of Medical-Emergency-Related Knowledge among Senior Dental Students and Clinical

- Trainers. *Int J Environ Res Public Health*. 2021;18(13):6889.
21. Nagarajappa R, Mahapatra I, Satyarup D, Mohanty S. Appraisal of awareness on medical emergencies and its management among dentists in Bhubaneswar, India. *Rocz Panstw Zakl Hig*. 2021;72(2):193-201.
 22. Chamberlain D, Smith A, Woollard M, Colquhoun M, Handley AJ, Leaves S, et al. Trials of teaching methods in basic life support (3): comparison of simulated CPR performance after first training and at 6 months, with a note on the value of re-training. *Resuscitation*. 2002;53(2):179-87.
 23. Solanki C, Geisinger ML, Luepke PG, Al-Bitar K, Palomo L, Lee W, et al. Assessing readiness to manage medical emergencies among dental students at four dental schools. *J Dent Educ*. 2021;85(9):1462-70.
 24. Greenwood M. Medical Emergencies: Risk Assessment and Management. *Prim Dent J*. 2018;7(3):46-56.