

## The Knowledge of Lithuanian Dentists about Medical Emergencies and First Aid

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### Abstract

**Background:** Medical emergencies can occur at any time in the dental practice, posing a direct threat to patient's life. No information is available on the occurrence of, and dentists' readiness for, medical emergencies in Lithuanian dental practice. **Objective:** This study was designed to obtain information on the incidence of medical emergencies in Lithuanian dental practice and dentists' knowledge and readiness for such events. **Methods:** The cross-sectional study used an original sample of 510 randomly selected Lithuanian dentists. The semi-self-administered questionnaire consisted of two parts: a demographic part and knowledge test. The questionnaires were distributed and collected between December 2015 and February 2016. **Results:** The response rate was 80.8%. Almost all respondents (93.9%) have participated in first aid courses at least once, however 32.5% of all respondents do not know what drugs are in their emergency kit. Every third respondent doubts that he could perform initial resuscitation effectively. The number of correct answers in the knowledge test ranged from 8 to 23 (mean, 18.2±2.9) out of 25. **Conclusion:** The results of this study reflect an alarming situation about the capability of dentists to deal with medical emergencies. Attending continuing dental education programs consisting of workshops and hands-on courses in this field should be mandatory.

**Keywords:** Dental practice; Dentists; First aid; Knowledge; Medical emergencies

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### Introduction

Although uncommon, medical emergencies can occur at any time in the dental office, possibly posing a direct threat to the patient's life [1]. It was found that almost half of all patients treated in dental offices have at least one chronic disease. Since some diseases and their treatments increase the likelihood of a medical emergency during dental care, dentists must be prepared to manage a variety of medical emergencies [2]. With adequate preparation developed through knowledge of the patient's medical history, having emergency-related drugs and equipment available, and having either knowledge or a written protocol to follow, a dentist can successfully manage most medical emergencies without assistance [3].

Medical emergencies can occur frequently in the dental setting; about 70.2 percent of general dental practitioners in the United Kingdom have managed such events, in general these emergencies are not life-threatening [4]. Cardiopulmonary resuscitation (CPR) was performed in the management of 1.1 to 1.4 percent of events in the dental office [5]. Other studies have demonstrated that about one in seven Australian practitioners had resuscitated a patient [6]; five percent of 244 Ohio dentists had performed CPR on a patient [7]; and three percent of Brazilian professionals mentioned the occurrence of cardiopulmonary arrest in their dental offices [8]. These studies also noted that the frequency of these medical emergencies appears to be increasing.

Effective management of an emergency situation in the dental office is ultimately the dentist's responsibility [9]. A lack of training

and inability to cope with medical emergencies can lead to tragic consequences [10]. For this reason, all health professionals, including dentists, should be well prepared to attend to medical emergencies [11]. Providing basic life support (BLS) is the dentist's most important contribution until definitive treatment for a medical emergency can be given.

Although medical emergency education has been taught in most European and American dental schools, little has been published about the self-perceived competence and readiness of dentists in regard to managing a medical emergency [12-15]. In fact it was reported that one of the greatest anxieties of dental practitioners' in general clinical situations was 'dealing with medical emergencies' [16]. Although global studies provide useful background data, no information is available on the occurrence of, and dentists' readiness for, medical emergencies in dental practice in Lithuania. This study was designed to obtain information on the incidence of medical emergencies in Lithuanian dental practice and dentists' knowledge and readiness for such events.

## Materials and Methods

Ethical approval for the study was obtained from the Lithuanian University of Health Sciences Bioethics Committee (approval number BES-OF-40). The sample size was determined by the formula of Paniotto [17].

$$n = \frac{1}{\Delta^2 + \frac{1}{N}} = \frac{1}{0,05^2 + \frac{1}{4048}} \approx 364$$

### Where:

n – the sample size

$\Delta$  - error

N – the population size

The cross-sectional study method was used and an original sample of 510 (out of 4048 active) dentists was randomly selected by computer from Lithuanian Dental Chamber registry [18]. The semi-self-administered questionnaire consisted of two parts: a demographic part and the knowledge test. To evaluate dentists' knowledge objectively the test created by Protzman and others was used with the author's permission [19]. An English-Lithuanian-

English test translation was administered. The demographic part of the questionnaire consisted of 23 questions about the respondents' gender, age, university of graduation, specialization, experience, workplace, type of anesthesia used, medical emergencies encountered, first aid courses completed and the availability of emergency drugs and equipment. The knowledge test which consisted of 25 questions sought information on three main topics:

### 1. Emergency medicine basics

Questions were asked on the signs and symptoms of medical emergencies and collection of patients' medical history.

### 2. First aid

Questions were asked on first aid options in case of medical emergencies

### 3. Diagnosis and treatment

Five clinical situations of medical emergencies were given and the respondents were asked to diagnose and to prescribe treatment.

Questionnaire validity was confirmed by the pilot study. The questionnaire was distributed to a randomly selected group of private practice dental offices and state polyclinics. Inclusion criteria were any private dental practice or a state polyclinic that possesses dental clinic(s) in Lithuania. Clinics from different geographic locations of Lithuania were included. The questionnaire was distributed and collected personally between December 2015 and February 2016. The dentists and dental offices participated on a voluntary basis and were assured of the confidentiality of the responses. The respondents were supplied with the questionnaires and the consent forms and were asked to complete it within a few days. The study was conducted in full accordance with the World Medical Association Declaration of Helsinki.

Statistical analysis was performed with SPSS 22.0 software package. When analyzing the data, descriptive statistics were calculated and statistical hypotheses about the differences between the averages of the frequency and characteristics of interdependence were assessed. For the assessment procedures on the statistical hypotheses, a significance level of  $P = 0.05$  was selected. Quantitative variable distribution normality was checked using the Kolmogorov-Smirnov test. Comparison of two groups of averages used the Student t or

nonparametric Mann-Whitney test, and for more than two groups we used parametric and nonparametric analysis of variance (ANOVA and Kruskal-Wallis test). For multiple pairwise comparisons we applied the LSD test. The connection between the signs has been applied to determine the Spearman correlation coefficient. Forecasting by measuring signs of the values used binary logistic regression analysis.

### Results

By 2016 January there were 4048 active dentists in Lithuania [18]. Completed questionnaires were received from 412 dentists; the response rate was 80.8%. The age of respondents varied from 23 to 71 years (mean 39.4±12.6). The number of years spent in dental practice ranged from 1 to 47 years (mean 15.2±12.3 yr). More detailed demographic information is presented in Table 1.

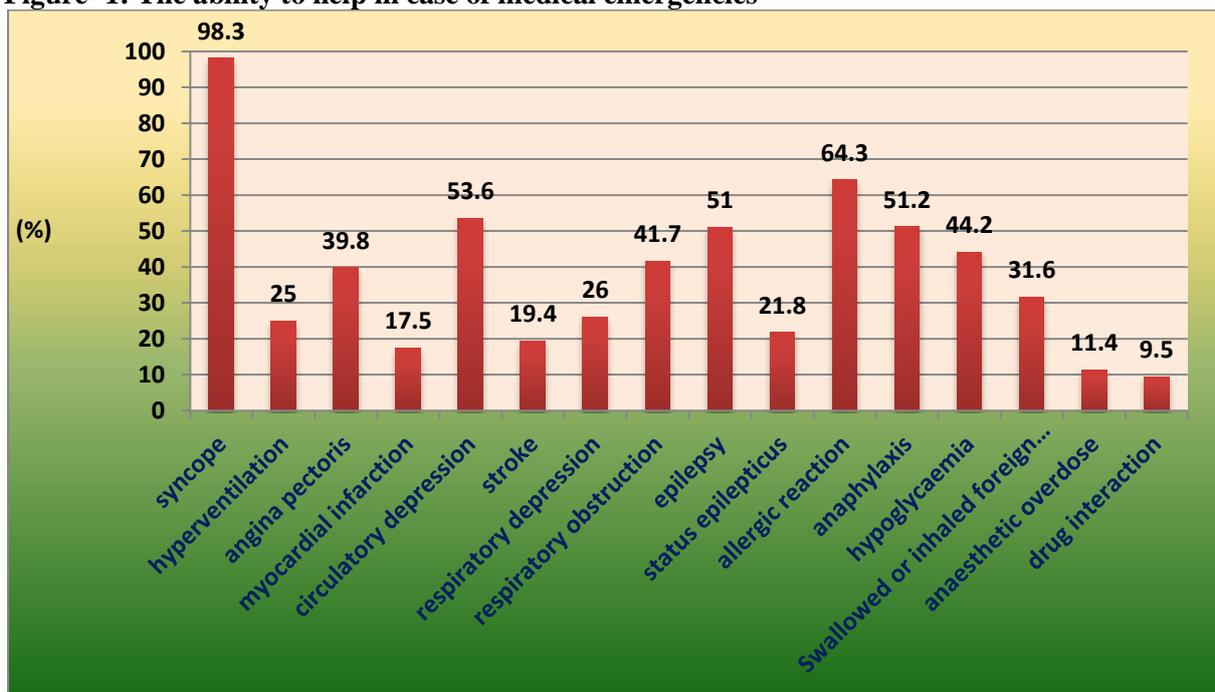
Nineteen doctors mentioned that they sometimes treat patients under general anesthesia. It was agreed by 54.1% of respondents that the anamnesis of the patient’s health should be collected on the patient’s first arrival and renewed every time. The number of respondents who had experienced a medical emergency during their practice in the past 10 years was 230 (55.8%). The most common medical

emergencies were: syncope- met by 46.6% of all respondents, circulatory depression (20.4%), epilepsy (16.7%), and hypoglycemia (8.7%). It was asked if the respondents could help during 16 specified medical emergencies. The results of their opinion are presented in Fig. 1.

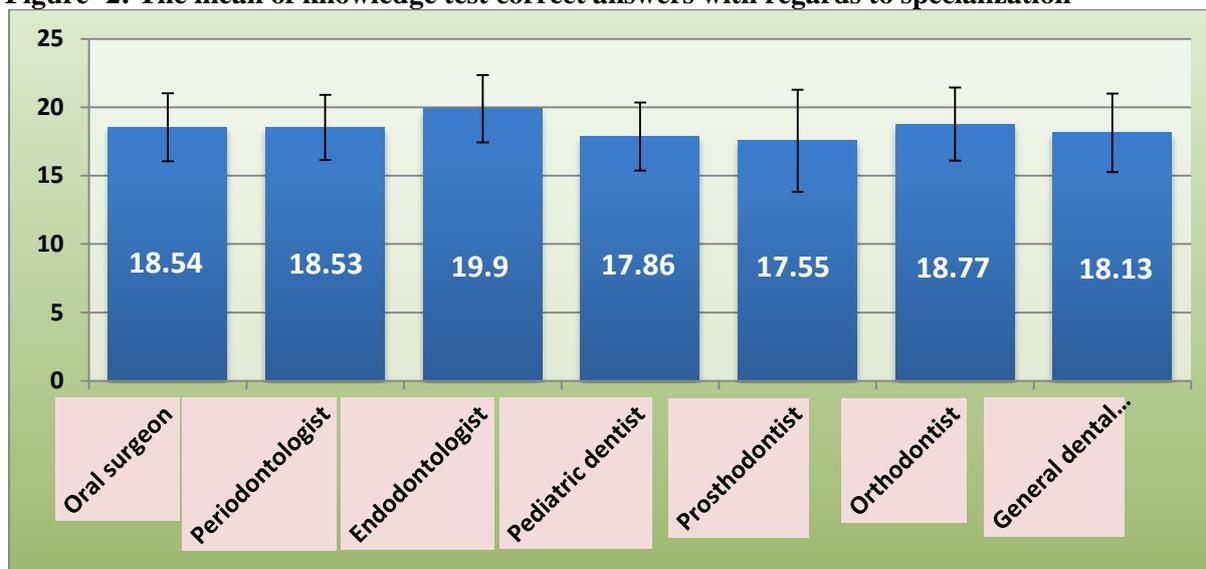
**Table- 1: Demographic information**

Demographic information		N	%
Gender	Female	338	82
	Male	74	18
Graduated university	Lithuanian University of Health Sciences	364	88.3
	Vilnius university	48	11.7
	Specialization		
	Oral surgeon	26	6.3
	Periodontologist	15	3.6
	Endodontologist	16	3.9
	Pediatric dentist	21	5.1
	Prosthodontist	53	12.9
	Orthodontist	43	10.4
	General dental Practitioner	238	57.8
workplace	City	342	83
	Countryside	70	17
practice	Private	221	53.6
	State polyclinic	74	18
	Both	117	28.4

**Figure- 1: The ability to help in case of medical emergencies**



**Figure- 2: The mean of knowledge test correct answers with regards to specialization**



A total of 362 ambulance calls were mentioned, 36.9% of respondents at least once during their practice have called an ambulance due to a medical emergency. The majority of respondents (93.9%) have participated in first aid courses at least once, however 17.5% of respondents mentioned that their assistants haven't taken these courses. Only 1.5% of all respondents did not agree that first aid courses are useful for dentists.

When it was asked what drugs are in the respondents' emergency kit, 32.5% of them didn't know the answer and 45.9% of them didn't know what emergency equipment was kept at their workplace. The most commonly available emergency drugs in emergency kits were adrenaline (28.2%) and prednisolone (9.2%). The most popular emergency equipment was a blood pressure monitor (16.5%). Only 28.2% of all respondents say that they could properly use drugs for the medical emergencies. Almost (41.5%) of all respondents claimed that they could use emergency equipment properly. Nearly one third (31.8%) of respondents believe that they could not perform initial resuscitation effectively. As was mentioned previously, the second part of the questionnaire consisted of 25 multiple choice questions, intended to check the dentist's knowledge about medical emergencies objectively. The number of correct answers ranged from 8 to 23 (mean, 18.2±2.9). These 25 questions could be divided into 3 parts by topic: 1) basic emergency medicine (13 questions); 2) First aid (7 questions); 3) Diagnosis and

treatment (5 questions with described emergency situations). The number of correct answers in the first part ranged from 4 to 13 (mean 10.2±1.8); in the second part from 1 to 7 (mean, 4.1±1.1); and in the third part from 0 to 5 (mean 3.9±1). The amount of collected points is presented in Table 2.

**Table- 2: The number of collected points**

No. of collected points	% of respondents
≤10	1.9
[11-15]	11.7
[16-20]	62.9
>20	23.5

It was seen that specialization seemed to have influence on the level of knowledge of the dentists. The numbers of correct answers due to specialization are shown in Fig. 2.

Vilnius University graduates had higher mean knowledge scores (18.23±3.58) overall than those who graduated from Lithuanian University of Health Sciences (18.18±2.77) out of a maximum possible score of 25 this difference was not significant (P = 0.498).

The mean knowledge score collected by women was 18.22±2.96, it was higher than men's score (18.03±2.44), but the difference was not significant (P = 0.262).

The ANOVA test showed that the number of years spent in dental practice had no correlation with the knowledge test score (P>0.05). The dentists from urban areas had a significantly higher mean knowledge score (18.35±2.82) than

their counterparts from rural areas ( $17.39 \pm 3.00$ ) ( $P = 0.012$ ).

There was a significant difference in the number of correct answers in relation to workplace ( $P < 0.05$ ). The dentists who work in private practice had a higher mean knowledge score ( $18.56 \pm 2.49$ ) than their colleagues from state sector ( $17.11 \pm 3.68$ ).

The dentists who reported that they have met a medical emergency during their practice, had statistically significant lower mean of knowledge test score ( $18.05 \pm 2.72$ ) than those who have never met medical emergency during their practice ( $18.36 \pm 3.06$ ) ( $P = 0.046$ ).

## Discussion

This was the first study, evaluating Lithuanian dentists' knowledge and preparedness for medical emergencies. Because of the random sampling procedure and the high response rate, the study findings should be highly representative of all the population of dental practitioners in Lithuania.

Fortunately, the incidence of emergency events seen in the dental practice is not very high, but when an emergency does occur it can be life-threatening. The results obtained from the present study show that the most common medical emergencies met in the dental practice are: syncope, circulatory depression, epilepsy and hypoglycemia. The rate of medical emergencies reported in this study is similar to the rates shown in most previous studies [20-22].

In the present study, the main objective was to determine dentists' knowledge about medical emergencies, the ability to use medical emergency drugs and equipment, the ability to diagnose medical emergencies and to prescribe proper treatment. In most of previous studies, dentists knowledge and preparedness for medical emergencies were evaluated subjectively without the usage of any objective knowledge test [20, 23-28].

The results obtained from the present study show that 54.1% agree that the anamnesis of the patient's health should be collected on the patient's first arrival and renewed every time. While Kumarswami et al. [26] stated in their study that 98% enquire and 12% get proformas completed by the patient; 38.4% obtain the vital

signs from the patient. Al-Sebaei et al. [20] stated in their study that 92% of the offices reported that they obtain a thorough medical history prior to treatment. The evaluation of patients should include a thorough medical history and appropriate physical examination at the time of admission, updating the medical histories at every appointment, and routine monitoring of vital signs prior to initiation of treatment. Consultation with appropriately trained faculty members should be sought for any patient whose condition is deemed to be medically complex at the time of intake, and consultation with the physician should occur when indicated [2].

Gupta et al. [29] stated in their study that less than half (42.1%) of the dentists reported having received practical training in management of medical emergencies during their undergraduate and postgraduate education. While Kumarswami et al. [26] reported that only less than one-tenth of the respondents had attended the courses whereas the results of our study showed that almost all participants (93.9%) had attended workshops regarding this and 98.5% of them agree that such courses were useful.

According to the data obtained in our study, more than half of the dentists (68.2%) were sure about their ability to perform the initial resuscitation effectively. Chapman et al [24] carried out a study and found similar results to our study. In their trial 55% of dentists felt competent to perform effective initial resuscitation.

Only 36.2% of all respondents stated that they have the same emergency kit, which is exactly like that stated by the Law. Only 28.2% of dentists know how to use their emergency drugs and equipment correctly. This can be attributed to the ignorance and lack of interest of dentists toward the preparedness for medical emergency. However, the results were different in a study carried out by Broadbent et al. [28] who found that 80.8% of dentists reported having appropriate emergency kit in their office.

Gupta et al. [30] found that the most commonly available emergency drugs in treatment areas were oral glucose (82.8%), adrenaline (65.8%) and bronchodilator spray (24.7%). The results obtained in our study showed that the most commonly available emergency drugs in emergency kits were adrenaline and

prednisolone. The most popular emergency equipment was a blood pressure monitor.

Chandrasekaran et al [31] carried out a study to evaluate awareness of basic life support among medical, dental, nursing students and doctors and conducted that their knowledge was very poor and needed to be improved. Similarly, Sudeep et al. [32] conducted a study to evaluate the awareness of basic life support among students and teaching faculty in a dental college and conducted that their knowledge needed to be improved and updated. In our study we used a 25-question multiple choice questionnaire, the average number of correct answers was 18.2. The last five questions were clinical situations with described medical emergencies and only one third of all respondents diagnosed the medical emergencies correctly. That shows a moderate knowledge level about medical emergencies of Lithuanian dentists.

Dentists are members of medical profession and should be confident in dealing with emergencies which may arise during their work. However our results indicate a worrying picture of the level of competence which the dentists have in dealing with such emergencies as do occur in the dental office. Minimal knowledge about these incidents leads to feelings of insecurity, dissatisfaction or limited appreciation of responsibility of dentists. The accumulation of improved knowledge is the key to success. Having reliable knowledge, appropriate emergency kit and being ready to cope with any medical emergency enables the dentist to be calm and confident, and to do his main job with reduced stress, which leads to better results.

A better acquaintance with the correct response to medical emergencies is crucial for further expansion of dentistry in Lithuania. This will ensure better provision and safer dental healthcare services for the population [33]. In addition to being aware of state dental practice acts, the dentist should also be familiar with the accepted treatments and protocols for medical emergencies, which often become the basis for a legal standard of care. Failure to use the degree of care considered appropriate under the circumstances, which results in unintentional injury, is negligence.

## Conclusion

The best way to handle a medical emergency is to be prepared in advance. Dentists, being members of the healthcare profession, should be prepared to deal with medical emergencies which may arise at their workplace. But the results of our study reflect an alarming situation about the capability of dentists to deal with such conditions. Attending continuing dental education programs consisting of workshops and hands-on courses in this field should be made mandatory.

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## References

1. Reed KL. Basic management of medical emergencies: recognizing a patient's distress. *J Am Dent Assoc.* 2010;141(Suppl 1):20S–24S
2. Greenwood M. Medical emergencies in the dental practice. *Periodontol.* 2008;46:27–41.
3. Seskin L. Anaphylaxis due to local anesthesia hypersensitivity: report of case. *J of the Am Dental Association* 1978;96:841-843.
4. 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.
5. Atherton GJ, McCaul JA, Williams SA. Medical emergencies in general dental practice in Great Britain. Part 2: drugs and equipment possessed by GDPs and used in the management of emergencies. *Br Dent J* 1999; 186(3):125–30.
6. Chapman PJ. Medical emergencies in dental practice and choice of emergency drugs and equipment: a survey of Australian dentists. *Aust Dent J* 1997; 42(2):103–8.
7. Kandray DP, Pieren JA, Benner RW. Attitudes of Ohio dentists and dental hygienists on the use of automated external defibrillators. *J Dent Educ* 2007; 71(4):480–6.
8. Gonzaga HFS, Buso L, Jorge MA, Gonzaga LHS, Chaves MD, Almeida OP. Evaluation of knowledge and experience of dentists of São Paulo state, Brazil about cardiopulmonary resuscitation. *Braz Dent J* 2003; 14(3):220–2.
9. Malamed SF. Emergency medicine in pediatric dentistry: preparation and management. *J Calif Dent Assoc* 2003; 31(10):749–55.

10. Peskin RM, Siegelman LI. Emergency cardiac care: moral, legal, and ethical considerations. *Dent Clin North Am* 1995; 39(3):677–88.
11. Kaeppler G, Daublander M, Hinkelbein R, Lipp M. Quality of cardiopulmonary resuscitation by dentists in dental emergency care. *M Kiefer Gesichtschir* 1998;2(2):71–7.
12. 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.
13. Gasco C et al. Cardiopulmonary resuscitation training for students of odontology: skills acquisition after two periods of learning. *Resuscitation* 2000; 45(3):189–94.
14. Mutzbauer TS, Rossi R, Ahnefeld FW, Sitzmann F. Emergency medical training for dental students. *AnesthProg* 1996; 43(2):37-40.
15. Clark MS, Wall BE, Tholström TC, Christensen EH, Payne BC. A twenty-year follow-up survey of medical emergency education in U.S. dental schools. *J Dent Educ* 2006; 70(12):1316–9.
16. Kieser J, Herbison P. Clinical anxieties among dental students. *N Z Dent J* 2000; 96(426):138–9.
17. Паниотто, В. И. [Paniotto, V. I.] 1986. Качественосоциологической информации. Методы оценки и процедуры обеспечения [The Quality of Sociological Information. Evaluation Methods and Procedures of Assurance]. Киев: Науковадумка [Kiev: NaukovaDumka].
18. [Lithuanian Dental Chamber registry] Accessible at: URL <http://info.odontologurumai.lt> Accessed December 2015
19. Sue Protzman, Jeff Clark, WilheminaLeeuw [Management of Medical Emergencies in the Dental Office] Accessible at: URL <http://www.dentalcare.com/media/en-US/education/ce445/ce445.pdf> Accessed December 2015
20. Al-Sebaei MO, Alkayyal MA, Alsulimani AH, Alsulaimani OS, Habib WT The preparedness of private dental offices and polyclinics for medical emergencies. A survey in Western Saudi Arabia. *Saudi Med J*. 2015 Mar;36(3):335-40.
21. 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;186:72–79.
22. Wilson MH, McArdle NS, Fitzpatrick JJ, Stassen LF. Medical emergencies in dental practice. *J Ir Dent Assoc*. 2009;55:134–343.
23. Carvalho RM, Costa LR, Marcelo VC. Brazilian dental students' perceptions about medical emergencies: a qualitative exploratory study. *J Dent Educ*. 2008 Nov;72(11):1343-9.
24. Chapman PJ Medical emergencies in dental practice and choice of emergency drugs and equipment: A survey of Australian dentists. *Aust Dent J*. 1997 Apr;42(2):103-8.
25. Narayan DP, Biradar SV, Reddy MT, Bk S. Assessment of knowledge and attitude about basic life support among dental interns and postgraduate students in Bangalore city. *India World J Emerg Med*. 2015;6(2):118-22.
26. Kumarswami S, Tiwari A, Parmar M, Shukla M, Bhatt A, Patel M. Evaluation of preparedness for medical emergencies at dental offices: A survey. *J Int Soc Prev Community Dent*. 2015;5(1):47-51.
27. Jodalli PS, Ankola AV. Evaluation of knowledge, experience and perceptions about medical emergencies amongst dental graduates (Interns) of Belgaum City, India. *J Clin Exp Dent*. 2012;4(1):e14-18.
28. Broadbent JM, Thomson WM. The readiness of New Zealand general dental practitioners for medical emergencies. *N Z Dent J* 2001;97(429):82-6.
29. Gonzaga HF, Buso L, Jorge MA, Gonzaga LH, Chaves MD, Almedia OP. Evaluation of knowledge and experience of dentists of São Paulo State, Brazil about cardiopulmonary resuscitation. *Braz Dent J*. 2003;14:220–2.
30. Atherton GJ, McCaul JA, and Williams SA. Medical emergencies in general dental practice in Great Britain. Part 3: perceptions of training and competence of GDPs in their management. *British Dental Journal* 1999;186:234-237.
31. Atherton GJ, Pemberton MN, Thornhill MH. Medical emergencies: the experience of staff of a UK dental teaching hospital. *Br Dent J*. 2000;188:320–4.
32. Champman PJ. A questionnaire survey of dentists regarding knowledge and perceived competence in resuscitation and occurrence of resuscitation emergencies. *Aust Dent J*. 1995;40:98–103.
33. James DW. General anesthesia, sedation and resuscitation in dentistry. *Br Dent J*. 1991;171:345–7.