

Knowledge, Attitude and Perceived Confidence in Handling Medical Emergencies among Dental Practitioners in Dakshina Kannada, India

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Abstract

Introduction: Medical Emergencies may arise on the dental chair despite efforts to minimize them. Lack of training and inability to cope with these can lead to tragic consequences.

Aims: The aim of this study was to assess the perceived level of competency among dental practitioners in handling medical emergencies.

Materials and Methods: A structured survey consisting of 13 questions pertaining to knowledge, attitude and perceived confidence of dental practitioners in handling medical emergencies was developed, and 282 dental practitioners holding at least a Bachelor of Dental Surgery degree and practicing in Dakshin Kannada district, Karnataka, India were approached.

Statistical analysis used: The data collected was tabulated and analysed by using the Epi-info version 5.0 and Statistical Package for Social Sciences (SPSS) version 17.0. The results were expressed in terms of proportion, chi-square test, odds ratio and its 95% confidence interval were applied for comparison purpose, a p-value < 0.05 was considered as statistically significant.

Results: Over 70% of the specialists responded that they record medical history and follow the universal precaution guidelines. Training as well as perceived confidence of most dentists was statistically low in administering Cardio-Pulmonary-Resuscitation, intravenous drugs and Heimlich maneuver. The training and perceived confidence was highest for measuring blood pressure and managing syncope.

Conclusions: Dentists do have a gap in their knowledge, awareness and practice; hence a curriculum related to handling medical emergency should be enforced in dentistry to provide safe healthcare.

Key Words: Knowledge, Perceived confidence, Medical emergencies, Dental practitioners

Key Messages

- The present study shows that a gap exists in their knowledge and awareness in handling medical emergencies among dentists therefore a revised curriculum that includes handling of medical emergencies in dentistry should be enforced in all dental teaching institutions.

- The knowledge needs to be reinforced and assessed regularly by means of continuing professional development programs and simulated basic life support training courses so that there is an increased confidence level amongst the dentist in preventing and managing medical emergencies.

Introduction

An increasing number of elderly and medically compromised patients are being treated in the dental clinic. The management of medically compromised patients by the dental practitioner might require modifications in oral health care [1,2]. Generally a medical emergency can be prevented by taking a thorough medical history, examining the patient and formulating comprehensive treatment plan with appropriate alterations to dental treatment as required. Despite efforts to minimize any untoward incidence, emergency situations may arise on the dental chair. The more common medical emergencies encountered in the dental chair include syncope, angina pectoris, cardiac arrest, postural hypotension, swallowed foreign bodies, bronchospasm, anaphylaxis, hypoglycemia and seizures [3]. In general, these emergencies can be life-threatening and there have been cases of patients dying resulting

from medical emergencies in dental offices [4,5]. Effective management of medical emergencies in the dental office is ultimately the dentist's responsibility. Lack of training and inability to cope with medical emergencies can lead to tragic consequences and sometimes legal action. Therefore, dental practitioners must be able to recognize and communicate adequately about relevant medical problems as well as have appropriate knowledge of oral health care and potential interactions with medical conditions [6]. The purpose of this study was to assess the knowledge, attitude and the perceived confidence of the dental practitioners having a varied range of experience and from different dental specialties in managing an emergency arising while treating a patient in the dental clinics.

Subjects and Methods

A cross-sectional study was conducted over duration of five months from April 2011 to August 2011, among 282 dental practitioners holding at least a Bachelor of Dental Surgery degree (BDS) and practicing as dentists in Dakshin Kannada district of Karnataka, India. The Dakshin Kannada district is located in the south Indian state of Karnataka and has a large dentist population due to the presence of a many well-established and renowned dental colleges. The sample size was estimated for finite population with the help of EPI-info version 5.0 statistical package and verified by using the following formula $Nt^2pq/[d^2(N-1)+t^2pq]$. Here, the confidence level was taken as 95%, $t=1.96$ for 95% CI, $p=50%$ prevalence

rate of the outcome variable, $q=(100-p)$, $d=5\%$ and $N=1000$. Using this formula, the final sample size for the study was 278 dental practitioners. Snowball technique of chain referral sampling was adopted for the selection of respondents from the designated place (Mangalore city, Dakshin Kannada district, Karnataka, India). Snowball technique of sampling is a nonprobability method for developing a research sample where future subjects are recruited by existing study subjects from among their acquaintances. This sampling technique is often used in cases where a sampling frame is hard to establish and it is assumed that cases are affiliated through links that can be exploited to locate other respondents based on existing ones. On occasions when a designated respondent was unavailable for the interview, two more attempts were made to contact them. Dentists who were unavailable during three visits or not willing to participate in the study were excluded.

Approval for the present study was obtained from the research and ethical committees of the respective affiliated institution. The information obtained during the data collection was strictly kept confidential. In order to maintain anonymity, a random code number was issued to each participant of this study while responding to the questionnaire. Informed written consent was obtained from every participant prior to the inception of the study. A structured survey questionnaire was developed that consisted of thirteen closed-ended questions and a pilot study was conducted among thirty dental practitioners to study the feasibility constraints and identify problems with any of the measures prior to commencing the study. The validity of the survey was confirmed, Cronbach's alpha (reliability coefficient) was used to measure its internal consistency, and the coefficient was calculated at 0.79.

The questionnaire consisted of two parts. Part A recorded the demographic details of the subjects, their professional degree and specialization (if any). Part B of the questionnaire included 13 questions pertaining to knowledge, attitude and perceived confidence of dental practitioners in handling medical emergencies in the dental clinic. Dentists' knowledge and awareness regarding the symptoms of syncope and their confidence in administering CPR (Cardiopulmonary Resuscitation), intravenous drugs and measuring BP (Blood Pressure) were also assessed. They were asked to grade their

perceived confidence levels as and not at all confident, not very confident, fairly confident, very confident.

The data collected was tabulated and analysed by using the Epi-info version 5.0 and Statistical Package for Social Sciences (SPSS) version 17.0. Epi-info version 5.0 was used for sample size calculation and analysis of summarized data, while SPSS was used for comparison of raw data. The results were expressed in terms of proportion, chi-square test; odds ratio and its 95% confidence interval were applied for comparison purpose. In this study, a $p\text{-value}<0.05$ was considered as statistically significant.

Results

A total of 291 dental practitioners working in Dakshin Kannada district, Karnataka were approached in person out of which 282 agreed to participate in this study. The respondents were divided into two groups as those holding a Bachelor of Dental Surgery (BDS, total number-138) degree and another group of those pursuing their post-graduation or holding a Master of dental surgery degree (total number-144). The age of the respondents ranged from 21 years to 57 years. Results are presented in tabular format (*Tables 1 and 2*). All the responses were categorized into two categories for the convenience of analysis.

In this present study there were 9 non-respondents (3.2%) who refused to participate. Since the proportion of non-respondents is very less, we assume it to have minimum impact on the results. This study showed that 88.4% of BDS and 77.4% PG/MDS dental practitioners always recorded the medical history of their patients. The response rate for always following stress reduction protocol was 61% among BDS and 56.85% among the PG/MDS group whereas that for the universal precaution guidelines was 84.1% among BDS and 72.6% among the PG/MDS group.

The investigators had cross-checked the data for power calculation of sample size in both groups and it was found to be 81.2%. This shows that our original sample size of 138 and 144 in both the groups was adequate. Only 52.5% BDS and 66.3% PG/MDS practitioners knew the emergency contact number to call in case of a medical emergency in the dental clinic. Though 96.35% of BDS and 93.25% of PG/MDS responded to having been trained in measuring blood

Table 1. Response of Knowledge, attitude and perceived confidence in handling medical emergencies among dental practitioners (in percentage).

Questions	BDS		PG/MDS	
	Always	Sometimes/never	Always	Sometimes/never
Record Medical history	88.4%	11.6%	77.4%	22.55%
Follow Stress reduction protocol	61%	39%	56.85%	42.65%
Follow Universal precaution guidelines	84.1%	15.9%	72.6%	27.4%
	Yes	No/Not sure	Yes	No/Not sure
Emergency contact number	52.5%	47.5%	66.3%	33.7%
Trained in measuring BP	96.35%	3.65%	93.25%	6.75%
Trained in administering CPR	29.9%	70.1%	59.9%	40.1%
Trained in iv administration of drugs	16.5%	83.5%	46.75%	53.25%
Trained in Heimlich maneuver	20.15%	79.85%	49.6%	50.4%
	Very/fairly	Not very/not at all	Very/fairly	Not very/not at all
Awareness of the symptoms of syncope	97.55%	2.45%	96.4%	3.6%
Confidence in handling a patient going into syncope	94.4%	5.6%	97.5%	2.5%
Confidence in measuring BP	95.75%	4.25%	96.45%	3.55%
Confidence in administration of CPR	39.65%	60.35%	64.75%	35.25%
Confidence in IV administration of drugs	27.5%	72.5%	52%	48%

Table 2. Statistical analysis of responses.

Questions	χ^2 (Chisquare)	df (degree of freedom)	OR (odds ratio)	95%CI (Confidence Interval)	p-value
Record Medical history	3.46	1	2.19	0.96 – 5.04	0.063
Follow Stress reduction protocol	0.19	1	1.18	0.65 – 2.16	0.666
Follow Universal precaution guidelines	2.96	1	1.94	0.92 – 4.12	0.852
Emergency contact number	3.27	1	0.57	0.31 – 1.04	0.071
Trained in measuring BP	0.38	1	1.81	0.45 – 7.63	0.535
Trained in administering CPR	16.99	1	0.29	0.15 – 0.53	0.0001*
Trained in intravenous administration of drugs	19.71	1	0.23	0.11 – 0.46	0.0001*
Trained in Heimlich maneuver	18.48	1	0.25	0.13 – 0.49	0.0001*
Confidence in administration of CPR	11.55	1	0.36	0.19 – 0.66	0.0007*
Confidence in intravenous administration of drugs	11.37	1	0.35	0.19 – 0.66	0.0007*

pressure, the response rate for training in Heimlich manoeuvre was 20.15% amongst BDS and about 49.6% amongst PG/MDS groups. A statistically significant difference was seen among the two groups with regards to training and perceived confidence in administration of CPR and intravenous Drugs. Confidence in measuring blood pressure, awareness of the symptoms of syncope and confidence in handling a patient going into syncope were also compared between the BDS and PG/MDS groups with the help of Fisher exact test. However, these differences were not found to be statistically significant.

Discussion

The importance of maintaining knowledge and awareness in management of the medical emergencies have always being recognized. Life-threatening emergencies can occur anytime, anywhere and to anyone. Such situations are somewhat more likely to occur within the confines of the dental office due to the increased level of stress which is so often present [7]. The results of a postal questionnaire undertaken in Australia reported that 1 in 7 out of the 1250 general dental practitioners had had to perform a resuscitation [8]. A similar study done in Great Britain over a period of ten years found that an emergency event was reported, on average, for every 4.5 practice years in England & Wales and 3.6 years in Scotland. The study also found that there were 1.9 cases of syncope reported per dentist per year [9]. Completed questionnaire received from 199 dental practitioners in NewZealandshowed that 65 percent respondents hadexperienced at least one medical emergency in their practice in the last 10 years [10].

All attempts must be made to prevent the occurrence of a medical emergency and this prevention begins as soon as the patient is asked about his medical history [11]. According to the present study higher number of BDS (88.4%) recorded medical history of their patients than PG/MDS practitioners (77.4%). This could be due to the ignorant attitude of dental practitioners towards the need for recording medical history. According to the protocol all dentists need to record the medical history as it may help them to recognize the possible complication/s and modify the treatment plan when required [12]. Additionally, the notes about each patient should be kept together in one file bearing the patient's name and other personal details. The file should also contain referral letters from health centres or family doctors and other documents relating to the patient's condition. This will help to build up acompletdocumentation of the medical history of the patient.

Most of the dentists did not follow stress reduction protocol while treating their patients. It is reported that three-

quarters of all medical emergencies develop because dentists often fail to recognize patient's anxiety [13]. A medically compromised patient experiencing high stress level in the dental clinic may develop chest discomfort, dysrhythmias, pulmonary edema, acute episode of respiratory distress, hyperventilation or vasodepressor syncope [14]. Therefore, it is required that stress reduction protocol should be followed by dentists [15]. This can be achieved by scheduling the patients for short morning appointment, use of preoperative sedation and administration of profound Local anesthesia as well as use of vocal sedation techniques [16-18].

84.1% BDS followed universal precaution guidelines in their dental clinic however 27.4% PG/MDS practitioners failed to follow in the present study. Similarly, Bishop GD et al. [19] while studying the attitudes and beliefs of Singapore health care professionals concerning HIV/AIDS, observed only 78% of the dentists followed universal precautions. Martins Amebl et al. [20] among dentists in Montes Claros, Brazil, observed high percentage of dentists did not wear gloves, masks, protective eyeglasses, caps, and/or medical coats 100% of the time. These findings suggest ignorance or poor risk perception by dentists [21,22]. This aspect is worrisome, given that the false sense of security significantly increases the risk of infection in clinical practice particularly for healthcare workers. Therefore, it is necessary for all health care workers to strictly follow universal precaution protocol in their day to day clinical practice.

Almost half of the dental practitioners were not sure of the emergency number to contact in case of a medical emergency. It is essential for the dental care provider to know this because even though they may recognize and provide first line of treatment in a medical emergency, the patient must ultimately be moved to a proper medical facility where the patient will have access to specialized care [23]. All this must be done without delay so that the life of the patient is not endangered. It has been recommended that a response time of 5 mins would collapse which may provide the maximum potential for successful cardiac and cerebral resuscitation in case of an emergency situation. A delay could increase the risk of patient mortality significantly [24]. The emergency number should be displayed prominently in the dental office so that it can be viewed easily by all [25].

Although there was no significant difference in between BDS and PG/MDS practitioners in the training and level of confidence in measuring blood pressure but PG/MDS practitioners showed significantly higher confidence and better training than BDS practitioners in administering Cardio-

Pulmonary-Resuscitation (CPR), intravenous administration of drugs and Heimlich manoeuvre. Amirchaghmaghi et al. [26] in his study observed that nearly 50% of dentists get training on Cardio-Pulmonary-Resuscitation, oxygen administration and diagnosis of medical emergencies during their under and post graduate course. Gonzaga HF et al. also noted that nearly 55% of dentists can manage Cardio-Pulmonary-Resuscitation (CPR) but training for the administration of the intravenous drugs is very low (10.8%) among dental interns [4]. Chapman PJ [7] did a survey among Australian dentists and found 96% of respondents believed that dentists should be competent in Cardio-Pulmonary-Resuscitation (CPR) however, only just over half (55%) felt they were competent in Cardio-Pulmonary-Resuscitation (CPR). These findings could be because of the low level of training and poor curriculum being followed by the dental institutes. CPR and intravenous drug administration may be considered too complex for a dental student and hence not much relevance given for its training at undergraduate levels. The other possible reason could be the wrong thought process that dentist would rarely be expected to encounter a medical emergency requiring these interventions. These false notions must be changed since the incidences of medical emergencies in dental setup are always a possibility and CPR provides the fundamental Basic Life Support (BLS) that can be lifesaving in an emergency situation [27].

Both BDS and PG/MDS practitioners (>95%) were aware of the symptoms during syncope and had confidence in handling a patient going into syncope. This could probably be because of better training and practice in handling patients undergoing syncope since it is one of the most common medical emergencies encountered in a dental chair [3,28]. Based on results of the presents study there is gap in the knowledge and handling of medical emergencies encountered during dental treatment procedures. It is a matter of concern that should be considered. Dental institutes need to incorporate handling of medical emergencies in their curriculum. There are many ways to improve and update the knowledge and skills of handling medical emergencies, such as continuation education program with hands on workshops followed by assessment of practical skills. Carvalho RM et al. in their study found that Brazilian dental students considered continuing training in BLS to be necessary over their entire professional lives in order to control a medical emergency situation in the dental office [29]. Newby JP et al. [30] conducted and evaluated undergraduate training programme on simulation of medical emergencies in dental practice and concluded that training should be incorporated into undergraduate teaching. Similarly, Balmer MC et al. found simulation training tailored for dentist's needs highly effective [31]. Furthermore, printing and distributing leaflets can be costly and there is no opportunity for the health worker

to ask questions, interact with a trainer or raise issues relevant to their practice.

In a primary health care setting, it may not be possible to eliminate some hazardous procedures and so training (an administrative control) is important in the prevention and management of medical emergencies. The handling of a medical emergency in a dental office is a skill that cannot be acquired just by attending lectures. One must have hands on experience to gain the level of confidence necessary to manage life threatening situations [32]. This can be done by regularly attending hands-on workshop which will subsequently assess the skills acquired. Gill and Scully [33] evaluated the attitude and awareness of final-year pre-doctoral dental and medical students to medical emergencies in dentistry and reported that knowledge and training of dental students were moderate. They suggested that the training of the dentists is inadequate and the curriculum should be revised to include the training so that medical emergencies can be handled in a more efficient manner. The results of a study by Arsati F et al. [34] showed that Brazilian dentists are not fully prepared to manage medical emergencies and have insufficient experience training in CPR. Their most common justification for this was a lack of updating coursed following graduation.

Every effort must be made to prevent such emergencies. However, in the advent of such an emergency occurring, the dental team must be prepared to manage it competently and timely. Dental regulatory boards across USA require mandatory completion of board-approved course in Infection Control and certification in Basic Life Support courses for license renewal. Similarly the UK and Canadian boards require that all members of staff who might be involved in dealing with a medical emergency are trained together regularly in a simulated emergency so they know exactly what to do. These training are reflected through the continuing education programs that the dentists must attend in order to collect the credit points required to renew their license to practice [35-37]. Thus successful management of medical emergencies would require preparedness in the form of a well-trained and skilled dental team as well as the immediate availability of the emergency drugs and equipment [9,23].

Limitation of the Study

Due to feasibility constraints the investigators had applied the non-probability sampling method in the form of snowball technique. This could pose a limit to generalization of the findings. This study was conducted among dentists practicing in a localized area of south India. Further studies are required to assess the knowledge and awareness of dentists regarding handling of medical emergencies at the national and international levels.

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