An exploratory study of the empirical knowledge, attitude and behavior of undergraduate dental students towards CPR

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Abstract

Background: Cardiopulmonary resuscitation (CPR) has been a liberator in addressing the cardiac disease emergency outburst worldwide. Dentists can encounter a situation of cardiac arrest while treating patients and thus need to be proficient in CPR procedure. The study assesses the knowledge, attitude and behaviour (KAB) of dental undergraduates towards CPR training.

Methods: Employing a cross-sectional-study design, 104 final year students and Interns of a Dental College in Bangalore were administered a validated questionnaire to assess the student's KAB towards CPR training. The difference in KAB scores were compared using the Man-Whitney U test.

Results: Poor knowledge was exhibited by students with only 3 questions receiving the majority of correct responses. No statistically significant difference in KAB was found between the interns and final BDS students. While 85 (81.7%) students felt that CPR training should be a part of the curriculum, 41 (41.3%) students were unaware that CPR was included in the existing curriculum.

Conclusion: The study showed that the students had a poor CPR knowledge, but exhibited a positive attitude and behaviour. This study is a compelling evidence to undertake advocacy efforts with policy makers and sensitize curriculum developers and stakeholders to mandate CPR training amongst all health professional curricula.

Keywords:

Attitude, Behaviour, Cardiopulmonary resuscitation, Knowledge, Undergraduates

Introduction

Cardiovascular diseases (CVDs) being multifactorial in nature(1), are showing a boom in the population worldwide, with a trend of reaching the younger age groups(2). The gravity of this situation justifies the need for every individual to be able to perform the basics of cardiopulmonary resuscitation: chest compression and rescue breath. A study by Liang Ji et al showed that the success rate of CPR ranged between 5-10% under various circumstances(3).Several research has shown that the survival rates of individuals have increased relatively in individuals receiving CPR(4).

The importance of being well informed of handling CPR by all individuals is encompassed by various health organisations like World Health Organisation, American Heart Association and the British Heart Foundation. In addition, The ILCOR, a body of seven international resuscitation organizations (AHA, ERC, IAHF, HSFC, ANZCOR, RCSA, and RCA), published the CPR guidelines with a goal of simplifying CPR for all individuals including healthcare and to maximize the potential for early resuscitation(5).

In an event of emergency, the first 3-4 minutes are very crucial in deciding the life and death of an individual(6). In India, the massive transformation in lifestyle and living conditions of individuals entitles them to a growing risk profile of diseases like stress and obesity. In addition, the increased life expectancy of individuals has caused an increase in geriatric population(2). However, discrepancies in the health care delivery system with non-stringent surveillance of cardiac problems, ambulance services not being very efficiently active in all areas, especially in rural India and the attitude of people to help injured people due to trepidation of legal issues, may cost the life of a person in need. Thus as a responsible citizen every individual should be responsive to emergency situations(7).

Individuals are predisposed to emergency situations at any moment, delay in which may cost a life. This entitles every individual to be equipped to face these situations efficiently. Dental treatments being invasive in nature can predispose to development of cardiac problems due to local anaesthetic use, Aspiration and swallowing of endodontic instruments and airway deterioration(8). The gravity of these situations justifies the need for every dental practitioner to be able to perform the basics of cardiopulmonary resuscitation: chest compression and rescue breath. The dentists population in the country is on a continuous rise, from hundreds to now nearing 110,000, formulating the ease to train this huge cohort in medical emergencies(9).

In this regard, a bi-modal technique should be instituted. This includes curricular integration with comprehensible definition of the competencies to be achieved, clear content outline and justified evaluation outcome and measures. In addition, abiding with the American Heart Association (AHA) modified protocols of incorporating emergency armamentarium like AMBU bag, cannulas, tegaderm, oxygen cylinder and endotracheal tubes in the dental kit in all dental institutions or operatories in government or private sector should be instituted(10).

Foreseeing this, an amendment passed by the Dental Council of India on 25th August 2011 for Bachelor of Dental Surgery, was integrated in the RGUHS curriculum, stating that interns during Oral Surgery postings were expected to complete a 15 days posting in emergency services of a dental or general hospital with extended responsibilities in emergency dental care in the wards with particular reference to resuscitation procedures(11). However, many dental colleges have no hospital services associated and lack of resources like an extended emergency service in dental colleges limit the successful inculcation of the amendment in the curriculum. Dental colleges have failed to amend this guideline, by delivering only minimal theoretical knowledge to the students, resulting in a lack of competency in students to perform resuscitation procedures[12–14].

Thus a strong enforcement of policy and curriculum change is necessary, which requires a baseline data of the existing competencies and perceptions among dental professionals in performing CPR. Thus the present study aims to assess the knowledge, attitude and behaviour towards CPR training among the final year dental undergraduate students and interns.

Materials and Methods:

A cross sectional study was conducted in a private dental institution in Bangalore for a period of 6 months to assess the Knowledge, attitude and behaviour of dental students towards CPR training. Ethical Clearance [IRB number-102/VOL1/2015] was obtained from the Institutional Review Board.

Following a total enumeration method, 120 final year dental undergraduate students and interns in the institution were recruited for the study. Students who failed to provide consent and were absent on the day of intervention were excluded from the study.

Questionnaire:

A self-structured validated questionnaire in English language was developed for the study. It was validated for face and content validity by a team of 4 faculty members and 6 post graduate students. The validated questionnaire was then pilot tested on 15 third year BDS students and comprehensibility of the questionnaire was assessed.

The final questionnaire consisted of personal details of the participants and 25 closed ended multiple choice questions covering 4 domains namely Knowledge on CPR (14), Curricular perceptions on CPR (3), Attitude towards CPR (7) and Behaviour towards CPR (1).

Data Collection:

The data collection process began with an initial briefing about the study and obtaining informed consent in a classroom setting. The questionnaires were then distributed targeting 15-20 participants at a time. The participants were given sufficient time to fill the questionnaire. No names were recorded and all the questionnaires were pre-coded thus assuring complete anonymity.

Analysis:

The collected data was entered into Microsoft Excel and analysed using SPSS version 16. Descriptive and inferential statistics were used to analyze the data in the study. Demographic details and the KAB of students towards CPR training were expressed in terms of number and percentage. Gender-wise and year-wise difference in KAB of final year undergraduates and interns was assessed using 'Mann-Whitney U Test'. $p < 0.05$ was considered significant.

Results

The study cohort consisted of a majority of females [69 (66.3%)]. 56 (53.8%) participants were interns and 48 (46.2%) were final year BDS students (Table 1).

Table 1: Demographic details of the participants

Sl	Characteristic	Variable	Number	Percentage
1.	Year of study	Final BDS	48	46.2
		Internship	56	53.8
2.	Gender	Male	35	33.7
		Female	69	66.3
3.	Age (in Years)	< 20 yrs	1	1.0
		21-25 yrs	103	99.0
4.	Nationality	Indian	102	98.1
		Iranian	2	1.9
5.	Place of stay	Hostel	27	26.0
		Home	40	38.5
		Paying Guest	33	31.7
		Local Guardian	4	3.8
6.	Mode of admission	Comed-K	50	48.1
		CET	31	29.8
		Management	23	22.1
7.	Fathers educational qualification	School grade<10th	3	2.9
		PUC	5	4.8
		Graduate	48	46.2
		Postgraduate	42	40.4
		PhD	6	5.8
8.	Mothers educational qualification	School grade<10th	4	3.8
		PUC	9	8.7
		Graduate	59	56.7
		Postgraduate	31	29.8
		PhD	1	1.0

Knowledge of students regarding CPR

11 of 14 questions assessing the knowledge of CPR received a greater percentage of incorrect responses indicating poor knowledge among the participants. Only 15 (14.4%) participants were aware of the number of CPR cycles indicated before cardiac rhythm assessment which comprehends the poor knowledge observed. (Table 2).

Table 2: Knowledge of students regarding CPR

Domain 1: Knowledge of students regarding CPR			
Sl	**Question**	**Responses – n(%)**	
		Correct	**Incorrect**
1.	Time taken for brain damage and death after cardiac arrest	21(20.2)	83(79.8)
2.	No of compressions per minute	26(25.0)	78(75.0)

3.	Compression to ventilation ratio	47(45.2)	57 (54.8)
4.	No of cycles of continuous CPR indicated before cardiac rhythm reassessment	15 (14.4)	89(85.6)
5.	Position of hands during chest compressions, depth of compression, in adults	23(22.1)	81 (77.9)
6.	Recommended method for chest compression in children/ infants	62 (59.6)	42(40.4)
7.	Time spent checking for recommencement of spontaneous breathing	24 (23.1)	80 (76.9)
8.	Conditions that are an absolute indications for CPR	30 (28.8)	74 (71.2)
9.	What should be the pulse in an unconscious patient	38 (36.5)	66(63.5)
10.	Manoeuvre performed to create a patent airway	59(56.7)	45(43.3)
11.	AED stands for	64(61.5)	40 (38.5)
12.	Should CPR be performed within 6-7 min of the stoppage of blood flow to vital organ	43 (41.3)	61 (58.7)
13.	Current order of upgraded CPR intervention	36 (34.6)	68 (65.4)
14.	Is it recommended that all procedures be performed with minimal interruption to chest compressions?	36 (64.4)	37(35.6)

The mean score for the domain ranged from 0-14. The Knowledge of the participants regarding CPR was 5.33± 2.161. The mean value obtained for the domain by the 4th BDS and interns was 5.27±1.5 and 5.39±2.6 respectively. This difference was not found to be statistically significant [p=0.616]. No significant gender wise differences were found in the knowledge scores of the students (Male: 4.94±2.11, Female: 5.54±2.17, p=0.306) (Table 3).

Table 3: Year wise and gender wise difference in CPR

Variables		**Knowledge**		**Curricular perception**		**Attitude**		**Behaviour**	
		MR	**P**	**MR**	**P**	**MR**	**P**	**MR**	**P**
Gender	Male	48.30	0.306	56.94	0.279	48.97	0.391	56.86	0.278
	Female	54.63		50.25		54.29		50.29	
Year of Study	IV BDS	50.92	0.616	43.26	0.003*	50.68	0.564	52.66	0.960
	Interns	53.86		60.42		54.06		52.37	

MR- Mean Rank, p - significance level, *- significant

Curricular perceptions of students regarding CPR

5 items assessed the participants professed knowledge on CPR and its inclusion in curriculum. The mean value for the domain ranged from 1-19. Although 49 (47.1%) students were aware that CPR training was a part of the BDS curriculum, 55 (52.9%) students were unaware of the RGUHS ordinance guideline regarding CPR. However 59 (56.7%) students still perceived that the curriculum related to CPR training was inappropriately defined (Table 4).

Table 4: Curricular perceptions of students regarding CPR

Domain 2: Perceived knowledge of students regarding CPR			
Sl	**Questions**	**Responses**	**n(%)**
1.	Is Basic Life Support course, a part of the BDS curriculum	Yes	49 (47.1)
		No	43 (41.3)
		May be	12 (11.5)
2.	Are you aware of the guideline given in the RGUHS ordinance regarding CPR training	Yes	28 (26.9)
		No	55 (52.9)
		May be	14 (13.5)
		Don't know	7 (6.7)
3.	Do you think it is defined appropriately in the curriculum,so as to enhance the competency of students in CPR	Yes	23 (22.1)
		No	59 (56.7)
		May be	9 (8.7)
		Don't know	13 (12.5)
4.	If not adequate, what changes do you think can be incorporated in the curriculum regarding CPR	Practical	34 (32.7)
		Trained personnel	46 (44.2)
		Training hours	18 (17.3)
		Don't know	6 (5.8)
5.	Do you think that, practical demonstration of CPR with a mannequin will help in better understanding the technique	Yes	74 (71.2)
		No	23 (22.1)
		May be	6 (5.8)
		Don't know	1 (1.0)

A statistically significant difference was observed in the perceived knowledge of final BDS Students **(**8.29$\pm$2.22) and Interns (9.77$\pm$2.38) [p=0.003] with interns having a higher perception of the existing curriculum. No significant gender wise differences were found in the scores of the students regarding curricular perceptions (Male: 10.71$\pm$2.75, Female: 10.09$\pm$2.49, p=0.279) (Table 3).

Attitude of students towards CPR training

The mean value for the domain ranged from 1-32. The mean value obtained for the domain by the final BDS students and interns was 18.33±2.75 and 18.57+2.48 respectively**.** This difference was not found to be statistically significant [p=0.564]. No significant gender wise differences were found in the attitude scores of the students (Male: 17.09±2.93, Female: 17.33±2.31, p=0.391) (Table 3). A positive attitude towards CPR training was found as 85 (81.7%) students felt that CPR should be taught during the undergraduate level. In addition, 39 (37.5%) students felt that CPR training should be instituted during 1st year BDS with reinforcement every 6 months [58 (55.8%)]. The self perceived competencies of the students were assessed which showed that majority of the students felt that they were not competent in performing CPR procedures like Endotracheal intubation [75 (72.1%)], Chest compression [55 (52.9%)], Defibrillation [66(63.5%)] and insertion of central venous line [76 (73.1%)] (Table 5).

Table 5: Attitude of students towards CPR training

Domain 3: Attitude of students towards CPR training			
Sl	**Questions**	**Responses**	**n(%)**
1.	Basic Life Support (BLS) course should be taught during undergraduate level	Yes	85(81.7)
		No	16 (15.4)
		May be	3 (2.9)
2.	I feel that my BDS training is adequate to equip me to handle resuscitation confidently	Yes	33 (31.7)
		No	71 (68.3)
3.	All junior doctors should have advanced cardiac life support course training before practice	Yes	72 (69.2)
		No	17 (16.3)
		May be	12 (11.5)
		Don't know	3 (2.9)
4.	The Basic life support training should be reinforced every 6 months	Yes	64 (61.5)
		No	15 (14.4)
		May be	21 (20.2)
		Don't know	4 (3.8)
5.	If resuscitation is made mandatory in the BDS curriculum ,at what point should it be initiated	1st BDS	39 (37.5)
		2nd BDS	19 (18.3)
		3rd BDS	37 (35.6)
		4th BDS	8 (7.7)
		Internship	1 (1.0)
6.	If resuscitation is made mandatory in the BDS curriculum ,at what point should it be reinforced	No	18 (17.3)
		Yes, 6 months	58 (55.8)
		Yes, every year	25 (24.0)

			Don't know	3 (2.9)
7.	I am confident to be/ perform	A team leader	Yes	50 (48.1)
			No	54 (51.9)
		Endotracheal intubation	Yes	29 (27.9)
			No	75 (72.1)
		Chest Compression	Yes	49 (47.1)
			No	55 (52.9)
		Defibrillation	Yes	38 (36.5)
			No	66 (63.5)
		Insertion of central venous line	Yes	28 (26.9)
			No	76 (73.1)

Behaviour of students towards CPR training

The mean value for the domain ranged from 1-4. A positive behaviour was observed among the participants towards performing CPR during emergency events. The mean value obtained for the domain by the final BDS students and interns was 2.67 $\pm$0.753 and 2.46$\pm$1.01respectively**.** This difference was not statistically significant [p=0.960]. No significant gender wise differences were found in the behaviour scores of the students (Male: 2.51 $\pm$0.887, Female: 2.58$\pm$0.914, p=0.278) (Table 3).

Discussion:

Knowledge of participants regarding CPR in comparison with present study

The initiation of a cardiopulmonary resuscitation technique requires dental professionals to have appropriate knowledge about it. In the present study, the knowledge of CPR among dental students was poor. Similar findings were found in various studies conducted worldwide wherein dental students displayed inadequate or fair knowledge of CPR(12–16) and dental professionals displayed poor knowledge regarding cardiopulmonary resuscitation(17–19).

Knowledge of participants on curricular aspects of CPR in comparison with present study

The present study found that although 47% of the students were aware that CPR training was a part of the BDS curriculum, 52.9% students were unaware of the related RGUHS ordinance. To the best of our knowledge, no previous studies have assessed the perceived knowledge of students regarding inclusion of CPR training in the curriculum. This unacquainted state of the students may be owed to the theoretical knowledge of CPR imparted to the students during formal training of other subjects like oral and maxillofacial surgery or general surgery. In addition the responses may also be based on the apparent thinking of the students to the questions listed.

Attitude of participants towards CPR in comparison with present study

Amidst poor knowledge, the present study showed that the students had a positive attitude towards learning CPR. In the current study 81.7% students felt that CPR training should be mandatory in the curriculum with reinforcement periodically. Similar results have been demonstrated conducted by Narayan DP et al where dental students expressed a positive attitude towards learning CPR(20). The perceived confidence of most dentists was statistically low in administering Cardio-Pulmonary-Resuscitation, intravenous drugs and Heimlich maneuver which was consistent with the results of the present study where students illustrated lack of confidence in handling CPR techniques(21).

Behaviour of participants towards CPR in comparison with present study

Amidst the positive attitude exhibited by students towards learning CPR, in instances of emergency situations, 51.9% of the students initiated to check for breathing and pulse while 10-20% of the students sought to use alternatives like calling for an ambulance or asking for help. Similar findings were found in studies conducted that have shown that students were reluctant to perform resuscitation(15,22).

The profession of health care is novel and hence the skill of saving a person's life is vital which could influence the attitude and behaviour of students in initiating and practicing CPR. However, the loopholes in emergency training imparted to the dental students have hampered their competency in confidently handling such situations, which is an alarming situation and needs to be addressed.

CPR in a dental Setting: Significance

Life threatening emergencies can occur anytime, anywhere and to anyone. A dental setting is thus a situate for such emergencies due to the high level of stress present within its confine. CPR is a life saving procedure whose importance in such situations is undeniable and thus is evolving rapidly in modern medicine. This necessitates the dental professionals to have sound knowledge of the Basic Life saving procedures to enable them in saving a person's life.

The initiation of a CPR technique requires dental professionals to have appropriate knowledge about it. In the present study, the knowledge of CPR among dental students was poor. Similar findings were found in various studies conducted worldwide. Dental professionals had poor knowledge about CPR(17). In contrast, a study by Srinivias HT et al showed that dental students had a fair knowledge of CPR(23). The lack of knowledge on the basic emergency procedures among dental students can be attributed to the lack of emphasis on CPR training in the present curriculum.

The results of the current study highlight the need to enforce and strengthen CPR training for Dental health professionals. It is thus a matter of concern which needs to be addressed by all the stakeholders. Primarily, the regulations in the curriculum regarding CPR training need to be modified. Curriculum developers should develop initiatives for making CPR training mandatory in all medical and paramedical colleges with regular evaluation systems to enhance the training mechanisms.

Dental institutions should emphasize the need for regular CPR training sessions to the students through continuing dental education programs. Training of CPR through demonstration with periodic reinforcement had a positive effect on the attitude of students and their desire to perform CPR(16,24,25).

Limitations of the study

However, it cannot be ruled out that the responses of the participants were obtained through a questionnaire; hence there may be a probability of the responses being influenced by social desirability bias.

Conclusion

The present study indicates that amidst poor knowledge and training in CPR, the attitude and behaviour of dental students towards CPR was positive. Cardiac diseases have been a global disease burden with

multiple risk factors and thus can be a major constituent in achieving the Millennium development goals. Though it often resonates with the predilection of students to CPR training, it is still not imparted on a satisfactory basis in most colleges. This study may be compelling evidence to strengthen advocacy efforts, convince policy makers, curriculum developers and all the stakeholders to standardize CPR training and make it a mandatory component of all medical, dental, nursing and Para-medical undergraduate and postgraduate curricula.

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