



## Awareness of Basic Life Support Among Staff and Students in a Dental School

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### ABSTRACT

**Aim:** To assess and compare the knowledge of basic life support (BLS) among third, fourth and fifth (III, IV and V) year Bachelor of Dental Surgery (BDS) clinical students, dental interns, postgraduate students and Bachelor of Dental Surgery (BDS) and Master of Dental Surgery (MDS) faculty of Panineeya Institute of Dental Sciences and Hospital, Hyderabad, India.

**Materials and methods:** A BLS questionnaire consisting of 22 questions was used to assess the levels of III, IV and V years BDS clinical students, dental interns, postgraduate students and BDS and MDS faculty of Panineeya Institute of Dental Sciences and Hospital, Hyderabad, India. Statistical Package for Social Sciences software (SPSS version 12.0) was used to analyze the statistical data. The  $p < 0.05$  was considered statistically significant.

**Results:** A total of 338 respondents took part in the study. When gender comparison was done with correct knowledge responses, statistically significant differences were noted for Q6, Q9, Q12, Q13, Q15 and Q17. For age groups and educational qualifications, significant difference was observed for all questions. It was noted that III, IV and V year undergraduate clinical students and half of interns had adequate knowledge when compared to postgraduate students (6.9%), BDS tutors (0.00%) and MDS staff (10.7%).

**Conclusion:** The study concludes that there is a significant lack of knowledge among postgraduates students BDS and MDS faculty, regarding BLS when compared to III, IV and V year's clinical BDS students and dental interns. This study emphasizes the need for all health care professionals to regularly update the knowledge and skills regarding BLS.

**Keywords:** Basic life support, Cardiopulmonary resuscitation, Dental students, Training.

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### INTRODUCTION

Basic life support (BLS) is the foundation for saving lives following cardiac arrest.<sup>1</sup> It maintains viability until full cardiopulmonary resuscitation (CPR) can be commenced.<sup>2</sup> Fundamental aspects of adult BLS include immediate recognition of sudden cardiac arrest and activation of the emergency response system, early performance of high quality cardiopulmonary resuscitation (CPR) and rapid defibrillation, when appropriate. Early access to emergency medical care has saved hundreds of thousands of lives around the world.<sup>1</sup>

Cardiopulmonary resuscitation (CPR) invented in 1960, is a simple but effective procedure that allows almost anyone to sustain life in the early critical minutes after cardiac and respiratory arrest.<sup>3</sup> In 1966, the American Heart Association (AHA) developed the first CPR guidelines,<sup>4</sup> which have been followed by regular updates.<sup>5,6</sup> Likewise, various countries like Europe,<sup>7</sup> Singapore,<sup>8</sup> Australia and New Zealand,<sup>9</sup> have formulated guidelines on cardiopulmonary resuscitation (CPR).

Life-threatening emergencies may occur anytime in dental office. The frequent administration of local anesthetics and other drugs, usage of dental materials with high sensibilizing potential, the dental care of medical compromised patients and adult patients, the fear of unknown surgical operations in many patients are frequent causes of emergency situations.<sup>10</sup> Every dental practitioner must be able to diagnose and treat common emergent problem (for example syncope, hyperventilation syndrome) and less common or rare potentially life-threatening emergencies (for example anaphylactic reaction).<sup>11</sup>

As health care professionals, dentists' must be acquainted with various protocols to competently handle emergencies arising in a dental office. A study by Senter et al<sup>12</sup> in 2005 revealed that close to 60% of dentists had

participated in the management of one to three medical emergencies annually. Providing BLS in medical emergency situations is the most essential contribution until definitive medical care can be provided till the victim is stabilized. For this reason, it becomes imperative for the dentist to be well versed with prevention and management of such emergencies in the dental office.<sup>13</sup>

Proper practice of the techniques and maneuvers is essential to effectively resuscitate a victim, which requires adequate knowledge and training during the dental education years. A study in Bulgaria<sup>11</sup> revealed that though 73% of dental students were self-confident that they will recognize the emergent problem quickly, but severe lack of practical skills was observed. On the other hand, study by Chandrasekaran et al<sup>14</sup> revealed that the study group comprising of medical, dental, nursing students and faculty in a city in Tamil Nadu, India were severely lacking in the awareness of BLS. With this background, the present study was designed to assess and compare the knowledge of BLS among third, fourth and fifth (III, IV and V) year Bachelor of Dental Surgery (BDS) clinical students, dental interns, postgraduate students and BDS and Masters of Dental Surgery (MDS) faculty of Panineeya Institute of Dental Sciences and Hospital, Hyderabad, India.

## MATERIALS AND METHODS

The study population comprised of III, IV and V year BDS clinical students, dental interns, postgraduate students and BDS and MDS faculty of Panineeya Institute of Dental Sciences and Hospital, Hyderabad.

The survey instrument employed was a self-administered questionnaire comprising of 20 multiple choice questions (Q1-Q20) and last two questions (Q21-Q22) were directed toward training on BLS. The questionnaire assessed the basic theoretical and practical knowledge regarding BLS. Ethical clearance was obtained from institutional review board and participation was voluntary.

Statistical Package for Social Sciences software (SPSS version 12.0) was used to analyze the statistical data. Mann-Whitney U test was utilized to determine the association between variables and their knowledge scores. To determine the association between variables with respect to mean knowledge score, t-test was employed. Multiple group comparison was done using analysis of variance (ANOVA) and Kruskal-Wallis test. The  $p < 0.05$  was considered statistically significant.

## RESULTS

Table 1 demonstrates the demographic details of the study population. A total of 338 respondents comprising of 246

**Table 1:** Demographic distribution of study population

Variables	n (%)	
Gender	Male	92 (27.2)
	Female	246 (72.8)
Age groups	19-24 years	226 (66.8)
	25-28 years	77 (22.8)
	29+ years	35 (10.4)
Educational qualifications	III BDS	59 (17.6)
	IV BDS	65 (19.2)
	V BDS	55 (16.3)
	Interns	60 (17.8)
	BDS (staff)	13 (3.9)
	PG (students)	58 (17.2)
MDS (staff)	28 (8.3)	

(72.8%) females and 92 (27.2%) males participated in the study. Majority of the study group population belonged to the age group of 19 to 24 years (66.8%). Mean age of study population was  $23.5 \pm 4$  years.

Correct responses to the questions have been illustrated in Table 2.

When gender comparison was done with correct knowledge responses, statistically significant differences were noted for Q6, Q9, Q12, Q13, Q15 and Q17. For age groups and educational qualifications, significant difference was observed for all questions (Tables 3 and 4).

On questioning for 'training on BLS received' (Q21), higher numbers of females (68.7%) reported receiving the training as compared to males (31.3%) which was not statistically significant ( $p = 0.33$ ). For the question 'do you think every health care worker should receive the training' (Q22), a statistically significant difference was observed between males and females with majority of the females (73.3%) agreeing to compulsorily receiving the training ( $p = 0.03$ ).

When mean knowledge score was compared, females revealed a higher mean scores ( $69.9 \pm 19.3$ ) as compared to males ( $66.0 \pm 22.8$ ). Based on the age groups, highly significant mean knowledge score (78.3%), with majority possessing adequate knowledge score percentage (76.1%) were seen in 19 to 24 years group as compared to other age groups ( $p = 0.000$ ). Also, significant difference ( $p = 0.000$ ) was noted based on educational qualifications with more percentage of III BDS students having adequate knowledge score (91.5%) (Table 5).

## DISCUSSION

Knowledge about chain of survival is an efficient strategy which influences the course of sudden cardiac arrest. The chain of survival includes early recognition of the emergency and activation of the emergency medical services (EMS) system, early CPR, early defibrillation, and early advanced life support, including postresuscitation care.<sup>15</sup>

**Table 2:** Correct responses to the questions

S.no	Questions	Correct responses
Q1	Abbreviation of 'BLS'?	Basic life support
Q2	Find someone unresponsive in the middle of the road, what will be your first response? (Note your alone)	Look for safety
Q3	If you confirm somebody is not responding to you even after shaking and shouting at him, what will be your immediate action?	Activate EMS
Q4	Location of chest compression?	Mid chest
Q5	Location for chest compression in infants?	One finger breadth below the nipple line
Q6	If you do not want to give mouth-to-mouth CPR, the following can be done 'EXCEPT'?	No CPR
Q7	Rescue breathing in infants?	Mouth-to-mouth and nose
Q8	Depth of compression in adults during CPR?	One-half to one-third depth of chest
Q9	Depth of compression in children during CPR?	1-1 and half inches
Q10	Depth of compression in neonates during CPR?	One-half to one-third depth of chest
Q11	Rate of chest compression in adult and children during CPR?	100/minute
Q12	Ratio of CPR, single rescuer in adults is?	30:2
Q13	In a newborn, the chest compression and ventilation ratio is	3:1
Q14	Abbreviation AED stands for?	Automated external defibrillator
Q15	Abbreviation EMS stands for?	Emergency medical services
Q16	If you and your friend are having food in a canteen and suddenly your friend starts expressing symptoms of choking, what will be your first response?	Confirm foreign body aspiration by talking to him
Q17	You are witnessing an infant who suddenly started choking while he was playing with the toy, you have confirmed that he is unable to cry (or) cough, what will be your first response?	Back blows and chest compression of five cycles each then open the mouth and remove foreign body only when it is seen
Q18	You are witnessing an adult unresponsive victim who has been submerged in fresh water and just removed from it. He has spontaneous breathing, but he is unresponsive. What is the first step?	Keep him in recovery position
Q19	You noticed that your colleague has suddenly developed slurring of speech and weakness of right upper limb. Which one of the following can be done?	Possibly stroke, he may require thrombolysis and hence activate emergency medical services
Q20	A 50-year-old gentleman with retrosternal chest discomfort, profuse sweating and vomiting. What is next?	Probably, myocardial infarction, hence activates EMS, give an aspirin tablet and allow him to rest

How-so-ever, limited knowledge regarding BLS hinders the skills to perform CPR. Hence, the present study was designed to investigate the knowledge of III, IV and V year BDS, dental interns, postgraduate students, and BDS and MDS faculty of Panineeya Institute of Dental Sciences and Hospital, Hyderabad.

In India, the undergraduate curriculum as proposed by the Dental Council of India (DCI) includes medical emergency management under the subjects of general medicine and oral and maxillofacial surgery.<sup>16</sup> Keeping this in mind, only III, IV, V years (clinical dental students) along with the postgraduates, interns and faculty were included in the study.

Literature review<sup>3,11-13</sup> revealed lack of any standardized questionnaire to assess the knowledge about BLS, therefore, questionnaire utilized by Chandrasekaran<sup>14</sup> et al was employed in this study.

The study results demonstrated that there were more of female respondents (72.8%) than males (27.8%) indicating

more number of females enrolling for course. This was in concordance with a study conducted in Malaysia by Chew and Yazid<sup>17</sup> which also had more number of female respondents.

According to the study by Roshana et al<sup>18</sup> on medical and paramedical professionals in Nepal, the correct responses to the questions 'CPR' (96.7%) and 'unwilling to perform mouth-to-mouth CPR, what next' (55.4%) was comparable to the correct responses in our study (98.8 and 69.2%) respectively.

Avabratha et al<sup>19</sup> reported (45.2%) of the medical interns of three medical colleges in coastal Karnataka, had inadequate knowledge regarding resuscitation, which contradicted the findings of our study where in only (3%) interns had inadequate knowledge.

In the present study, it was noted that III, IV, V year undergraduate clinical students and half of interns had adequate knowledge when compared to postgraduate students (6.9%), BDS tutors (0.00%), and MDS staff

**Table 3: Comparison of correct response knowledge scores based on gender and age groups**

Q.no	Questions	Gender N (%)		p-value	Age groups n (%)				p-value
		Male	Female		19-24 yrs	25-28 yrs	29+ yrs		
Q1	Abbreviation of 'BLS'?	90 (26.9)	244 (73.1)	0.304	226 (67.7)	73 (21.8)	35 (10.5)	0.001*	
Q2	Find someone unresponsive in the middle of the road, what will be your first response? (Note your alone)	50 (28.1)	128 (71.9)	0.705	147 (82.6)	12 (6.7)	19 (10.7)	0.000*	
Q3	If you confirm somebody is not responding to you even after shaking and shouting at him, what will be your immediate action?	61 (24.4)	189 (75.6)	0.050	205 (82.0)	31 (12.4)	14 (5.6)	0.000*	
Q4	Location of chest compression?	7 (21.2)	26 (78.8)	0.415	9 (27.3)	12 (36.4)	12 (36.3)	0.000*	
Q5	What is the location for chest compression in infants?	68 (25.2)	201 (74.8)	0.114	205 (76.2)	52 (19.3)	12 (4.5)	0.000*	
Q6	If you do not want to give mouth-to-mouth CPR, the following can be done 'EXCEPT'	56 (23.9)	178 (76.1)	0.042*	197 (84.2)	23 (9.9)	14 (5.9)	0.000*	
Q7	How do you give rescue breathing in infants?	61 (26.9)	166 (73.1)	0.890	192 (84.5)	25 (11.1)	10 (4.4)	0.000*	
Q8	Depth of compression in adults during CPR?	55 (23.6)	178 (76.4)	0.026*	194 (83.3)	30 (12.9)	9 (3.8)	0.000*	
Q9	Depth of compression in children during CPR?	67 (27.1)	181 (72.9)	0.890	204 (8)	30 (12.1)	14 (5.7)	0.000*	
Q10	Depth of compression in neonates during CPR?	48 (27.4)	127 (72.6)	0.929	150 (85.7)	14 (8.1)	11 (6.2)	0.000*	
Q11	Rate of chest compression in adult and children during CPR?	62 (28.1)	159 (71.9)	0.636	176 (79.7)	35 (15.8)	10 (4.5)	0.000*	
Q12	Ratio of CPR, single rescuer in adults is	51 (23.5)	166 (76.5)	0.040*	181 (83.4)	30 (13.8)	6 (2.7)	0.000*	
Q13	In a newborn, the chest compression and ventilation ratio is	57 (23.5)	185 (76.5)	0.016*	197 (81.4)	34 (14.1)	11 (4.5)	0.000*	
Q14	What does abbreviation AED stands for?	73 (25.8)	210 (74.2)	0.183	217 (76.6)	51 (18.1)	15 (5.3)	0.000*	
Q15	What does abbreviation EMS stands for?	83 (25.9)	237 (74.1)	0.026*	225 (70.3)	65 (20.4)	30 (9.3)	0.000*	
Q16	If you and your friend are having food in a canteen and suddenly your friend starts expressing symptoms of choking, what will be your first response	59 (26.8)	161 (73.2)	0.821	177 (80.5)	35 (15.9)	8 (3.6)	0.000*	
Q17	You are witnessing an infant who suddenly started choking while he was playing with the toy, you have confirmed that he is unable to cry (or) cough, what will be your first response?	68 (24.1)	214 (75.9)	0.004*	192 (68.1)	66 (23.4)	24 (8.5)	0.044*	
Q18	You are witnessing an adult unresponsive victim who has been submerged in fresh water and just removed from it. He has spontaneous breathing, but he is unresponsive. What is the first step?	56 (27.5)	148 (72.5)	0.906	177 (86.7)	18 (8.8)	9 (4.5)	0.000*	
Q19	You noticed that your colleague has suddenly developed slurring of speech and weakness of right upper limb. Which one of the following can be done?	74 (28.1)	190 (71.9)	0.527	189 (71.5)	51 (19.3)	24 (9.2)	0.002*	
Q20	A 50-year-old gentleman with retrosternal chest discomfort, profuse sweating and vomiting. what is next?	76 (28.1)	194 (71.9)	0.445	172 (63.7)	68 (25.1)	30 (11.2)	0.047*	

\*Denotes statistically significant



**Table 4: Comparison of correct response knowledge scores based on educational qualification**

Q.no	Questions	Educational qualification n (%)							p-value
		III BDS	IV BDS	V BDS	Interns	BDS (staff)	MDS (staff)	PG-students	
Q1	Abbreviation of 'BLS'?	59 (17.7)	65 (19.5)	55 (16.5)	60 (18.0)	13 (3.9)	28 (8.4)	54 (16.2)	0.0034*
Q2	Find someone unresponsive in the middle of the road, what will be your first response? (Note your alone)	55 (30.9)	47 (26.4)	41 (23.0)	3 (1.7)	2 (1.1)	19 (10.7)	11 (6.2)	0.0000*
Q3	If you confirm somebody is not responding to you even after shaking and shouting at him, what will be your immediate action?	59 (23.6)	60 (24.0)	49 (19.6)	51 (20.4)	3 (1.2)	11 (4.4)	17 (6.8)	0.0000*
Q4	Location of chest compression?	0 (0.0)	0 (0.0)	0 (0.0)	7 (21.2)	5 (15.2)	13 (39.4)	8 (24.2)	0.0000*
Q5	What is the location for chest compression in infants?	58 (21.6)	54 (20.1)	54 (20.1)	56 (20.8)	2 (0.7)	9 (3.3)	36 (13.4)	0.0000*
Q6	If you do not want to give mouth-to-mouth CPR, the following can be done 'EXCEPT'?	55 (23.5)	61 (26.1)	49 (20.9)	37 (15.8)	4 (1.7)	13 (5.6)	15 (6.4)	0.0000*
Q7	How do you give rescue breathing in infants?	55 (24.2)	60 (26.4)	47 (20.7)	46 (20.3)	2 (0.9)	10 (4.4)	7 (3.1)	0.0000*
Q8	Depth of compression in adults during CPR?	54 (23.2)	65 (27.9)	49 (21.0)	43 (18.5)	6 (2.6)	6 (2.6)	10 (4.3)	0.0000*
Q9	Depth of compression in children during CPR?	56 (22.6)	60 (24.2)	54 (21.8)	53 (21.4)	3 (1.2)	10 (4.0)	12 (4.8)	0.0000*
Q10	Depth of compression in neonates during CPR?	51 (29.1)	56 (32.0)	41 (23.4)	8 (4.6)	2 (1.1)	8 (4.6)	9 (5.1)	0.0000*
Q11	Rate of chest compression in adult and children during CPR?	48 (21.7)	53 (24.0)	49 (21.0)	45 (20.4)	3 (1.4)	11 (5.0)	12 (5.4)	0.0000*
Q12	Ratio of CPR, single rescuer in adults is?	52 (24.0)	55 (25.3)	46 (21.2)	42 (19.4)	5 (2.3)	6 (2.8)	11 (5.1)	0.0000*
Q13	In a newborn, the chest compression and ventilation ratio is?	48 (19.8)	55 (25.3)	25.3 (21.2)	47 (19.4)	2 (0.8)	7 (2.9)	27 (11.2)	0.0000*
Q14	What does abbreviation AED stands for?	59 (20.8)	59 (24.4)	59 (24.4)	54 (19.1)	2 (0.7)	10 (3.5)	38 (13.4)	0.0000*
Q15	What does abbreviation EMS stands for?	59 (18.4)	65 (23.0)	55 (17.2)	60 (18.8)	13 (4.1)	24 (7.5)	44 (13.8)	0.0000*
Q16	If you and your friend are having food in a canteen and suddenly your friend starts expressing symptoms of choking, what will be your first response?	52 (23.6)	55 (25.0)	47 (21.4)	37 (16.8)	2 (0.9)	8 (3.6)	19 (8.6)	0.0000*
Q17	You are witnessing an infant who suddenly started choking while he was playing with the toy, you have confirmed that he is unable to cry (or) cough, what will be your first response?	52 (18.4)	55 (25.0)	48 (17.0)	59 (20.9)	9 (3.2)	18 (6.4)	47 (16.7)	0.0006*
Q18	You are witnessing an adult unresponsive victim who has been submerged in fresh water and just removed from it. He has spontaneous breathing, but he is unresponsive. What is the first step	51 (25.0)	49 (17.4)	47 (23.0)	40 (19.6)	0 (0.0)	8 (3.9)	8 (3.9)	0.0000*
Q19	You noticed that your colleague has suddenly developed slurring of speech and weakness of right upper limb. Which one of the following can be done?	51 (19.3)	50 (24.5)	43 (16.3)	53 (20.1)	4 (1.5)	18 (6.8)	42 (15.9)	0.0001*
Q20	A 50-year-old gentleman with retrosternal chest discomfort, profuse sweating and vomiting. What is next?	49 (18.1)	53 (20.1)	36 (13.3)	56 (20.7)	9 (3.3)	24 (8.9)	49 (18.1)	0.0045*

\*Denotes statistically significant

**Table 5:** Association of variables with mean knowledge score levels

Variables		Knowledge scores n (%)			Mean knowledge score (%)	p-value
		Inadequate (<50%)	Satisfactory (51%-75%)	Adequate (>75%)		
Gender	Males	25 (27.1)	20 (21.7)	47 (51)	66.0 ± 22.8	0.121
	Females	53 (21.5)	53 (21.5)	140 (56.9)	69.3 ± 19.3	
Age groups	19-24 yrs	10 (4.4)	44 (19.4)	172 (76.1)	78.3	0.000*
	25-28 yrs	47 (61)	18 (23.3)	12 (15.5)	50.4	
	29+ yrs	21 (60)	11 (31.4)	3 (8.5)	47.9	
Educational qualifications	III BDS	0 (0.00)	5 (8.47)	54 (91.5)	83.4	0.000*
	IV BDS	0 (0.00)	15 (23.0)	50 (76.9)	80.0	
	V BDS	0 (0.00)	12 (21.8)	43 (78.2)	80.3	
	Interns	3 (5.00)	24 (40.00)	33 (55.00)	73.6	
	BDS (staff)	12 (92.3)	1 (7.7)	0 (0.00)	36.0	
	PG students	47 (81.0)	7 (12.0)	4 (6.9)	42.7	
	MDS (staff)	16 (57.1)	9 (32.1)	3 (10.7)	49.2	

\*Denotes statistically significant

(10.7%). This could be attributed to the fact that III year students attended general medicine clinics. The subject of oral and maxillofacial surgery is integrated in the IV and V year which could be the reason for adequate knowledge score in this group. Lower scores in the postgraduate students and faculty (BDS and MDS) and highlights the need for continuous improvising of the skills and knowledge regarding BLS.

Surprisingly, the findings of the study brought to light that no training on BLS was received by III, IV and V year clinical BDS students. On the other hand, majority of interns received training, whereas not a satisfactory number of BDS and MDS faculty were updated with the skills of BLS. This stresses the need for compulsory continuing education programs to be conducted and attended by all the dental fraternity on a regular basis. In another Indian study conducted by Gupta T et al<sup>13</sup> on dentists of Udupi and Mangalore, majority of the participating dentists recalled having received training in management of medical emergencies as undergraduates. On the contrary, study conducted by Stoeva I<sup>11</sup> on dental students in Plovdiv, Bulgaria, reported less number of students (11.3%) had received some type of training with regard to CPR.

Though, the present study incorporated both theoretical as well as practical questions regarding the skills of BLS, the results must be interpreted with certain limitations. The study was confined to a single dental institute; therefore generalization of the results cannot be done. Also, no information was sought regarding the equipments essential for administering CPR (e.g. Ambu bag). Lastly, question on whether the BLS and CPR was delivered in an emergency situation by the respondents was not taken into account, which could question the practical skills of performing the CPR procedure.

## CONCLUSION

There is a significant lack of knowledge among postgraduates students BDS and MDS faculty, regarding BLS when compared to III, IV and V year's clinical BDS students and dental interns. This study emphasizes the need for all health care professionals to regularly update the knowledge and skills regarding BLS, along with a hands-on course on.

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