

## IMPACT OF SIMULATION TRAINING ON COGNITIVE AND PSYCHOMOTOR SKILLS REGARDING BASIC LIFE SUPPORT AMONG MEDICAL INTERNS

Subbramaniyan Kumarasamy<sup>1</sup>, Thirumavalavan Rajavelu<sup>2</sup>, Sheeba Jebakani A<sup>3</sup>, Ambiga K<sup>4</sup>, Sakthivel E<sup>5</sup>, Pradeep Selvaraj<sup>6</sup>

<sup>1</sup>Associate Professor, Department of Medicine, SRMMCH & RC SRM University.

<sup>2</sup>HOD, Department of Simulation Center, SRMMCH & RC SRM University.

<sup>3</sup>Assistant Professor, Department of Nursing, SRM College of Nursing, SRM University.

<sup>4</sup>Assistant Professor, Department of Nursing, SRM College of Nursing, SRM University.

<sup>5</sup>Assistant Professor, Department of Community Medicine, SRMMCH & RC SRM University.

<sup>6</sup>Resident, Department of Community Medicine, SRMMCH & RC SRM University.

### ABSTRACT

#### BACKGROUND

Although the BLS ability of a medical student is a crucial competence, poor BLS training programs have been documented worldwide.

The aim of this present study is to assess and compare cognitive and psychomotor skills towards basic life support (BLS) among medical interns.

#### MATERIALS AND METHODS

A cross-sectional, single group pre-test/post-test design was used to study the effect of simulation on cognitive and psychomotor skills development in basic life support (BLS). A 25-point structured questionnaire and 9-item checklist was used during the training on a group of medical interns. Initially, needs assessment was done. Based on the need assessment we embarked on the course to fulfil the gaps identified in the need assessment. A pre-test assessment was done; CPR scenarios were given to improve the psychomotor skills. During the class, videos, demos and hands-on skills were given. After debriefing, the participants undertook post-test that included the same structured questionnaire and checklist.

#### RESULTS

Ninety medical interns participated in the study. Comparison was done between pre-test cognitive (9.98±, 2.7, range 13) and post-test cognitive results (21.06±3.153, range 17). Comparison was also done between pre-test psychomotor skill (1.63±, 2.96, range 13) and post-test results (12.88±, 1.16, range 11). Results revealed an overall improvement in cognitive and psychomotor skill after the simulation training program (t = 25.98, df = 89, p<0.0001), (t= 33.02, df =89, p<0.0001).

#### CONCLUSION

The cognitive and psychomotor training is associated with retention of knowledge, skill and high student satisfaction. Prior BLS training influences the retention of knowledge and skill that is needed for all health care professionals to have some standards to handle emergency.

#### KEYWORDS

BLS, AHA, Cognitive, Psychomotor Skill, Medical Interns.

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#### BACKGROUND

BLS is the foundation for saving life after cardiac arrest. Despite important advances in prevention, sudden cardiac arrest remains a leading cause of death in developing countries. Most incidents occur at home and majority are unwitnessed. Outcome from out-of-hospital cardiac arrest remains poor. Early CPR and rapid defibrillation combined with early advanced care can produce high longterm survival

rates for witnessed cardiac arrest.<sup>[1]</sup> The poor knowledge of CPR among clinical medical students is a serious issue because these potential junior doctors who need to be competent in CPR will be graduating with insufficient knowledge and skills in CPR.<sup>(2)</sup> The lack of training and inability to cope with medical emergencies can lead to tragic consequences and sometimes legal complications. PS Phillips and Nolan J P (2001) from Royal Hospital Bath (UK) analysed the junior doctors in medical schools of UK and found many junior doctors were not competent in carrying out effective resuscitation even though medical schools in U K provided them some form of life support training.<sup>(3)</sup> Recent years, several publications have highlighted the deficiencies in CPR quality, both out-of-hospital and in-hospital, which have partly been addressed in the newest BLS guidelines.<sup>(4)</sup> Therefore, health professionals must be well prepared to deal with medical emergencies. This study was undertaken to assess the cognitive and psychomotor skills towards basic life support (BLS) among medical interns at SRM Medical College Hospital and Research Center SRM University, Kanchipuram.

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Corresponding Author:

Dr. Subbramanian Kumaraswami,

Associate Professor,

Department of Medicine,

SRM Medical College and Hospital, Research Centre

SRM University, Kattankulathur.

Kancheepuram-603203, Tamilnadu.

E-mail: subbramaniyan.35@gmail.com

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**MATERIALS AND METHODS**

A cross-sectional, single group pre-test/post-test design was used to study the effect of BLS simulation on cognitive and psychomotor skill towards basic life support (BLS). Similar to the study conducted by Ajjappa A K et al in Davangere,<sup>(5)</sup> 90 medical interns were included in the present study, conducted at SRM Stratus Simulation center, SRM University by convenience sampling method. Before the start of the study, the permission to carry out the study was obtained from the institutional ethical committee. Initially needs assessment was done, based on the need assessment we embarked on the course to fulfil the gaps identified in the needs assessment. A pre-test assessment was done; CPR scenarios were given to improve the psychomotor skills. During the class, videos, demos and hands-on skills were given. The training was a six-hour course divided into two sessions, and every session was divided into one hour of theoretical training and two hours of practice on the high-fidelity manikin by trained and certified BLS trainers. After debriefing, participants undertook post-test that included the theory and practice with the same 25-point structured questionnaire and 9-item checklist.

During the skill assessment, students were asked to perform different parts of BLS on a standard manikin, and later evaluated for their skills using the 2010 American Heart Association (AHA) CPR testing checklist including checking for unresponsiveness by shouting and shaking the manikin, asking for help and calling Emergency Medical Service (EMS), opening the airway using head tilt-chin lift manoeuvre, checking breathing, giving two breaths, checking the carotid pulse, baring the victim's chest and locating the CPR hand position, performing the first cycle of compressions, and giving two breaths after the first cycle of compressions. The students were rated for the first nine skill steps and also additional steps regarding checking for environmental safety. Skills related to Automated External Defibrillator (AED) were tested. For each step, the students got one point for appropriate performance and zero for inappropriate one.

The data was analysed using Mean, Standard Deviation, Variance. Student 't' test and Paired 't' test were used for statistical analysis and p value <0.05 was considered statistically significant.

**RESULTS**

Ninety medical interns participated in the study. Comparison between pre-test cognitive (9.98±, 2.7, range 13) and post-test cognitive results (21.06, ±, 3.153, range 17) and the comparison between pre-test psychomotor skill (1.63±, 2.96, range = 13) and post-test results (12.88±, 1.16, range 11) showed an overall improvement in cognitive and psychomotor skill after the simulation training program (t=25.98, df=89, p < 0.0001), (t=33.02, df =89, p < 0.0001.) Knowledge of basic life support (BLS) and expertise in cardiopulmonary resuscitation (CPR) techniques ensures the survival of the patient long enough till experienced medical help arrives and in most cases is itself sufficient for survival. CPR skills are not constantly stressed upon as a part of the curriculum among the student population. In a similar assessment study, it was found that many of the students after failing abysmally initially were particularly receptive after practical tutorials.<sup>(6)</sup>

Test	Scores (%)		Subject Scores (%)		Mean Difference (%)	Paired 't' test	df	P value
	Min	Max	Mean	SD				
Pre- test	5	18	9.98	2.707	11.08	-25.979	89	.0001*
Post- test	8	25	21.06	3.153			89	

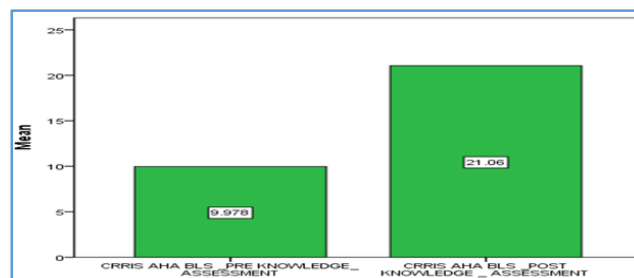
**Table 1. Comparison of Pre-test and Post-test BLS Knowledge among Interns (N=90)**

\*Statistically significant.

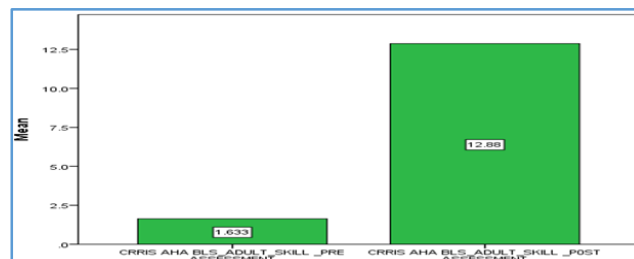
Test	Scores (%)		Subject Scores (%)		Mean Difference (%)	Paired 't' test	df	P value
	Min	Max	Mean	SD				
Pre test	0	13	1.63	2.958	11.25	-33.024	89	.0001*
Post test	2	13	12.88	1.160			89	

**Table 2. Comparison of Pre-test & Post-test Cognitive & Psychomotor Skills among Interns (N=90)**

\*Statistically significant.



**Figure 1. Comparison of Pre-test and Post-test BLS Knowledge among Interns (N=90)**



**Figure 2. Comparison of Pre-test & Post-test Cognitive & Psychomotor Skills among Interns (N=90)**

**DISCUSSION**

In our study, the pre-existing knowledge and skill of medical interns regarding the basic life support was less prior to participation in the BLS training. The present BLS training was successful in enhancing the knowledge and skills of interns. Asmita Chaudhary et al in their study analysing the BLS knowledge among medical and paramedical staff reported that only 3 out of 117 participants had secured 80-90% marks in pre-test, and post-workshop assessment showed 70% candidates securing more than 80%.<sup>(7)</sup> It is common notion among the public and patients to expect even first-year medical students to be capable of handling emergencies. However, the present curriculum does not provide medical intervention skills to first-year medical students. Study conducted by Sushma Pande et al evaluated retention of knowledge and skills imparted to first-year medical students through basic life support training if recommended that BLS skills be learnt right from the first

year medical curriculum along with the basics sciences of the cardiovascular and respiratory systems, followed by reinforcement of the skills every year thereafter, which would lead to a more fruitful outcome.<sup>(8)</sup> Study conducted by Akshatha Rao Aroor et al recommended that the regular refreshing courses are necessary with hands-on experience.<sup>(9)</sup> Educational institution should be involved in the training of students and professionals for BLS and other emergencies that can occur in the clinical settings. BLS should be considered as a part of medical curriculum. Hence, BLS should be a core competency across all health care professional programs.

### CONCLUSION

Medical interns are currently expected to learn resuscitation skills in a clinical setting where there is little opportunity to correct poor techniques; after graduation, learning resuscitation skills may be complicated due to busy residency schedules and lack of resources. Many medical interns may not be competent enough to carry out effective cardiopulmonary resuscitation. BLS Training with high fidelity virtual reality simulator can improve skills and should be considered as an obligatory part of training before setting out internship practice. In conclusion, prior BLS training influences the retention of knowledge and skill that is needed for all health care professionals to have some standard to handle emergency.

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