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Effectiveness of hands-on training programme on knowledge and skill regarding basic life support among higher secondary school students in a selected schools at Kollam district

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Abstract
This school based interventional study was intended to assess the effectiveness of hands-on training programme on knowledge and skills regarding basic life support among higher secondary school students in a selected schools at Kollam district.

Methodology: Research Design adopted for the study was True experimental – Randomized one group pretest posttest control group design and Sampling technique was multistage cluster sampling with Randomization. Based on inclusion criteria a total of 40 (20 in experimental group and 20 in control group) higher secondary School students studying 12th standards were selected as samples. In phase one the students were assessed for pretest knowledge using self-administered questionnaire and skills assessed using BLS checklist based on American heart association (AHA). Phase two educational intervention regarding BLS and hands on training using Resusci-Anne manikin. In phase three post intervention evaluation was done on 15th and 30th day of training programme using the same pretest tools.

Results: Paired t-test was performed to compare the pre and post test scores of knowledge and skills of students about BLS both in experimental and control group. There was significant change in knowledge from pretest score mean=3.85, SD= 0.812 to post test score mean = 8.55 SD =1.276 and ($p<0.001$). Significant change was noticed regarding the skills on BLS as evident from increase in pretest score (mean = 2.20, SD = 0.833) to post test score mean=8.45, SD= 1.050 and ($p<0.001$).

Conclusion: Result of the study revealed that hands on training on BLS among higher secondary students was effective in improving their knowledge and skills. Adding BLS training in the school curriculum can be a fruitful investment in ensuring proper and timely management of cardiac arrest not only for school children but also for the community at large.

Keywords: Hands on training programme, Knowledge. Skill, BLS, AHA, Higher secondary students

Introduction

Sudden cardiac arrest is a sudden, unexpected death caused by loss of heart function. Heart is the vital organ which supply oxygenated blood to all organs and tissues of the body. When there is sudden stoppage of heart and lungs functioning cardio pulmonary arrest occurs. Basic life support is an important activity performed to assist people who have suffered with cardiac arrest and suddenly stopped breathing in order to supply oxygen to the vital tissues of the body. According to AHA heart disease is the world's largest killer, claiming, about 17.3 million people died each year with the problem of cardiac arrest. Brain death occurs within 3to 5 minutes after the cardiac arrest and giving immediate CPR keeps blood flowing and provides oxygenated blood to brain and other vital organs of body and allowing the victim to have better recovery. Elbaih Hamed Adel, *et al*. (2019) [1] conducted a study to assess the CPR knowledge and experience among hospital nurses reveals that CPR increases the survival rate but cardiac arrest without treatment is falling to 10-15% per minute of survival rate. So high quality CPR will give higher probability of survival and reduce the mortality [1] Joshin (2020) [2] conducted a study to assess the effectiveness of structured teaching programme on knowledge and skill regarding Basic cardiac Life support. A pre-experimental one group pretest post-test design was used and 50 students selected through convenient sampling technique.

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The result of the study shows the structured teaching program was effective and made significant improvement of knowledge and skill score regarding basic cardiac life support among study participants. Findings of study suggest the need of such teaching and skill training programs, which in turn may enhance the overall health standard and save the life of victims [2]. The need of giving training on CPR is to learn to maintain blood circulation, open airway and provide artificial breathing and therefore it provides basic life support till the medical and advance life support arrives. High quality CPR will provide live saving chances for the victim in an emergency situation.

Need and significance of the study
The Basic life support is considered to be the foundation to save lives following sudden cardiac arrest. The statistics of cardiac arrest is increasing day by day and alarming the need of introducing these types of research studies in and around our environment, thus everyone should be competent both young and old and skilful in doing BLS so as to improve the life span and to reduce the mortality due to cardiac arrest. Basic life support training is an important community survival skill necessary for all individuals as injuries and accidents have become the major epidemic of noncommunicable disease in India. Safety education should begin with school children since they not only represent the bulk of at-risk population with injury proneness, they also have the aptitude to learn with keen enthusiasm to preach and practice among their family members, peers and community. Schools are the most suitable places where education and skill training on BLS can be delivered effectively due to inherent ambience of the institution which make them more receptive to any type of educational training. Teaching basic life support activities will help the school children to develop self-confidence and step by step thinking for when come across real life events that need basic life support and can convey that knowledge skills to other people to handle the emergency situations thus to save the lives.

Review of Literature
A quasi-experimental study was conducted to assess the effectiveness of a study program regarding basic life support in middle school children, at Wat Lat Peng School Samut Songkhram Province at Thailand. The result of the study showed that after participating in the basic life-saving education activities, the school children's basic life support knowledge score was higher than their knowledge score before entering the program. M = 6.49 and *SD* 3.01, whereas the score after BLS training was M = 12.21 and SD = 2.20 [3]. A descriptive cross-sectional study was conducted regarding the Evaluation of public awareness, knowledge and attitudes towards basic life support among adolescence in Jordan. The result of the study showed that participants who received training performed chest compression, mouth-to-mouth ventilation, and both compression and ventilation were higher than those who did not receive training and 256 participants (88.3%) reported that they would perform CPR on someone from their family without hesitation [4]. A quasi-experimental research study was conducted at Ankara, Turkey, to evaluate the effectiveness of traditional Basic Life Support training and alternative technology-enhanced methods in high school. Total 83 voluntary students were randomly allocated to theoretical (Group A), video-based (Group B), and mobile-assisted video-based instructions (Group C). Result of the study shows that statistically significant difference was found for the groups' measurable Basic Life Support scores (F (2, 73) = 13.527, p = 0.000, $\eta p2$ = 0.270); and Group C (23.76 ± 3.98) scored higher than the other groups. Findings of the study showed that all instruction methods increased Basic Life Support knowledge [5]. A cross-sectional research study was conducted to determine the levels of awareness of BLS and CPR among female secondary students at governmental schools in Riyadh city, Saudi Arabia (SA). The study result shows that, more than 50% of the students (54.8%) did not have information about BLS, and 82.6% felt their knowledge about BLS was insufficient. Only 10.8% of the participants had taken BLS course, and 38.5% believe BLS courses should be mandatory. The levels of awareness regarding BLS among female secondary school students in governmental schools in Riyadh was found to be insufficient [6]. A randomized controlled trial study was conducted to compare the impact of Lifesaver only, face-to-face training only, and Lifesaver with face-to-face training on CPR knowledge, skills and attitudes among UK school children. The findings of study showed that the combined group performed better in skills assessment than Lifesaver (4.02; 95% CI 2.81 to 5.22; p=0.001) and F2F (1.76; 95% CI 0.51 to 3; p=0.003); that means use of Lifesaver by school children, compared to F2F training alone, can lead to comparable learning outcomes for several key elements of successful performance of CPR [7].

Statement of the problem
A study to assess the effectiveness of hands-on training programme on knowledge and skill regarding basic life support among higher secondary school students in a selected schools at Kollam district.

Objectives
1. To assess the knowledge and skill regarding Basic Life Support among higher secondary school students in experimental and control group.
2. To determine the effectiveness of hands-on training programme on knowledge and skill regarding Basic Life Support among higher secondary school students in experimental group.
3. 3.To find out the correlation between knowledge and skill regarding BLS among higher secondary school students after hands-on training programme in experimental group and control group.
4. To find out the association between knowledge and skill regarding BLS with selected socio demographic variables of higher secondary school students in experimental and control group.

Hypotheses
H_1: There is a significant difference in mean pretest and posttest knowledge scores regarding BLS among higher secondary school students after hands-on training programme in experimental group.

H_2: There is a significant difference in mean pretest and posttest skill scores regarding BLS among higher secondary school students after hands-on training programme in experimental group

H₃: There is a significant difference between mean posttest knowledge scores regarding BLS among higher secondary school students in experimental and control group.

H₄: There is a significant difference between mean posttest skill scores regarding BLS among higher secondary school students in experimental and control group.

H₅: There is a correlation between pretest score of knowledge and skill regarding BLS among school children in experimental group and control group.

H₆: There is a significant association between pretest knowledge and skills scores regarding BLS with selected socio demographic variables.

Research Methodology
The researcher adopted quantitative research approach and true experimental – Randomized one group pretest posttest control group design for the present study in order to assess the effectiveness of hand on training program on knowledge and skills of higher secondary students studying in selected schools at Kollam district.

Theoretical frame-work
Schematic representation of the variables
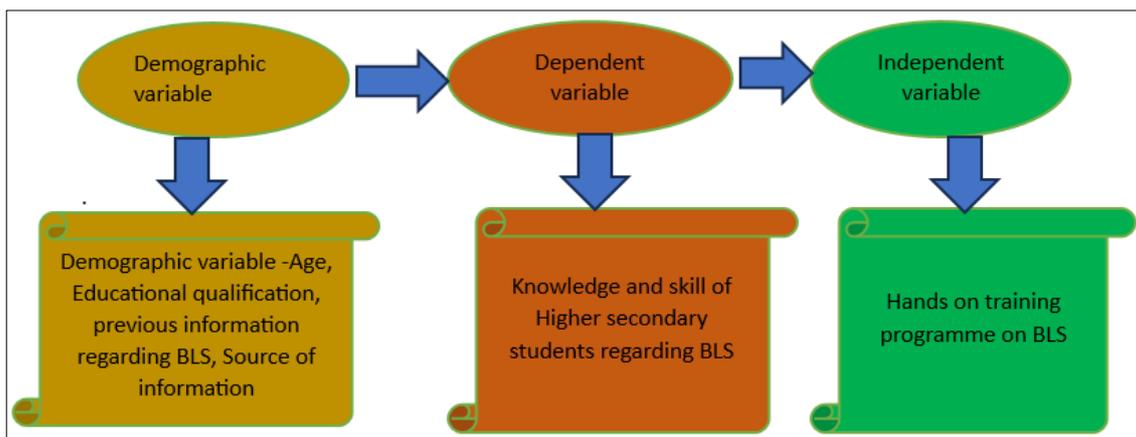
Ethical Consideration
This study was approved by institutional review board and ethical committee of Bishop Benziger college of nursing research center. Official permission was obtained from the principals of selected schools at Kollam district. Data collection period was one month. Written informed consent was obtained from the study participants and their parents after explaining the need for the study by the investigator. The subjects were informed that the confidentiality of the data would be maintained.

Data Collection Process
After obtaining permission from school management the data were collected from higher secondary school students of selected schools at Kollam district. Self-introduction about the investigator and information regarding the nature of the study was explained. Informed consent was sought from each student at the beginning of the study. In phase one Pretest knowledge was assessed using structured knowledge question are and skill assessed using observation checklist on BLS. Phase two educational intervention given by lecture, PowerPoint presentation and hands on training

Research Setting: Selected higher secondary schools at Kollam district.

Sample: Higher secondary school students studying in selected schools at Kollam district.

Sample size: 40 (Experimental group20 and Control group 20)

Sampling technique: Multistage cluster sampling with Randomization

Data and sources of data
Tool 1: Socio demographic Proforma to collect the baseline information regarding the sample.

Tool 2: Self structured knowledge questionnaire regarding BLS.

Tool 3: Observational checklist for assessing skills on BLS based on AHA.

programme on BLS was conducted using Resusci-Anne manikin. In phase three reinforcement was given and 1ˢᵗ posttest done on 15ᵗʰ day and 2ⁿᵈ post test done on 30th day. On the completion of data collection, the researcher thanked the management and respondents for their interest and cooperation.

Data Analysis
The data were analyzed by applying SPSS statistics version 20. Descriptive and Inferential statistics were used to analyze the data. The demographic data were analyzed using frequency and percentage. Paired 't' test was used to find out the effectiveness of knowledge and skill regarding hands on training programme on BLS. Chi-Square test used to find out the significant association of pretest knowledge and skill scores with selected socio demographic variables.

Results
The present study showed significant difference in the mean percentage of knowledge and skill scores before and after the hands-on training programme

Table 1: Distribution of level knowledge and skill regarding basic life support among school children in experimental and control group in pretest n=40

Sl. No	BLS	Experimental Group [n=20]		Control Group [n=20]		χ^2	p-value
		No.	%	No.	%		
		Knowledge					
1.	Good [8-10]	0	00	0	00	0.143	0.705 NS
	Average [5-7]	4	20	5	25		
	Poor [0-4]	16	80	16	75		
		Skill					
2.	Good [8-10]	0	00	0	00	-	-
	Average [5-7]	0	00	0	00		
	Poor [0-4]	20	100	20	100		

NS - Non-Significant

Table 1 shows the Percentage distribution of level knowledge and skill regarding Basic Life Support among school children in experimental and control group in pretest. Regarding level of knowledge, majority 80% of the school children in the experimental group and 75% in the control group had poor knowledge regarding basic life support. The χ^2 value and p value shows that school children in the experimental group and control group were homogenous and comparable (p>0.05). Regarding skill level, all 100% of the school children in the experimental group and control group had poor skill on basic life support. The χ^2 value and p value shows that school children in the experimental group and control group were homogenous and comparable.

Table 2: Comparison of mean level knowledge and skill regarding basic life support among school children in experimental and control group in n=40

Sl. No	BLS	Experimental Group [n=20]		Control Group [n=20]		Mean difference	't' value	p value
		Mean	SD	Mean	SD			
1.	Level of knowledge	3.85	0.812	3.65	1.565	0.20	0.507	0.615 NS
2.	Skill	2.20	0.833	2.25	0.786	0.05	0.195	0.846 NS

NS – Non-Significant

Table 3 shows the Comparison of mean level knowledge and skill regarding Basic Life Support among school children in experimental and control group in pretest.
The pretest mean level of knowledge was 3.85 in the experimental group and 3.65 in control group (MD=0.20) which was not significant (p>0.05). The pretest mean level of skill was 2.20 in the experimental group and 2.25 in control group (MD=0.05) which was not significant (p>0.05).

Table 3: Comparison of Mean level of knowledge regarding Hands on training programme on Basic Life Support among school children in experimental group between Pretest, Post-test 1 and post-test 2. n=40

BLS	level of Knowledge		Mean difference	Paired t-value	p value
	Mean	SD			
Pretest vs post-test 1	3.85	0.812	4.70	17.253	<0.001*** S
	8.55	1.276			
Pretest vs Post test 2	3.85	0.812	5.75	30.228	<0.001*** S
	9.60	0.502			

***Significant at p<0.001

Table 3 exhibits the Mean level of knowledge regarding Basic Life Support among school children in experimental group between Pretest, post-test1and post-test2.The level of knowledge shows the mean difference of 4.70 as the pretest mean score 3.85 was increased to 8.55 in post-test 1 which found to be highly significant (p<0.001). Thus, it was evident that a significant difference existed between pretest and post-test 1 in increasing level of knowledge among school students in the experimental group after intervention. The level of knowledge shows the mean difference of 5.75 as the pretest mean score 3.85 was increased to 9.60 in post-test 2 which found to be highly significant (p<0.001). Thus, it was evident that a significant difference existed between pretest and post-test 2 in increasing level of knowledge among school students in the experimental group after intervention.

Table 4: Comparison of Mean level of skill regarding Hands on training programme on Basic Life Support among school children in experimental group between Pretest, post-test 1 and post-test 2. n=40

BLS	Level of Skill		Mean difference	Paired t-value	p value
	Mean	SD			
Pretest vs post-test 1	2.20	0.833	6.25	18.420	<0.001*** S
	8.45	1.050			
Pretest vs post-test 2	2.20	0.833	7.30	35.356	<0.001*** S
	9.50	0.512			

***Significant at p<0.001

Table 4 exhibits the Comparison of Mean level of skill regarding Basic Life Support among school children in experimental group between Pretest, post-test 1 and post-test 2. The level of skill regarding basic life support shows the mean difference of 6.25 as the pretest mean score 2.20 was increased to 8.45 in post-test 1 which found to be highly significant ($p<0.001$). Thus, it was evident that a significant difference existed between pretest and post-test 1 in increasing in skill on BLS among school students in the experimental group after intervention. The level of skill regarding basic life support shows the mean difference of 7.30 as the pretest mean score 2.20 was increased to 9.50 in post-test 2 which found to be highly significant ($p<0.001$). Thus, it was evident that a significant difference existed between pretest and post-test 2 in increasing in skill on BLS among school students in the experimental group after intervention.

Table 5: Comparison of mean level of knowledge regarding basic life support among school children between experimental group and control group at different intervals

n=40

Level of knowledge	Experimental group (n=20)		Control group (n=20)		Mean difference	't' value	p value
	Mean	SD	Mean	SD			
Pre-test	3.85	0.812	3.65	1.565	0.20	0.507	0.615 NS
Post-test 1	8.55	1.276	3.60	0.940	4.95	13.964	<0.001*** S
Post-test 2	9.60	0.502	3.80	1.105	5.80	21.367	<0.001*** S

***Significant at $p<0.001$
NS - Non Significant

Table 5 shows the comparison of mean level of knowledge regarding Basic Life Support among school children between experimental group and control group at different intervals. In pretest, the mean knowledge was 3.85 in experimental group and 3.65 in the control group (MD=0.20) which inferred that there is no significant difference in level of knowledge ($p>0.05$).In post-test I, the mean knowledge was 8.55 in experimental group and 3.60 in the control group (MD=4.95) which inferred that there is significant difference in level of knowledge ($p<0.001$).In post-test II, the mean knowledge was 9.60 in experimental group and 3.80 in the control group (MD=5.80) which inferred that there is significant difference in level of knowledge ($p<0.001$).

Table 6: Comparison of mean level of skill on Basic Life Support among school children between experimental group and control group at different intervals n=40

Level of skill	Experimental group (n=20)		Control group (n=20)		Mean difference	't' value	p value
	Mean	SD	Mean	SD			
Pre-test	2.20	0.833	2.25	0.786	0.05	0.195	0.846 NS
Post-test 1	8.45	0.234	2.50	0.153	5.95	21.194	<0.001*** S
Post-test 2	9.50	0.114	3.25	0.203	6.25	26.746	<0.001*** S

***Significant at $p<0.001$
**Significant at $p<0.01$

Table 6 shows the comparison of mean level of skill regarding Basic Life Support among school children between experimental group and control group at different intervals. In pretest, the mean skill was 2.20 in experimental group and 2.25 in the control group (MD = 0.05) which inferred that there is no significant difference in level of skill ($p>0.05$). In post-test I, the mean skill was 8.45 in experimental group and 2.50 in the control group (MD = 5.95) which inferred that there is significant difference in level of skill ($p<0.001$).In post-test II, the mean skill was 9.50 in experimental group and 3.25 in the control group (MD = 6.25) which inferred that there is significant difference in level of skill ($p<0.001$).

Table 7: Correlation between level of knowledge and skill regarding BLS among school children among experimental group and control group in Post-test 2 n=40

Group	Variable	Mean	SD	KarlPearson's r	p value
Experimental group	Level of knowledge on BLS	9.60	0.502	0.204	0.388 NS
	Skill on BLS	9.50	0.512		
Control group	Level of knowledge on BLS	3.80	1.105	-0.157	0.509 NS
	Skill on BLS	3.25	0.910		

NS - Non-Significant

Table 7shows Karl-Pearson correlation between level of knowledge and skill regarding BLS among school children among experimental group and control group in post-test 2. Among experimental group, there is non-significant positive correlation between level of knowledge and skill regarding BLS (r=0.204; $p>0.05$). Which inferred an increase in level

of knowledge there is increase in level of skill. In control group, there is non-significant negative correlation between level of knowledge and skill regarding BLS (r=-0.157; *p*>0.05). Which inferred an increase in level of knowledge there is decrease in level of skill. Chi-square test revealed no significant association between level of knowledge and skill regarding BLS with selected sociodemographic variables (*p*>0.05).

Summary and Discussion
The research project analysed on the effectiveness of a hands-on training programme for teaching higher secondary school children regarding basic life support activities. The main findings of the study were that most of the students lacked knowledge regarding BLS before the training and at base line had no skills exposure concerning BLS both in experimental and control group. The students (experimental group) Basic life support knowledge scores after receiving hands on training on BLS was higher than before these activities. The level of knowledge shows the mean difference of 4.70 as the pretest mean score 3.85 was increased to 8.55 in post-test 1 which found to be highly significant (*p*<0.001). The level of knowledge shows the mean difference of 5.75 as the pretest mean score 3.85 was increased to 9.60 in post-test 2 which found to be highly significant (*p*<0.001). It was evident that a significant difference existed between pretest and post-test 2 in increasing level of knowledge among school students in the experimental group after intervention. This is in line with research study by Tippayanate *et al*. (2018) [8] who compared the effectiveness of basic resuscitation training using video and traditional methods against real practice among high school students in mahasarakam province. The research study found statistically significant increase in knowledge level of subjects [8].

The high school students BLS skills were poor at baseline both in experimental and control group. There was a greater demonstration of skills on the Resusci-Anne skill meter Manikin after the training. All students performed reasonably well in the hands-on skill training programme. The level of skill regarding basic life support shows the mean difference of 6.25 as the pretest mean score 2.20 was increased to 8.45 in post-test 1 which found to be highly significant (*p*<0.001). Thus, it was evident that a significant difference existed between pretest and post-test 1 in increasing in skill on BLS among school students in the experimental group after intervention. The level of skill regarding basic life support shows the mean difference of 7.30 as the pretest mean score 2.20 was increased to 9.50 in post-test 2 which found to be highly significant (*p*<0.001). Thus, it was evident that a significant difference existed between pretest and post-test 2 in increasing in skill on BLS among school students in the experimental group after intervention. A similar study was conducted by chaisongmuang and pearkao (2018) [9] regarding the effect of the basic cardiac arrest aid teaching programme on knowledge and skills of high school students. The study findings revealed that providing a basic resuscitation teaching programme resulted in increased knowledge and skills in the target audience who received the programme [9].

Limitation
This research studied only a few samples of students at the higher secondary level and providing a larger sample size would have better result in identifying the impact of the training programme on the participants.

Recommendation
1. Theoretical knowledge and skill training on BLS /CPR should be taught as part of curriculum in the secondary school level.
2. There should be more focus on ensuring sustainability of this training during education.
3. Longitudinal study on BLS training can be conducted as it would demonstrate students' retention of the subject matter.

Conclusion
The present study revealed a perceived need for knowledge and skill regarding Basic Life Support among higher secondary students and thus advocates that BLS hands on training programme should be made compulsory in school curriculum. This would not only enhance their skills toward emergency management of cardiac arrest but is a crucial step forward to disseminate the need of BLS training programme in the community set up so that they are able to give basic life support effectively in an emergency situation in order to save a precious life.

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Conflict of Interest
The author declares no conflict of interest

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