The Effectiveness of Basic Life Support Activities in Lower Secondary School Children Wat Lat Peng School, Samut Songkhram Province

Jatuporn Ounprasertsuk*, Chonthicha Wongthong

Department of Medical and Public Health Secretary, College of Allied Health Sciences, Suan Sunandha Rajabhat University, Samut Songkram Provice, Thailand

ABSTRACT

This study employs quasi-experimental design and aims to examine the effectiveness of basic life support models in middle school students at Wat Lat Peng School, Samut Songkhram Province. A sample of 85 junior high school students were asked to carry out a range of activities regarding the basic life support test including defrosting behavior, undergoing basic life-saving education using video media, doing group activities, and being taught step-by-step methods using a dummy. Data was collected using the basic life support knowledge assessment and was analyzed by distribution of frequency, percentage, mean, and standard deviation. Student knowledge before and after the experiment was compared using statistical analysis and the paired t-test. Before providing basic life support knowledge, the average mean was knowledge level was 6.49 and after the activities the mean was 12.21. Statistical calculations found that $t = 42.31$ with p-value < 0.01. The basic life-saving model was suitable for conveying this basic life-saving knowledge because there is a clear sequence of educational activities that assist students in understanding the content, including practical activities they can follow. This adds an element of fun that helps stimulate learning and ensures students are more interested in these activities. This research is limited because the number of models was not enough for the number of students. The researchers hope that the results of this research will be useful to those who are interested in applying basic life support activities in the effective learning of lifesaving skills.

INTRODUCTION

Resuscitation is an important activity performed to save lives. It is used to assist people who have suffered with cardiac arrest and suddenly stopped breathing in order to supply sufficient oxygen to the vital tissues of their body. If a patient stops breathing for more than 4 minutes in combination with cardiac arrest, the body tissue becomes dehydrated (Zhan *et al.*, 2017). This results in the deterioration or destruction of the tissue and the patient cannot then return to a normal state (Ghosh *et al.*, 2019). Sudden cardiac arrests caused by ischemic heart disease are one of the most common causes of death in middle and upper-middle income countries (Benjamin *et al.*, 2018; Duff *et al.*, 2018). To ensure patients have a high chance of survival, basic life support must be carried out as soon as possible, and it must be done accurately, by people with a good working knowledge of the procedures, utilizing proper life support equipment, and by people working together as a team (Abelsson *et al.*, 2020; Bylow *et al.*, 2019).

Junior high school students have a need to learn basic life support because adolescence is still the age where they are ready to learn in terms of intelligence, memory, and cognitive strength (Cholsuk, 2009; Watanabe *et al.*, 2017). This can provide effective assistance to patients because sometimes some people may be able to help the patient promptly the survival rate of the patient is increased (Suksatan *et al.*, 2020; Watanabe *et al.*, 2017). Teaching basic life support activities will help children develop step-by-step thinking for when they come across real-life events that need basic life support. Students who are able to perform the correct procedures will have confidence in assisting the sick, increase the survival rate of patients, and can pass that knowledge on to other people.

LITERATURE REVIEW

Cardiopulmonary resuscitation or CPR refers to resurrection. It is a combination of resuscitation to help add oxygen to the lungs and compression to the left chest to allow the heart to circulate oxygenated blood. CPR is a lifesaver that will give the best results if the resuscitator has been trained because if done without proper knowledge this procedure can cause harm to the patient, such as rib fractures (Cowan & Haslam, 2006). CPR is used when the patient is not breathing, their pulse stops, and they are unconscious (Ventura & Denton, 2021). Therefore, if these three criteria are not met, CPR is not necessary because it may cause adverse effects via chest compression while the victim's heart is still beating, potentially causing the heart to stop beating. In addition, if the patient is suspected of injury to the spine, the head or neck should not be moved. Limsuwat (2018) summed up basic lifesaving in the case of encountering an unconscious person. It is providing basic assistance to save the lives of the sick during crises before the arrival of an ambulance and before the patient can be delivered to a doctor (Brodie *et al.*, 2019). Performing CPR with the use of assistive devices such as an automatic defibrillator or AED will increase the chances of survival for the patient. Initial resuscitation should be done along with a follow-up with the rescuers or EMS team to ensure the patient is promptly rescued. The survival rate from cardiac arrest can be improved by using high-quality cardiopulmonary resuscitation (CPR) and early defibrillation (Meaney *et al.*, 2013; Song *et al.*, 2016). Guidelines for CPR comprise of chest compressions performed at a depth of 5–6 cm with a rate of 100–120 compressions/min. Ventilation consists of one second of inflation of the patient's chest every six seconds with an air volume of 400–700 ml. The chest compressions to ventilation ratio should be 30 : 2 (Maconochie *et al.*, 2015; Song *et al.*, 2016).

OBJECTIVE

To study the effectiveness of a study program regarding basic life support in a middle school child, conducted at Wat Lat Peng School, Samut Songkhram Province, Thailand.

HYPOTHESIS

After participating in the basic life-saving education activities, children's basic life support knowledge score is higher than their knowledge score before entering the program.

METHODS

This study employs a quasi-experimental research method and a one group pretest-posttest design method. The study population is 162 students from Wat Lat Peng School, Nang Taken Sub-district, Muang District, Samut Songkhram Province. Simple random sampling was done by drawing a random sample and a control group was used. There were two types of research tools used:

1. The experimental tools consisted of defrosting behavior, basic life-saving education using a video of CPR, teaching basic life support step-by-step with a dummy, a test, and practical training.

2. Tools used for data collection were a questionnaire that the researcher created to assess knowledge of basic life support. The questionnaire was divided into 2 parts: Part 1 contained general information for early elementary school students (e.g., information on gender, age, educational level) and used tick-box questions; Part 2 assessed student knowledge on basic lifesaving using 15 questions. To test this research tool, a specialist performed the test and scored 76%. Personal data was analyzed for the samples using distributing frequency, percentage, mean and standard deviation, and compared the test scores before and after participating in the basic life support training using statistical analysis and a paired t-test.

RESULTS

The sample consisted of junior high school students at Wat Lat Peng School, Samut Songkhram Province. Students were mostly male, with the highest number of students being educated to degree level 2 and aged 14 years. Most of the students did not have knowledge of basic life support previously, as shown in Table 1.

Table 1. Personal information of junior high school students ($N = 85$)

Personal information	Number	Percentage
Gender		
Male	55	64.70
Female	30	35.30
Education level		
Senior high school degree level 1	0	0
Senior high school degree level 2	49	57.60
Senior high school degree level 3	36	42.40
Age (years)		
13	21	24.70
14	42	49.40
15	18	21.20
16	4	4.70
Basic life support knowledge level		
Unknowledgeable	60	70.60
Knowledgeable	25	29.40
No specific source of knowledge	19	22.40
First aid	3	3.60
Navy	1	1.20
Camping	1	1.20
YouTube	1	1.20

Table 2. Mean (M) and standard deviation (*SD*) of basic life support education for pre- and post-study students ($N = 85$)

Sample group	M	*SD*
Before study	6.49	3.01
After study	12.21	2.20

From Table 2, before basic life support education M = 6.49 and *SD* 3.01, whereas the score after basic life support training was M = 12.21 and *SD* = 2.20.

Table 3. Overall basic life support education scores of senior high school students before and after training (*N*= 85)

Score	Number	Percentage	M	SD
			2.78	0.61
Same	3	3.50		
Decrease	8	9.40		
Increase	74	87.10		

Table 3 shows the scores of 85 senior high school students. It can be seen that for 74 middle school students scores increased, accounting for 87.10% of students. There was a decrease in the score of 8 participants, representing 9.40% of students, and the same score was found for 3 participants, representing 3.50%. Overall mean score was 2.78.

Table 4. Basic life support education scores of before and after studying for senior high school students (*N* = 85)

Sample group	M	SD	t	*p*-value
			42.31	0.00*
Before	6.49	3.01		
After	12.21	2.02		

From Table 4, it was found that for junior high school students before receiving their basic life support training had a mean score of 6.49 and standard deviation of 3.01. After their studying, their mean score was 12.21 and the standard deviation was 2.02. Statistical calculations found that $t = 42.31$ and $p < .001$. Therefore, basic life support activities are appropriate and in line with basic life support education.

SUMMARY AND DISCUSSION
This research project analyzed on the effectiveness of a training model for teaching children basic life support activities. The analysis and summary of the research results can be discussed as follows. Students' basic life support knowledge scores after receiving life support training activities is higher than before these activities. This is in line with the research of Tippayanate *et al.* (2018) who compared the effectiveness of basic resuscitation training using video and traditional methods against real practice among high school students in Mahasarakham Province. The research resulted in the knowledge level of subjects increasing statistically significantly (Tippayanate *et al.*, 2018). This is in line with the research done by Kumari *et al.* (2014), a clinical study to help recovery resurrection (CPR) among medical students. It has been found that one of the key skills students should develop during graduation training is to be prepared for emergency life-saving measures, such as CPR, anytime, anywhere. Students play a key role in learning and cultivating clinical skills (Kumari K *et al.*, 2014). Chaisongmuang and Pearkao (2018) studied the effect of the basic cardiac arrest aid teaching program on the knowledge and skills of high school students. Using a provincial high school in the Northeast, the research results showed that providing a basic resuscitation teaching program resulted in increased knowledge and skills in the target audience receiving the program (Chaisongmuang & Pearkao, 2018). Pumvisat (2012) performed a research study on nursing management styles in enhancing knowledge in emergency medicine systems in Suphanburi province. The research results showed that the average first responders who received training regarding emergency operations had more knowledge and skills than those who did not receive the training (Pumvisat, 2012). This is not in line with the research carried out by Ubol *et al.* (2016), however, who studied basic life support teaching using videos for the caregivers of pediatric patients at risk of cardiac arrest. These research results found that between a video-teaching and self-guided group of pediatric caregivers, and groups that were taught using video and direct practice with nurses, there was no statistically significant difference in their knowledge scores regarding basic life support (Ubol *et al.*, 2016).

RESEARCH SUGGESTION
Management and related personnel are able to develop these research results and show the effectiveness of basic life support models in their ability to provide students or staff with the appropriate knowledge. In the creation of the training materials to educate subjects to be suitable for students or other personnel. In addition, a basic life support manual should be developed that is modern and easy to understand in order to reach people of all ages.

LIMITATION
This research studied only a sample of students at the lower secondary school level. The knowledge test for before and after these activities was a one-sided test of knowledge. There is not yet a complete practical test for everyone due to limitations of the model. In further research, basic life support operations should be tested on real dummies for students to develop their skills and so they can provide patients with basic life support effectively.

CONFLICT OF INTEREST
The authors declare no conflicts of interest.

REFERENCES
1. Abelsson, A., Appelgren, J., & Axelsson, C. (2020). Enhanced self-assessment of CPR by low-dose, high-frequency training. *International Journal of Emergency Services.* https://doi.org/10.1108/IJES-03-2020-0010
2. Benjamin, E. J., Virani, S. S., Callaway, C. W., Chamberlain, A. M., Chang, A. R., Cheng, S., ..., & Muntner, P. (2018). Heart disease and stroke statistics—2018 update: A report from the American Heart Association. *Circulation, 137*(12), e67-e492. https://doi.org/10.1161/CIR.0000000000000558
3. Brodie, D., Slutsky, A. S., & Combes, A. (2019). Extracorporeal life support for adults with respiratory failure and related indications: A review. *JAMA, 322*(6), 557-568. https://doi.org/10.1001/jama.2019.9302
4. Bylow, H., Karlsson, T., Claesson, A., Lepp, M., Lindqvist, J., & Herlitz, J. (2019). Self-learning training versus instructor-led training for basic life support: A cluster randomised trial. *Resuscitation, 139*, 122-132. https://doi.org/10.1016/j.resuscitation.2019.03.026
5. Chaisongmuang, P., & Pearkao, C. (2018). Effects of first aid to sudden cardiac arrest program for high-school students in Northeast Thailand. *Nursing Journal of the Ministry of Public 28*(2), 118-132.
6. Cholsuk, D. (2009). *Leadership of the school administrators school atmosphere, quality of teachers and the relevance of parents to their child's education towards ethical achievement of junior high school students in Bangkok.* Suan Sunandha Rajabhat University. Bangkok.
7. Cowan, J., & Haslam, J. (2006). Resuscitation: turning guidelines into practice. *Clinical Governance: An International Journal, 11*(2), 160-165. https://doi.org/10.1108/14777270610660547
8. Duff, J. P., Topjian, A., Berg, M. D., Chan, M., Haskell, S. E., Joyner, B. L., ..., & Atkins, D. L. (2018). 2018 American Heart Association focused update on pediatric advanced life support: An update to the American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation, 138*(23), e731-e739. https://doi.org/10.1161/CIR.0000000000000612
9. Ghosh, S., Padalia, J., & Moonah, S. (2019). Tissue destruction caused by entamoeba histolytica Parasite: Cell death, inflammation, invasion, and the gut Microbiome. *Current Clinical Microbiology Reports, 6*(1), 51-57. https://doi.org/10.1007/s40588-019-0113-6
10. Kumari K, M., Amberkar, M. B., Alur S, S., Bhat, P. M., & Bansal, S. (2014). Clinical awareness of do's and don'ts of cardiopulmonary resuscitation (CPR) among university medical students: A questionnaire study. *Journal of clinical and diagnostic research : JCDR, 8*(7), MC08-11. https://doi.org/10.7860/jcdr/2014/8541.4567
11. Limsuwat, C. (2018). *Primary life support in adults (basic)* Retrieved April 29, 2020 from https://www.si.mahidol.ac.th/sidoctor/epl/articledetail.asp
12. Maconochie, I. K., Bingham, R., Eich, C., López-Herce, J., Rodríguez-Núnez, A., Rajka, T., Van de Voorde, P., Zideman, D. A., Biarent, D., & Monsieurs, K. G. (2015). European Resuscitation Council guidelines for resuscitation 2015: section 6. Paediatric life support. *Resuscitation, 95*, 223-248. https://doi.org/10.1016/j.resuscitation.2015.07.038
13. Meaney, P. A., Bobrow, B. J., Mancini, M. E., Christenson, J., de Caen, A. R., Bhanji, F., ..., & Leary, M. (2013). Cardiopulmonary resuscitation quality: [corrected] improving cardiac resuscitation outcomes both inside and outside the hospital: a consensus statement from the American Heart Association. *Circulation, 128*(4), 417-435. https://doi.org/10.1161/CIR.0b013e31829d8654
14. Pumvisat, R. (2012). *Nursing management of training patten for the emergency medical system in Suphanburi Province.* Cristian University of Thailand.
15. Song, K. J., Kim, J.-B., Kim, J., Kim, C., Park, S. Y., Lee, C. H., Jang, Y. S., Cho, G. C., Cho, Y., Chung, S. P., & Hwang, S. O. (2016). Part 2. Adult basic life support: 2015 Korean Guidelines for cardiopulmonary resuscitation. *Clinical and experimental emergency medicine, 3*(Suppl), S10-S16. https://doi.org/10.15441/ceem.16.129
16. Suksatan, W., Ruamsook, T., & Prabsangob, K. (2020). Factors influencing health literacy of students in health science curriculum: A cross-sectional study. *Indian Journal of Public Health Research & Development, 11*(7), 1469-1474. https://doi.org/10.37506/ijphrd.v11i7.10303
17. Tippayanate, N., Chaiyaprom, K., & Chanabutr, W. (2018). Comparison of the effectiveness of CPR training between the brief VDO training and traditional training in the group of secondary school student in Mahasarakham province. *37*(4), 470-477.
18. Ubol, L., Prasopkittikun, T., Srichantaranit, A., & Vijarnsorn, C. (2016). Basic life support training via video CD for caregivers of pediatric patients at risk for cardiopulmonary arrest. *Journal of Nursing Science, 34*(3), 66-78.
19. Ventura, C., & Denton, E. (2021). Principles of basic life support. In *The Emergency Medical Responder* (pp. 71-82). Springer. https://doi.org/10.1007/978-3-030-64396-6_6
20. Watanabe, K., Lopez-Colon, D., Shuster, J. J., & Philip, J. (2017). Efficacy and retention of Basic Life Support education including Automated External Defibrillator usage during a physical education period. *Preventive Medicine Reports, 5*, 263-267. https://doi.org/10.1016/j.pmedr.2017.01.004
21. Zhan, L., Yang, L. J., Huang, Y., He, Q., & Liu, G. J. (2017). Continuous chest compression versus interrupted chest compression for cardiopulmonary resuscitation of non-asphyxial out-of-hospital cardiac arrest. *Cochrane Database of Systematic Reviews*(3). https://doi.org/10.1002/14651858.CD010134.pub2