How to Cite:
Mohamed, Y. G., Soliman, R. A. M., & Abdelgeleel, N. M. (2022). Health education effect regarding pediatrics basic life support on knowledge, attitude and practice of primary schools` teachers in Ismailia city. *International Journal of Health Sciences*, *6*(S7), 6624-6637.
https://doi.org/10.53730/ijhs.v6nS7.13768

Health education effect regarding pediatrics basic life support on knowledge, attitude and practice of primary schools` teachers in Ismailia city

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***Abstract*---**Background: As children are more liable for fatal events and they spend longer time in schools, it is crucial to provide current knowledge and training in basic life support procedures to their teachers. Aim: The aim of the work was to assess the effect of health education on the knowledge, attitude and practice of schools' role about pediatric basic life support. Subjects and Methods: This quasi experimental study design was conducted on 100 schools' roles who teach or deal with students in primary school, with a convenience sample collected from some five schools at Ismailia governate, between January and March 2019. After receiving theoretical training, teachers were shown how to do BLS using a cardiac resuscitation model and video. The BLS procedures were then practised by the teachers on the cardiopulmonary resuscitation model. Teachers were required to execute the BLS stages sequentially on the cardiopulmonary resuscitation model after a minimum of 4 weeks and a maximum of 6 weeks following practical instruction. Results: Prevalence of good knowledge increased from 84% in the pre test to 100 % in the post test but this wasn't statistically significant. With regard to practice most of the assessment questions improved significantly in the post

test compared to the pre one. Also the overall frequency of good practice (as assessed by total score) increased from 68% in the pre test to 100% in the post test and this was statistically significant Conclusion: The efficacy of BLS techniques during clinical training and real-world circumstances can be improved by repeating BLS instruction throughout educational sessions. So, educational sessions about pediatrics BLS should by included in schools.

***Keywords*---**Basic Life Support, Pediatric, Teachers, Knowledge, Attitude, Practice.

Introduction

When compared to adults, children who experience an out-of-hospital cardiac arrest have lower odds of survival. Aside from the many etiologies of cardiac arrest in this age range, early compression-only CPR performed by a bystander can minimise neurological sequelae and double or quadruple survival chances. 3 For instance, Donoghue et al. showed that bystander CPR increased child patient survival rates from 4.7% to 9.4%. 3 According to recent research by Hunt et al., paediatric residents do CPR that is subpar and does not adhere to American Heart Association standards. 4 Teaching CPR to medical students should enhance subsequent performance as it is closely related to lower child survival rates.[(1)]

Basic life support (BLS) training programmes are extensively used in hospitals and lay organisations, but paediatric BLS (PBLS) programmes, particularly those that focus on PBLS in newborns and young children, are still underrepresented in paediatric curriculum at the university level.[(2)]

In order to lower the occurrence of sudden cardiac arrests, the American Heart Association emphasises the necessity for health team members to become competent in cardiopulmonary resuscitation techniques. Theoretical knowledge is necessary, but it is insufficient in and of itself to perform a successful cardiac resuscitation.[(2–5)]

A qualified BLS practitioner should possess several basic abilities that can lower the high fatality rate linked with cardiac arrest in individuals with cardiovascular disease. Additionally, cardio-respiratory arrest can occur more in children, with a few minor variations in the BLS protocol that medical professionals should be aware of. As a result, every member of the community, should possess the necessary knowledge and training to perform BLS techniques.[(6)]

Numerous studies have evaluated the BLS knowledge among medical students in various nations.[(7–10)] Similar information on Egyptian medical students was available, but data about effect of training programs on teachers are lacking. Therefore, we conducted this study to to assess the effect of health education on knowledge, attitude and practice of schools' role regarding pediatric basic life support aiming at prevention and early management of serious emergencies to reduce mortality and morbidity of children.

Aim of the study

The aim of the work was to assess the effect of health education on knowledge, attitude and practice of schools' role regarding pediatric basic life support aiming at prevention and early management of serious emergencies to reduce mortality and morbidity of children.

Subjects and Methods

This quasi experimental study was conducted on 100 schools' roles who teach or deal with students in kindergarten and primary school, with a convenience sample collected from some five schools at Ismailia governate, between January and June 2019. The included schools were 24 October, Elobor, Salah Eldin, Elzohor and Elfarouk Omar primary schools.

Eligibity criteria

All teachers of both gender, enrolled in one of the above schools were eligible to participate in this survey. Participants who refused to participate in the study were automatically excluded.

Sample size calculation

The sample size was calculated using Epi Info StatCalc. A 5% acceptable margin of error was considered; design effect of 1.0; cluster effect of 1.0, and a power of 80%, giving us an estimated sample size of 91 participants at a 95% confidence interval (95% CI). To cater for non-response associated with cross sectional design, 10% of the estimated sample size was added leading to a final sample size of 100 participants.

Data collection

By three different questionnaires : one for assessment of awareness and needs of the schools' roles then another two questionnaires for pretest and posttest evaluation of the scientific and practical skilled gained after their training on the basic life support skills . The first questionnaire consisted of two parts: Part A covered personal particulars such as participants' age, residence, education, occupation and total number, gender and age group of children under his supervision. Part B. collected information about the medical situation and types of injuries and use of health services, equipments and if they attended any medical meetings.

Then the pretest that contained questions to assess the knowledge, attitude and practice (KAP) of the children's primary carers or schools; roles towards first aid measures (defined as the assessments and interventions that can be performed immediately with minimal or no medical equipment).[11] for different childhood injuries. This section comprised 13 simple-choice questions on knowledge of treatment of common childhood emergencies. The questions were developed using a PedFACTs textbook and an instructor's resource manual published by the

American Academy of Pediatrics [8]. Each correct answer was given one point, with no points given for unanswered questions or answers of “Not sure”.

Health education session was done about pediatrics basic life support were done (Appendix I). Then after three months, reassessment of their knowledge, attitude and practice was done using the same questionnaire. Ethical approval was obtained from ministry of education and Suez Canal University before the study started. Informed consent was obtained from all the participants before they were enrolled in the study.

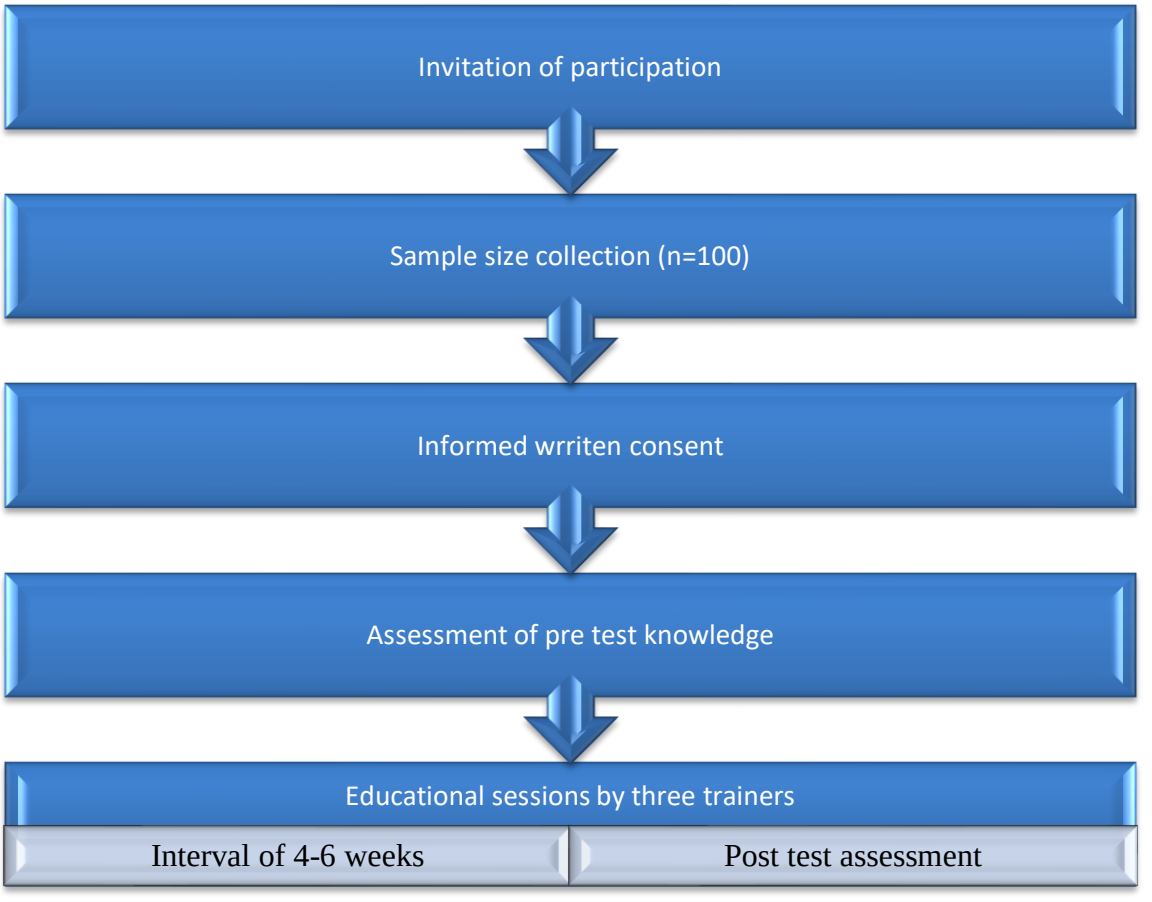

Figure 1: Data cooolection process

Statistical analysis

All data were entered into the Statistical Package for the Social Sciences for Windows (Version 26.0) for statistical analysis. The results of the questionnaire are expressed as frequency distributions and were computed in percentages. A comparison of the scores based on groups was performed with chi square or fisher exact test as needed. $P < 0.05$ was considered statistically significant for all analyses.

Results

One hundred school roles were enrolled in the study, personal and teaching characteristics of studied subjects are shown in table 1.

Table 1: Personal and teaching characteristics of studied subjects (n = 100)

Characteristic		**Frequency**	**%**
Gender	**Male**	16	16
	Female	84	84
Professional grade	**Head teacher**	12	12
	Grade teacher	88	88
Subject taught	**Science and math**	84	84
	Sports	12	12
	Music and art	4	4
Teaching grades	**Pre-school (< 5 years old)**	32	32
	School child (5 – 8 years old)	60	60
	School child (8 – 12 years old)	8	8
Teaching hours/day	**< 4 hours**	8	8
	> 4 hours	92	92

Baseline background about chocking was assessed in all teachers table 2. More than half of participants (64%) didn't have any previous emergency medicine course. Participants reported that 68% of students had diabetes, allergy or epilepsy with highest prevalence for allergy (48%). Sixteen participants watched a chocking child before; eight cases were by food particles, two by peanut and two by toy parts.

Table 2: Teachers' knowledge regarding BLS in children

	Preeducation	**Posteducation**
Do you have any previous emergency medicine course?		
Yes	36	36%
No	64	64%
Do you know the current medical status of your students?		
Yes	68	68%
No	32	32%
Do you have an diabetic, allergic, epileptic child in our school?		
No	32	32%
Diabetic	16	16%
Allergic	48	48%
Epileptic	4	4%
Did you watch any student taking his chronic medication in your classroom?		
Yes	24	24%
No	76	76%
Did you watch any case of chocking at school before?		
Yes	16	16%
No	84	84%

If yes; is it chocking by (n = 16)		
Food	8	50%
Peanut	4	25%
Toy parts	4	25%

All teachers were assessed for knowledge attitude and practices of pediatric basic life support skills pre and post a training program and results are shown in tables (3 – 5). Knowledge assessment was the same pre and post intervention except for signs of chocking question where right answers increased from 84% to 100%.

Table 3: assessment of knowledge of school roles about pediatric basic life support skills pre versus post educational session.

	Pre test No. (%)	**Post test No. (%)**	***p* value**
Do you think it is important to have a simple filing system about students in each classroom?			
Yes	85 (85%)	100 (100%)	
Do you think that insufficient chewing or hard food particles can cause chocking			
Yes	92 (92%)	96 (96%)	1[1]
No	8 (8%)	4(4%)	
What were the signs of chocking?			
Right answer	84(84%)	100 (100%)	0.125[1]
Wrong answer	16(16%)	0 (0%)	
Did you watch a collapsed child?			
Yes	32 (32%)	32(32%)	1[1]
No	68(68%)	68(68%)	
Do you think that your help, even before the school physician or an ambulance arrival can save the victim's life?			
Right answer	92(92%)	96(96%)	1[1]
Wrong answer	8(8%)	4(4%)	
Do you think the best person that can help in emergency?			
Right answer	72(72%)	76(76%)	1[1]
Wrong answer	28(28%)	24(24%)	
Do you know where are the emergency box and first aid measures in every school location?			
Yes	72(72%)	72(72%)	1[1]
No	28(28%)	28(28%)	
Do you have an emergency calling system in your school?			
• **Right answer**	60 (60%)	60(60%)	1[1]
• **Wrong answer**	40 (40%)	40(40%)	

1. McNemar test;

Total score for answers of questions in each part were added and participant was considered having good knowledge or practice when having more than or equal 50 % right answers otherwise he will be considered having poor knowledge, attitude or practice. Prevalence of good knowledge increased from 84% in the pre test to 100 % in the post test but this wasn't statistically significant (figure 2).

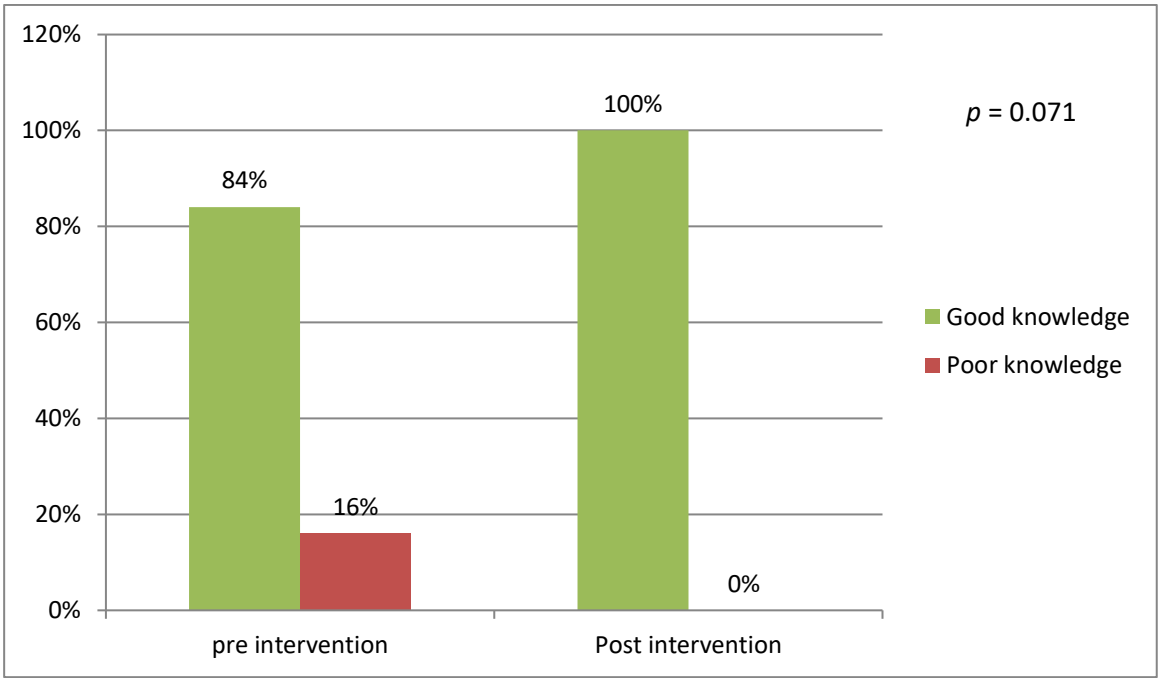

Figure 2: knowledge assessment pre and post intervention among studied teachers

Total score for answers of questions in each part were added and participant was considered having good knowledge or practice when having more than or equal 50 % right answers otherwise he will be considered having poor knowledge, attitude or practice. Prevalence of good knowledge increased from 84% and 16% had poor knowledge (figure 1).

Table 3: assessment of attitude of school roles about pediatric basic life support skills pre versus post educational session.

	Pre test No. (%)	**Post test No. (%)**	***p* value**
Do you think that every school teacher must learn basic life support?			
Yes	16 (16%)	20 (20%)	1[1]
Don't know	84 (84%)	80 (80%)	
Do you think that we must teach B.L.S skills to students at preparatory and high school?			
Yes	16 (16%)	20 (20%)	1[1]
Don't know	84 (84%)	80 (80%)	
Do you think you can help in teaching healthy behavior to students by?			
Right answer	20 (20%)	8 (32%)	**0.038**[2*]
Wrong answer	4 (4%)	3 (12%)	
Don't know	76 (76%)	14 (56%)	
Do you think that chocking can cause suffocation and death in minutes?			
Yes	16 (16%)	20 (20%)	1[1]
Don't know	84 (84%)	80 (80%)	

Do you think that you can help a child with chocking by simple skills?			
Yes	16 (16%)	5 (20%)	1[1]
Don't know	84 (84%)	20 (80%)	
Do you think that you can save your students' life if you have been just close to them?			
• **Yes**	16 (16%)	20 (20%)	1[1]
• **No**	84 (84%)	80 (80%)	

1. McNemar test; *Statistically significant

at $p < 0.05$

With regard to practice most of the assessment questions improved significantly in the post test compared to the pre one. Also the overall frequency of good practice (as assessed by total score) increased from 68% in the pre test to 100% in the post test and this was statistically significant (figure 3).

Table 4: assessment of practice of school roles about pediatric basic life support skills pre versus post educational session.

	Pre test No. (%)	**Post test No. (%)**	***P* value**
What are the medical consequences of chocking?			
Right answer	64 (64%)	100 (100%)	**0.004[1*]**
Wrong answer	36 (36%)	0 (0%)	
Is it mandatory to help the victim before the school physician or ambulance delivery?			
Yes	88 (88%)	100 (100%)	0.250[1]
No	12 (12%)	0 (0%)	
How many times we use back blows and abdominal thrusts in a case of chocking if victim is below 1 year?			
Right answer	32 (32%)	92 (92%)	**< 0.001[1*]**
Wrong answer	68 (68%)	8 (8%)	
What is the best action to help a chocking child > 1 years old?			
Right answer	52 (52%)	84 (84%)	**0.021[1*]**
Wrong answer	48 (48%)	16 (16%)	
Where is the place of abdominal thrust in a chocking child > 1 years old?			
Right answer	44 (44%)	88 (88%)	**0.003[1*]**
Wrong answer	56 (56%)	12 (12%)	
What is the best action to help child after chocking when he start to lose consciousness			
Right answer	60 (60%)	92 (92%)	**0.008[1*]**
Wrong answer	40 (40%)	8 (8%)	
What is the first to do when you see collapsed child?			
Right answer	24 (24%)	80 (80%)	**< 0.001[1*]**
Wrong answer	76 (76%)	20 (20%)	
What is the perfect time to start CPR in collapsed child?			
Right answer	72 (72%)	84 (84%)	0.508[1]
Wrong answer	28 (28%)	16 (16%)	
What is the best order to help a collapsed child?			
Right answer	32 (32%)	72 (72%)	**0.006[1*]**

Wrong answer	68 (68%)	28 (28%)	
How many chest compressions needed in CPR?			
Right answer	8 (8%)	44 (44%)	**0.004**[1*]
Wrong answer	92 (92%)	56 (56%)	
What is the depth of chest compressions in child > 1 year old?			
Right answer	56 (56%)	84 (84%)	**0.039**[1*]
Wrong answer	44 (44%)	16 (16%)	
How do we do chest compression in baby < 1 year?			
Right answer	68 (68%)	100 (100%)	**0.008**[1*]
Wrong answer	32 (32%)	0 (0%)	
How do we do chest compression in child > 1 year old?			
Right answer	60 (60%)	100 (100%)	**0.002**[1*]
Wrong answer	40 (40%)	0 (0%)	
What is the ratio of chest compression to breathe in 1 rescue?			
Right answer	52 (52%)	84 (84%)	**0.008**[1*]
Wrong answer	48 (48%)	16 (16%)	
How you make sure of depth of breathing given to the victim?			
Right answer	68 (68%)	96 (96%)	**0.016**[1*]
Wrong answer	32 (32%)	4 (4%)	
What is the best way to open the airway and give breathing?			
• **Right answer**	76 (76%)	100 (100%)	**0.031**[1*]
• **Wrong answer**	24 (24%)	0 (0%)	

1. McNemar test; *Statistically significant at $p < 0.05$.

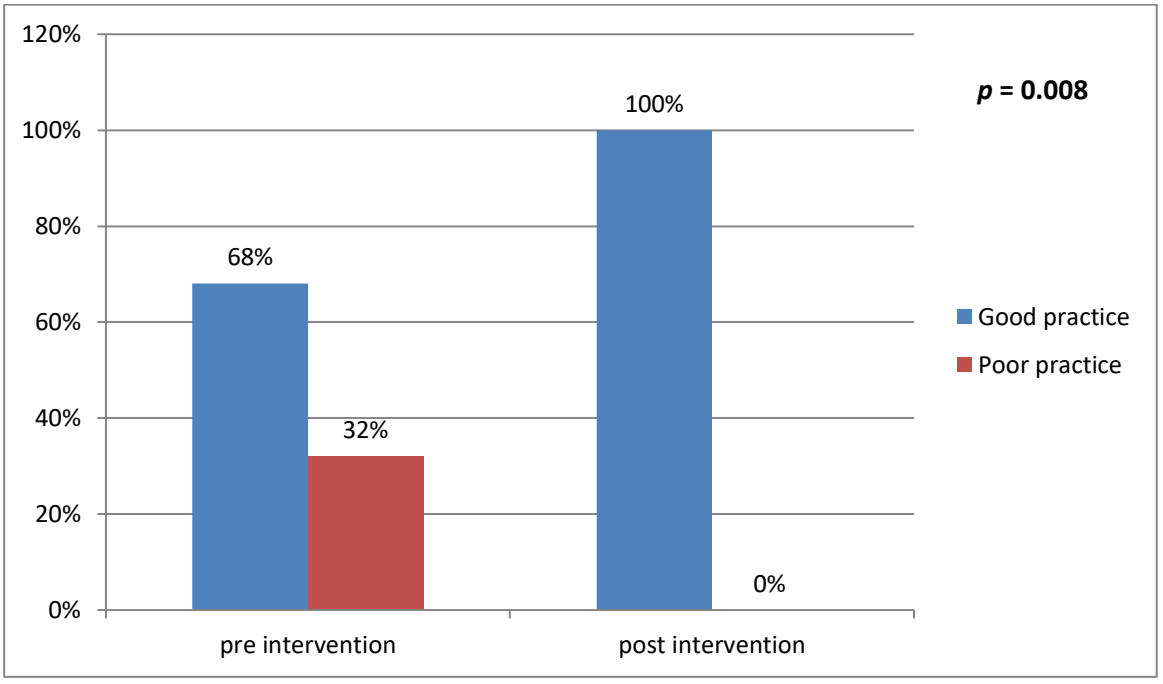

Figure 3: practice assessment pre sand post intervention among studied teachers

Discussion

The provision of BLS training for groups of the right size utilising effective techniques in compliance with international and national norms is crucial for the success of theoretical and practical training. Following initial observation and pre-test evaluation, the students in the current research received theoretical and practical instruction. Knowledge evaluation was done no less than two weeks after theoretical instruction and no more than four weeks later (post-test). In the study, a substantial difference in the Pediatrics BLS Knowledge scores before and after training was discovered. This data suggests that the Pediatrics BLS theoretical training was quite successful. Practice scores significantly increased.[12]

In the present study, it was observed that more than half of participants (64%) didn't have any previous emergency medicine course. Prevalence of good knowledge increased from 84% to 100%.

Most of studies were similar in the significant effect of training programe on knowledge about BLS, but among medical and para medical personnel.[13] [14] In order to evaluate the levels of knowledge of teachers in the city of Riyadh on fundamental first aid procedures and its variables, AlYahya et al. (2019) conducted a study. They discovered that just 60.1% of teachers were knowledgeable with first aid procedures, which was lower than our discovery of 90.9%. [15]

Despite the fact that more than half of teachers (62.88%) lacked first aid training and had low understanding (51.26%), a second survey from Saudi Arabia found that 95% of teachers had a positive attitude.[15]

Another study demonstrated that there was an unsatisfactory level of first aid knowledge among primary school teachers.[13] A research by Al-Robaiaay revealed that sports teachers lacked first aid knowledge. In Madinah, 44.76% of teachers were considered to have strong general first aid knowledge. In addition, they discovered that first aid teaching is seen favourably by 60.55 percent of teachers.[16]

According to a study from Egypt, primary school instructors don't have enough first aid training.[4] According to a research from Iraq, 95 percent of teachers had overall fair knowledge, compared to 5 percent who had bad knowledge, and 93.4% had a positive attitude.[17] According to a Chinese study, the majority of people had a favourable attitude about teaching and receiving first aid.[2]

An Indian study found that 12.5% and 10% of government school teachers were proficient in first aid, whereas 77.5% had just ordinary competence..[12]

Another Indian poll revealed that the comprehension of school teachers in Mangalore was between moderate and low in 87% and 13%, respectively. [5] Another research found that 72.5% of people had high knowledge.[6]

In the current study with regard to practice most of the assessment questions improved significantly in the post test compared to the pre one. Also the overall frequency of good practice (as assessed by total score) increased from 68% in the pre test to 100% in the post test and this was statistically significant

Studies with nursing students examined BLS knowledge levels, psychomotor abilities, and self-efficacy before and after training. These studies demonstrated a substantial improvement in knowledge of BLS practise, psychomotor skills, and self-efficacy following BLS training.[18–21] According to other research, nursing students improved their BLS practise skills after receiving BLS training.[22–24] The percentage of correct responses provided by the students on the knowledge questionnaire was extremely high, but the results show that the level of knowledge in some areas may still be raised. It is necessary to raise students' awareness of airway patency evaluation, spontaneous respiratory characteristics, rescue breathing techniques, patient/injury assessment goals, and specifically requesting emergency help. Repeating BLS training on a regular basis would improve its tenacity and help students' skills.[3]

After receiving theoretical training, teachers were shown how to do BLS using a cardiac resuscitation model and video. The BLS procedures were then practised by the teachers on the cardiopulmonary resuscitation model. Teachers kept practising until they were able to successfully apply each BLS procedure. Teachers were required to execute the BLS stages sequentially on the cardiopulmonary resuscitation model after a minimum of 4 weeks and a maximum of 6 weeks following practical instruction. During this second evaluation, a neutral observer evaluated the BLS abilities of the teachers. The BLS practise evaluation results acquired before and after the Pediatrics BLS training were compared in the current study. In comparison to pre-training scores, post-training evaluation scores showed significant increase.

Of the current study strength that the trainers were qualified to teach it. During the first and second observations, the teachers were watched by two different researchers. Also, no studies were done on teachers of primary schools. The trainers used at the up to date guidelines for the education of Basic Life Support steps.

But this study has some limitations as no control group existed. Techniques other than randomization were used to create the intervention group.

Conclusion

The results of the current study demonstrated that BLS training enhanced teachers of primary schools understanding of BLS-related abilities. The efficacy of BLS techniques during clinical training and real-world circumstances can be improved by repeating BLS instruction throughout educational sessions. So, educational sessions about pediatrics BLS should by included in schools.

Confilct of interest:

There is no conflict of interest

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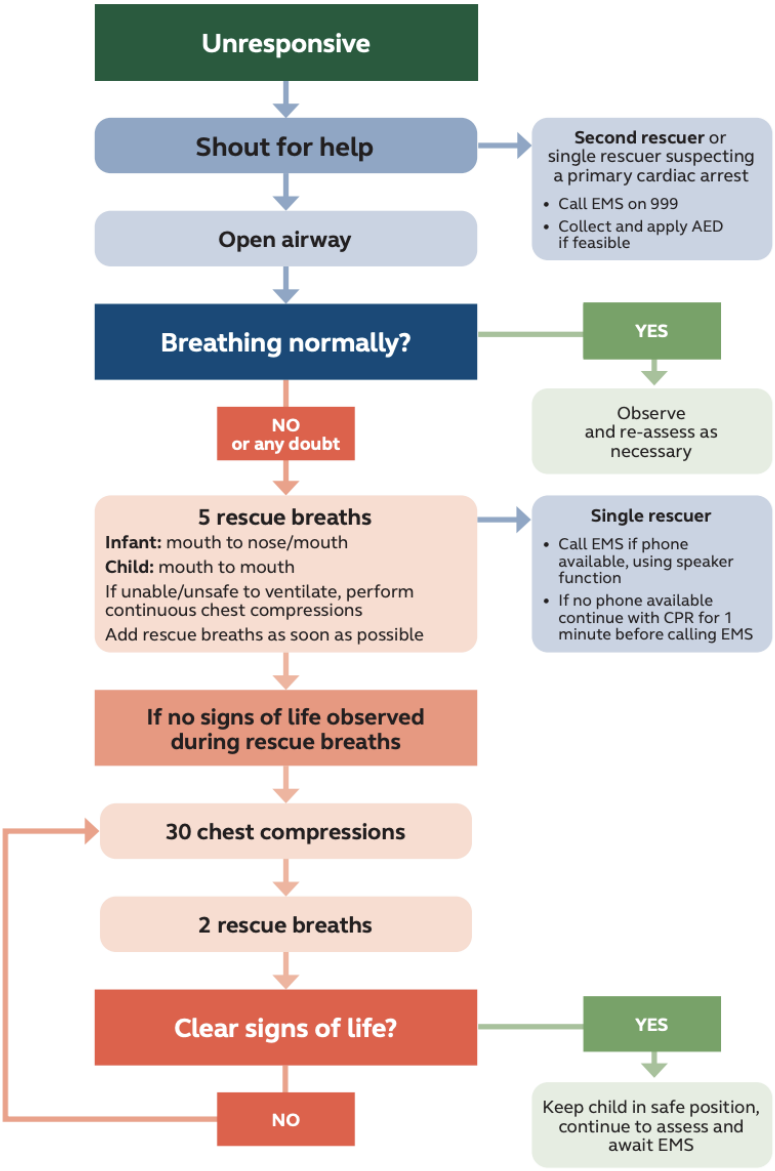
Appendix I

Resuscitation Council UK

GUIDELINES 2021

Paediatric out-of-hospital basic life support



Those trained only in 'adult' BLS (may include healthcare providers and lay rescuers) who have no specific knowledge of paediatric resuscitation, should use the adult sequence they are familiar with, including paediatric modifications.