Journal of High Institute of Public Health 2023;53(2):75-81.

Original Article

Effectiveness of First Aid Educational Program on the Knowledge of Primary School Students in Egypt

Mohamed F. Hussein [1¥], Ehab Elrewany [2]

1 Department of Occupational Health and Industrial Medicine, High Institute of Public health, Alexandria University, Egypt
2 Department of Tropical Health, High Institute of Public health, Alexandria University, Egypt

Abstract

Background: School students are at high risk of being injured or facing life-threatening conditions. So, improving their knowledge about first aid is essential.
Objective(s): To assess first aid knowledge and its determinants among primary school students in Alexandria and measure the level of their knowledge after first aid educational program.
Methods: A cross-sectional study followed by a pre- /post-test intervention was conducted on fourth to sixth grade students from the eight districts of Alexandria, who were selected by a multistage random sample technique. Students were invited to fill out a questionnaire to assess their knowledge regarding first aid. Then, educational sessions were conducted using different methods such as group discussions, case scenarios, and visual aids. Finally, students' knowledge was assessed after the educational program.
Results: The current study involved 372 (154 males and 218 females) primary school students with a mean age of 11.49 ± 0.93 years. Among the 15 questions used for assessing the knowledge of students, there was a deficiency in the knowledge about dealing with swallowing a chemical substance, burns, snake bites, epistaxis, bleeding, fractures, and sunstroke. These shortages improved significantly after the educational program. There was a highly statistically significant improvement in first aid knowledge score among the students, from 48.8 ± 11.5% to 87.4 ± 14.6 after the educational program. This improvement was also highly significant among males, females, the different districts and class grades, as well as among those having or not having a working father or mother.
Conclusion: School aged children showed high improvement in their knowledge regarding first aid dealing with swallowing a chemical substance, burns, snake bites, epistaxis, bleeding, fractures, and sunstroke after the application of an educational program.

Keywords: School students; first aid; educational program; Egypt

Available online at:
jhiphalexu.journals.ekb.eg

Print ISSN: 2357-0601
Online ISSN: 2357-061X

¥*Correspondence*:
Email:
hiph-mohamedfakhry@alexu.edu.eg

Suggested Citations: Hussein MF, Elrewany E. Effectiveness of First Aid Educational Program on the Knowledge of Primary School Students in Egypt. JHIPH. 2023;53(2):75-81.

INTRODUCTION

First aid is the preliminary, immediate help that is given to somebody who suffers an injury or illness at the location where it occurred. Proper and quick administration of first aid could make the difference between life and death. First aid may be simple techniques like cleaning minor cuts, treating a minor burn, and applying bandages, or it may require some training for life support such as cardiopulmonary resuscitation (CPR).[1]

As mentioned by the Red Cross, it is expected that up to 59% of deaths from injury could be prevented if first aid was given correctly before emergency medical services arrived. [2] Survival rates of out-of-hospital cardiac arrest are commonly less than 10%, but bystanders CPR have related to survival rates exceeding 50%. [3] Even applying simple techniques at the site of the accident, such as opening the airway and controlling bleeding, could save lives, but unfortunately, only 5% of adults have the skills and self-confidence to offer this simple first aid in emergency situations. So, it is essential to teach everyone first aid measurements for different emergency conditions. [4,5]

In general, children of school age are at higher risk of being injured or facing accidents. The high energy levels make them take risky actions without thinking logically.[6] A study carried out in 47 low- and middle-income countries reported that 40% of the students had one serious injury or more in the last 12 months. Also, two-thirds of school adolescents in six African countries reported one or more serious injuries within the past 12 months.[7,8] Broken bones or dislocated joints, cuts, or stab wounds were the most common injuries in some sub-Saharan African countries.[9] Regarding Egypt, the prevalence of injury in primary school students in Port Said city was 66.73%, and in secondary school students in Cairo it was 68.5%.[10,11]

The participation of children and teachers in health educational sessions on first aid is required for the prevention of injuries.[12] Moreover, some countries have started to include first aid educational program in the school curriculum, such as the Norwegian school system. Applying first aid training in schools leads to educating a large proportion of the population over time.[13,14]

It was recommended to integrate age-appropriate first aid and CPR training into the school curriculum from the primary years and to be refreshed annually, as there was significant progression in first aid knowledge and skills after the training session, which may stand or last for up to 12 months.[15]

There are few studies exploring the first aid knowledge among the Egyptians. Therefore, this study was conducted to shed light on the importance of first aid educational programs.

The current study aimed to assess the first aid knowledge of primary school students in Alexandria, identify the socio-demographic determinants that could influence their knowledge, and measure the level of their knowledge after a first aid educational program.

METHODS

A cross-sectional study followed by a pre-test/ post-test intervention was conducted in primary schools in Alexandria governorate, Egypt, during March and April 2023. Participants were eligible if they were in fourth to sixth grades of primary schools.

Using G. Power software with assumption that the effect of educational program on knowledge of students regarding first aid had an effect size of 0.4, using alpha error of 0.05 and power of 80%, the minimum required sample size is two hundred children.

A multistage random sampling technique was adopted. Alexandria is divided into 8 districts, from each district one primary school was randomly selected. Within the selected schools, two classes were randomly selected among grades from fourth to sixth. Within the selected classes, students were randomly selected to be invited to participate in the study. 40 children from each school were selected so the sample size was 320 (40*8) students.

Data collection method and tools

A pre-designed pre-coded structured interviewing questionnaire for students was used to collect the data. The questions were obtained from valid questionnaires.[16-18] Two professors of emergency medicine and public health were asked to validate the questionnaire and make sure it was in line with the goals of the study and the target population.

A pilot study was carried out prior to data collection (that was not part of the survey). Each investigator was requested to provide ten replies to calculate the time needed to complete the survey and to examine the clarity and understandability of the questionnaire. Based on the pilot results among 20 students, the time needed to fill out the questionnaire was 5–15 minutes, and a few sentences needed fine wording to be more comprehensible.

The Arabic questionnaire consisted of two parts:

1. Socio-demographic data which included age, sex, residence, school grade, occupation of father and mother.
2. First aid questions to assess the knowledge of the students through fifteen items covering main issues in the first aid topics. The answer to each question had two options (true or false). The questions were about how to deal with swallowing a caustic chemical, skin burns, inhalation of poison, snake bite, external bleeding, epistaxis, bone fracture, heat exhaustion, body catch of fire and suffocation. A right answer received a ‘1’ score and a wrong answer received a ‘0’ score. The total score was converted to a percentage and would range from 0 to 100%.

With a Cronbach's alpha of 0.71, the questionnaire demonstrated good internal consistency in terms of reliability.

Educational program

An educational program was implemented for the study sample of students to improve their knowledge regarding first aid measures.

Two educational sessions were conducted at school (about 20 students in each session). The session lasted for 45 minutes. The educational information covered causes and immediate corrective responses for the most common urgent medical conditions and the common mistakes that should be avoided when applying first aid measures. The lectures included first aid measures for swallowing of caustic chemicals, skin burns, inhalation of poison, snake bites, external bleeding, epistaxis, fractures of bones, heat stress and exhaustion, body catch of fire, and suffocation. Training was conducted through different educational methods, including group discussions, case scenarios, and visual aids.

Evaluation of the training sessions was conducted using the same knowledge questionnaire immediately after the end of the educational program.

Ethical considerations:

The approval of the Directorate of Education in Alexandria and each school was obtained. The researcher sought the approval of the Ethical Committee of the High Institute of Public Health, Alexandria University, Egypt (I.R.B. No. 00013692). The purpose of the research was stated at the

beginning of the sessions, and participants or their caregivers were able to accept or reject to participate. They were able to withdraw from the study at any time before its completion. The researcher complied with the International Guidelines for Research Ethics.

Statistical analysis

The collected data were coded, revised, cleaned, tabulated, and analyzed through IBM SPSS Statistics version 26 using appropriate statistics. The descriptive statistics including percentages (%), arithmetic mean and standard deviation (SD) were calculated for various qualitative and quantitative data to describe the study population. The analytic statistical tests comprised Chi squared (χ^2), student t test, paired t test and repeated measures analysis of variance (ANOVA) for various comparisons of the studied variables. In all applied statistical tests of significance, *p* value (< 0.05) was considered significant.

RESULTS

The current study involved 372 (154 males and 218 females) primary school students among the 8 districts of Alexandria with a mean age of 11.49 ± 0.93 years. Most of them have a working father (98.4%) and a non-working mother (81.5%). [Table 1]

Table 1: Socio-demographic characteristics of the studied primary school students in Alexandria, Egypt

		Total (n=372)	
		No.	%
Age	Min-Max	9-15	
	Mean ± SD	11.5 ± 0.9	
Sex	Male	154	41.4
	Female	218	58.6
School district	Al Gomrok	50	13.4
	Al Montazah	48	12.9
	Eastern	50	13.4
	Al Agamy	42	11.3
	Central	41	11.0
	Al Amreya	42	11.3
	Borg Al Arab	50	13.4
	Western	49	13.2
Class grade	Fourth	47	12.6
	Fifth	193	51.9
	Sixth	132	35.5
Father's job	Working	366	98.4
	Not working	6	1.6
Mother's job	Working	69	18.5
	Not working	303	81.5

The knowledge percentage among the students was 48.8 ± 11.5% before the educational program and increased to 87.4 ± 14.6% after it. The knowledge score revealed a significant difference between the 8 districts and between the 3 class grades involved before and after the educational program. The highest score was among Borg Al Arab district (54.3 ± 14.0%) and the sixth grade (51.4 ± 11.4%) while the lowest was among Central district (42.1 ± 7.95%) and the fifth grade (46.7 ± 10.8%) before the educational program. Regarding after the program, the highest score was among Al Agamy district (94.97 ± 7.5%) and the sixth grade (92.5 ± 10.3%) and the least was among Western district (67.1 ± 17.3%) and the fifth grade (83.7 ± 16.8%). Gender and having a working father or mother did not affect the knowledge score among the students before or after the educational program. There was a highly statistically significant improvement in the knowledge score among the students from 48.8 ± 11.5% before to 87.4 ± 14.6% after the educational program. This improvement was also highly significance among males, females, the different districts and class grade and also among those having or not having working father or mother. [Table 2 & Figure 1]

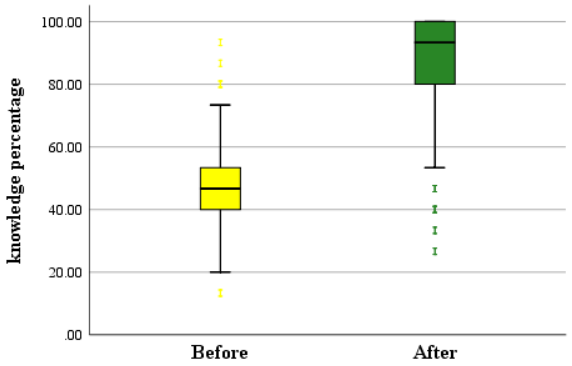

Figure 1: Knowledge percentage difference among primary school students before and after the educational program in Alexandria, Egypt

Among the 15 questions that have been used to assess the knowledge among the students, only 4 did not reveal improvement in the answers after the educational program. However, the remaining 11 questions entitled showed a high statistical correction of answers after the educational program. The first question was about inducing vomiting in someone who swallowed a chemical substance (acidic or alkaline substance). The correct answer would be "no", as the person could aspirate the chemical substance during vomiting. Thirty (8.1%) participants answered correctly before the educational session, whereas 335 (90.1%) students correctly answered the question after it with statistical significance (<0.001).

The second question was about the site of treatment for a person exposed to inhalation poison. The person should be removed from this place to avoid further inhalation by the victim or the helping person. Most of the pupils answered the question correctly before and after the educational program (332 (89.2%) before and 335 (90.1%) after the educational session). Surprisingly, question number 8 asked about the same situation but in a reverse manner. The majority answered wrongly, despite a slight increase in the right answer after the session (350 (94.1%) with the wrong answer before and 348 (93.5%) after the

session). The next question reviewed the answers about removing clothes stuck to burns. The correct answer was "no", as the skin will be removed with the clothes. There was a significant difference between the answers before and after the educational session (62 (16.7% versus 316 (84.9%) after the session with p <0.001).

Table 2: Knowledge percentage among primary school students before and after the educational program in Alexandria, Egypt

Knowledge percentage		Before		After		
		Mean ± SD	Test of significance (P-value)	Mean ± SD	Test of significance (P-value)	paired t test (P-value)
Overall		**48.8 ± 11.5**		**87.4 ± 14.6**		**-40.028 (<0.001)**
Sex	Male (n=154)	49.6 ± 11.9	t test = 1.17	87.7 ± 13.8	t test = 0.369	-25.909 (<0.001)
	Female (n=218)	48.2 ± 11.2	(0.243)	87.1 ± 15.2	(0.712)	-30.497 (<0.001)
School	Al Gomrok (n=50)	49.5 ± 10.3		93.8 ± 6.2		-26.065 (<0.001)
district	Al Montazah (n=48)	48.5 ± 11.1		93.5 ± 13.4		-17.91 (<0.001)
	Eastern (n=50)	51.2 ± 10.4		88.7 ± 12.1		-16.583 (<0.001)
	Al Agamy (n=42)	45.7 ± 10.9	ANOVA = 7.074	94.97 ± 7.5	ANOVA =	-24.157 (<0.001)
	Central (n=41)	42.1 ± 7.95	(<0.001)	87.2 ± 11.7	26.218	-20.412 (<0.001)
	Al Amreya (n=42)	43.8 ± 11.2		87.2 ± 12.96	(<0.001)	-16.383 (<0.001)
	Borg Al Arab (n=50)	54.3 ± 14.0		87.5 ± 11.0		-13.189 (<0.001)
	Western (n=49)	52.8 ± 9.99		67.1 ± 17.3		-5.009 (<0.001)
Class	Fourth (n=47)	50.2 ± 13.04	ANOVA = 7.196	88.4 ± 10.5	ANOVA =	-15.664 (<0.001)
grade	Fifth (n=193)	46.7 ± 10.8	(<0.001)	83.7 ± 16.8	15.382	-25.825 (<0.001)
	Sixth (n=132)	51.4 ± 11.4		92.5 ± 10.3	(<0.001)	-30.6 (<0.001)
Father	Working (n=366)	48.8 ± 11.5	t test = -0.215	87.4 ± 14.6	t test = -0.676	-39.741 (<0.001)
job	Not working (n=6)	47.8 ± 10.7	(0.83)	83.4 ± 16.2	(0.5)	-4.49 (<0.001)
Mother	Working (n=69)	50.1 ± 10.5	t test = -1.015	87. ± 15.9	t test = -0.053	-16.228 (<0.001)
job	Not working (n=303)	48.5 ± 11.7	(0.311)	87.4 ± 14.3	(0.958)	-36.588 (<0.001)

The fourth question asked about moving the limb that was bitten by a snake. The victim should not move the limb, as this would enhance the circulation in the limb by moving the poison to other parts of the body. The educational session significantly corrected the knowledge of the pupils (87 (23.4%) had correct answers before and 338 (90.9%) after the session with p <0.001). The skin in the second-degree burn has bubbles, but not in the third-degree. The students significantly corrected their knowledge after the session (74 (19.9%) students before versus 299 (80.4%) after the educational session, p <0.001).

The bleeding area must be pressed until the bleeding stops. The correct answer was "yes" Four-fifths of the students correctly answered the question before the session with mild improve after the session.

The next question asked about tilting the head back in cases of epistaxis. This is wrong, as it may cause aspiration. A statistically significant correct result was obtained after the session (124 (33.3%) before versus 332 (89.2%) after the educational session, p <0.001). The bleeding should not be stopped with a tissue (a cotton piece), as it will stick to the injured tissue. Significant improvement in knowledge about this point was observed after the educational session (97 (26.1%) before versus 335 (90.1%) after the session with p <0.001).

Regarding the question about tying the site after the snake bite, the correct answer was to tie the limb above the injured area to reduce the blood flow, with the toxin coming back from the limb to the heart. The correct answers of the students increased significantly after the educational session (254 (68.3%) before versus 323 (86.8%) after the session with p <0.001). The ice should not be used to soothe burns, as it might cause severe vasoconstriction of the blood supply in the affected area, and if it is applied to a large area, it would lead to hypothermia. More pupils correctly answered the question after the session (60 (16.1%) students before and 301 (80.9%) after the session with p <0.001). The fracture should not be repaired immediately before going to the hospital; fix the limb only as any movement may cut muscles, nerves, tendons, or blood vessels. The students' knowledge improved after the session (123 (33.1%) students before and 286 (76.9%) after the session with p <0.001).

Fluids should be given to the person suffering from heat exhaustion or sunstroke. Surprisingly, the percentage of students who answered correctly to the question decreased after the educational session. This may be due to the confusion they faced about whether the patient was awake or unconscious, as no fluids should be given by mouth to unconscious patients for fear of aspiration, so the pupils mistakenly thought the victim had lost consciousness in this situation. Concerning dealing with a person who caught fire, the person should not run, as the running victim would be exposed to more oxygen, and then the fire would increase. Pupils' knowledge had significantly corrected after the educational session (149 (40.1%) before and 355 (95.4%) after the session with p <0.001). The last question was about encouraging patients to cough in cases of airway obstruction. Most

of the students answered correctly to the question before and after the educational session. [Table 3

Table (3): The difference in knowledge answers among primary school students before and after the educational program in Alexandria, Egypt

	Knowledge Questions	Answer	Educational program: Before (n=372) No. (%)	Educational program: After (n= 372) No. (%)	χ^2 test (P-value)
1.	Vomit should be enforced to one who swallowed chemical substance (acidic or alkaline substance)	Yes	342 (91.9)	37 (9.9)	500.312 (<0.001)
		No (correct)	30 (8.1)	335 (90.1)	
2.	A patient who has been poisoned by inhalation must be treated in the place where he is	Yes	40 (10.8)	37 (9.9)	0.13 (0.718)
		No (correct)	332 (89.2)	335 (90.1)	
3.	The clothes stuck to burns must be removed	Yes	310 (83.3)	56 (15.1)	346.95 (<0.001)
		No (correct)	62 (16.7)	316 (84.9)	
4.	The organ that was bitten by a snake must be moved	Yes	285 (76.6)	34 (9.1)	345.733 (<0.001)
		No (correct)	87 (23.4)	338 (90.9)	
5.	The skin in the third-degree burn has bubbles	Yes	298 (80.1)	73 (19.6)	272.179 (<0.001)
		No (correct)	74 (19.9)	299 (80.4)	
6.	The bleeding area must be pressed until the bleeding stops	Yes (correct)	300 (80.6)	319 (85.8)	3.471 (0.062)
		No	72 (19.4)	53 (14.2)	
7.	The head must be tilted back in case of epistaxis	Yes	248 (66.7)	40 (10.8)	245.099 (<0.001)
		No (correct)	124 (33.3)	332 (89.2)	
8.	The patient who has been poisoned by inhalation must be removed from the scene	Yes (correct)	350 (94.1)	348 (93.5)	0.093 (0.761)
		No	22 (5.9)	24 (6.5)	
9.	The bleeding must be stopped with a tissue (cotton piece)	Yes	275 (73.9)	335 (9.9)	312.672 (<0.001)
		No (correct)	97 (26.1)	335 (90.1)	
10.	The injured limb must be tied below the site of the snake bite	Yes	118 (31.7)	49 (13.2)	36.76 (<0.001)
		No (correct)	254 (68.3)	323 (86.8)	
11.	Ice should be used to soothe burns	Yes	312 (83.9)	71 (19.1)	312.537 (<0.001)
		No (correct)	60 (16.1)	301 (80.9)	
12.	The fracture must be repaired immediately before going to the hospital	Yes	249 (66.9)	86 (23.1)	144.271 (<0.001)
		No (correct)	123 (33.1)	286 (76.9)	
13.	Fluids should be given to the person suffering from heat exhaustion or sunstroke	Yes (correct)	355 (95.4)	334 (89.9)	8.658 (0.005)
		No	17 (4.6)	38 (10.2)	
14.	If the body catches fire, the injured person must run until the flames are extinguished	Yes	223 (59.9)	17 (4.6)	261.015 (<0.001)
		No (correct)	149 (40.1)	355 (95.4)	
15.	The patient should be encouraged to cough in case of airway obstruction	Yes (correct)	325 (87.4)	317 (85.2)	0.727 (0.394)
		No	47 (12.6)	55 (14.8)	

DISCUSSION

There is a need to integrate first aid information into the school curriculum in Egypt, as the poor knowledge of the students leads to delays in the rescue, which endangers the life or application of fault techniques to the victim, resulting in major harm. About 3/4 of the students reported that they have suffered one accident or more in their life among the studied participants in Hungary.[19] Eldosoky, in a cross-sectional study, stated that 38.3% of the children experienced injuries in the previous month in Qalubeya governorate, Egypt. The most frequent types of injuries are cut wounds, falls and fractures, burns, poisoning, and foreign body aspiration.[20]

In the present study, we tried to figure out the degree of the first aid knowledge of the primary school children in the Alexandria governorate and implement an educational session to assess the improvement of the knowledge after it. Students had poor knowledge about the first aid of swallowing a caustic substance, skin burns, snake bites, epistaxis, bleeding, bone fractures and sunstroke. Similar results were reported from previous studies where primary school students or even undergraduate students failed to identify the correct management for shock, gastroesophageal reflux disease, epistaxis, foreign bodies in the eyes, trauma, and choking.[21,22]

In the current study, children in the sixth grade had a higher score for knowledge than those in the lower grade, with a statistically significant result indicating that those of older age had more knowledge. In compliance, a Portuguese study documented an increasing trend in the score of first aid knowledge with the participants' age.[23]

The result of the current study revealed a

significant improvement in the knowledge of the students regarding first aid (from 48.8 ± 11.5% before the educational program to 87.4 ± 14.6% after it, t-test -40.028, p <0.001). The progression was also statistically significant for all tested categories (males, females, the different districts, and class grade, among those having or not having a working father or mother (p <0.001)).

Similar results were found in a study carried out in Ahmedabad, India, assessed the knowledge of about 300 students about first aid using a questionnaire, then re-evaluated the students' knowledge after an educational session on the same day with the same questionnaire. Also, knowledge about different aspects of first aid improved after the educational session to range from 39% to 92.33% when compared with its range before the training (7.66% to 63.33%).[24] A study held by Ajani et al. among Indonesian school students found an improvement in the knowledge of junior high school students after simulation methods for handling emergency situations.[25]

The highly significant improvement may be because school-aged children are more likely to learn quickly and easily accept first aid training than older people. We hope the students share the acquired information with their families and friends; hence, we indirectly teach a larger portion of the community about first aid.

Regarding the questions asked, 11 out of 15 questions showed significant improvement after the implementation of the educational program. Those questions were about dealing with swallowing a chemical substance, burns, snake bites, epistaxis, bleeding, fractures, and sunstroke. In the same vein, Das et al. noticed a significant improvement in the knowledge of the students in many fields of first aid. The scores of knowledge concerning fainting (17.4%), poisoning (17.9%), and heat exposure (50.7%), elevated significantly to 52.7 %, 65.75%, and 69.2%, respectively, after the educational intervention.[26]

The same results were found in adults. Delaney et al. reported an improvement in the first aid knowledge of the general population in Uganda after the implementation of the educational program.[27]

Limitations of the current study included firstly, the evaluation of the educational sessions should be repeated after 3 to 6 months, but as the study was held in the second semester, we could not allocate the same students after this period as they would be on holiday. Second, the questionnaire may need to include more items about basic life support. Despite its limitations, this study sheds light on the critical shortages in the first aid knowledge of the students and encourages the government and public health managers to create and involve first aid concepts in the educational curriculum.

CONCLUSION AND RECOMMENDATIONS

School-aged children showed a high improvement in their knowledge after the application of an educational program concerning dealing with swallowing a chemical substance, burns, snake bites, epistaxis, bleeding, fractures, and sunstroke. This favors integrating first-aid educational programs into the school curriculum in Egypt, which could reduce the consequences of injuries and major accidents.

CONFLICT OF INTEREST

The research team expressed deep appreciation to the caregivers and the participants for acceptance to be involved in our study.

FUNDING

No funding sources

REFERENCES

1. Occupational Safety and Health Administration (OSHA) [Internet]. Medical and first aid. Washington: OSHA; 2022. [cited 2023 Nov 18]. Available from: https://www.osha.gov/medical-first-aid/recognition.
2. McNulty A. Are prehospital deaths from trauma and accidental injury preventable? A summary report. London: British Red Cross; 2016.
3. Daya MR, Schmicker RH, Zive DM, Rea TD, Nichol G, Buick JE, et al. Out-of-hospital cardiac arrest survival improving over time: results from the Resuscitation Outcomes Consortium (ROC). Resuscitation. 2015;91:108-15.
4. Murad MK, Husum H. Trained lay first responders reduce trauma mortality: a controlled study of rural trauma in Iraq. Prehosp Disaster Med. 2010;25(6):533-9.
5. British Red Cross [Internet]. Press release - New research shows just 5% of adults have the skills and confidence to provide first aid in emergency situations. London: British Red Cross; 2018. [cited 2023 Nov 18]. Available from: https://www.redcross.org.uk/about-us/news-and-media/media-centre/press-releases/press-release-new-research-on-adults-and-first-aid.
6. Bakke HK, Bakke HK, Schwebs R. First-aid training in school: amount, content and hindrances. Acta Anaesthesiol Scand. 2017;61(10):1361-70.
7. Street EJ, Jacobsen KH. Injury incidence among middle school students aged 13–15 years in 47 low-income and middle-income countries. Inj Prev. 2016;22(6):432-6.
8. Aboagye RG, Mireku DO, Nsiah JJ, Ahinkorah BO, Frimpong JB, Hagan JE, et al. Prevalence and psychosocial factors associated with serious injuries among in-school adolescents in eight sub-Saharan African countries. BMC public health. 2022;22(1):1-8.
9. Peltzer K. Injury and social determinants among in-school adolescents in six African countries. Inj Prev. 2008;14(6):381-8.
10. Wahdan MM, Sayed AM, Abd Elaziz KM, El-Hoseiny MM, Al-Gwaily MM. Prevalence of injuries among high school students in Eastern and Western parts of Cairo, Egypt. Injury. 2016;47(12):2650-4.
11. Zaghloul AM, El-masry A, Emara M, Eltobshy AA, Hosny AM, Marwan MM, et al. Prevalence, patterns of injuries and associated risk factors among primary school pupils in Port Said City. Medicine Updates. 2020;2(2):55-70.
12. Ekaprasetia F, Kristianto H, Susanto T. First Aid Guideline (FAG): A first aid education application for children aged 11–

14 years in Indonesia. JTUMED. 2018;13(6):587-91.
13. Malta Hansen C, Zinckernagel L, Ersbøll AK, Tjørnhøj-Thomsen T, Wissenberg M, Lippert FK, et al. Cardiopulmonary resuscitation training in schools following 8 years of mandating legislation in Denmark: a nationwide survey. JAHA. 2017;6(3):e004128.
14. British Red Cross [Internet]. First aid education for all: We speak up for better first aid training. London: British Red Cross; 2022. [cited 2023 Nov 18]. Available from: https://www.redcross.org.uk/about-us/what-we-do/we-speak-up-for-change/first-aid-education-for-all.
15. Wilks J, Pendergast D. Skills for life: First aid and cardiopulmonary resuscitation in schools. Health Educ J. 2017;76(8):1009-23.
16. Ganfure G, Ameya G, Tamirat A, Lencha B, Bikila D. First aid knowledge, attitude, practice, and associated factors among kindergarten teachers of Lideta sub-city Addis Ababa, Ethiopia. PloS one. 2018;13(3):e0194263.
17. Juliana N, Teng N, Kamal N, Johari S, Amin N, Abu I, et al. Validation of FAT4CP© first aid module and assessment tool: Evaluating module acceptance and the knowledge, attitude and confidence (KAC) on first aid response among childcare providers. Int J Res Pharm Sci. 2018.
18. Pais-Roldán P, del Carmen Olmos-Gómez M, Cuevas-Rincón JM, Luque-Suárez M. Study on the attitudes and knowledge of teachers and future teachers about immediate health care measures at school. EJIHPE. 2022;12(7):854-69.
19. Bánfai B, Deutsch K, Pék E, Radnai B, Betlehem J. Accident prevention and first aid knowledge among preschool children's parents. Kontakt. 2015;17(1):e42-e7.
20. Eldosoky R. Home-related injuries among children: knowledge, attitudes and practice about first aid among rural mothers. EMHJ. 18 (10), 1021-7, 2012.
21. Tripathi GK, Tripathi P, Shankar P, Tutu S, Lakhani P, Sachan AK, et al. Knowledge of first aid skills among undergraduate students of medical college in Lucknow. World J Pharm Res. 2016 Jan 1:60-3.
22. Tse E, Plakitsi K, Voulgaris S, Alexiou GA. Schoolteachers teach first aid and trauma management to young primary school children: an experimental study with educational intervention. Children. 2023 Jun 19;10(6):1076.
23. Dixe MdACR, Gomes JCR. Knowledge of the portuguese population on basic life support and availability to attend training. Rev Esc Enferm USP. 2015;49:0640-9.
24. Kapoor R, Vyas S, Mashru P, Mehta A, Mehta A, Mehta S, et al. Impact of training on knowledge and attitude regarding first aid among students of schools of Ahmedabad. Natl J Community Med. 2017;8(07):380-4.
25. Ajani AT, Movitaria MA, Komelasari Y, Saputra N, editors. Simulation methods for emergency handling preparedness in junior high school children in the new normal era. 1st International Conference on Health Sciences and Biotechnology (ICHB 2021); Atlantis Press; 2022.
26. Das K, Pal A, Dasgupta A, Bandyopadhay L, Paul B, Mandal S, et al. A study on the effectiveness of educational intervention regarding first aid management of selected medical emergencies among adolescents at a school in Kolkata. IJCMPH. 2020;7(1):340-4.
27. Delaney PG, Bamuleke R, Lee YJ. Lay first responder training in eastern uganda: leveraging transportation infrastructure to build an effective prehospital emergency care training program. World J Surg. 2018;42(8):2293-302.