

*Original Research Article*

# Pre-post First Aid Interventional Program on Knowledge and Practice of Primary School Teachers in Governmental Basic Schools - River Nile State – Sudan

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Abstract

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Children spend most of the time in school where they are exposed to various types of injuries, which influence their present and future state of health. First aid is the treatment of any injury or illness before availability of medical aid. Teacher is the key person who can attend the children for injuries in school through complete knowledge regarding first aid. This study was done among primary school teachers to evaluate the effectiveness of education program on knowledge and practice regarding first aid. The objective of this study was to evaluate the effect of first aid health education program on knowledge, and practice of primary school teachers in River Nile. Pre and post interventional study design was used to evaluate the effect of first aid training program on knowledge and practice of primary school teachers. Data was derived from 45 respondents participating from AL-matama locality which selected by non-probability convenience sampling technique. Structural questionnaire for knowledge and checklist for practice of first aid practice. Data collected pre and immediate post implementation of first aid health education program. Data analyzed by SPSS version 25. Knowledge about first aid improved from Inadequate 44(97.8%), moderately adequate 1.0(2.2%) and adequate 0.0(0.0%) in pre intervention to Inadequate 0.0(0.0%), moderately adequate 8.0(17.8%) and adequate 37(82.2%) post intervention, while also showed improvement in practice from inadequate 45(100%), moderately adequate 0.0(0.0%), and adequate 0.0(0.0%) in pre intervention to Inadequate 0.0(0.0%), moderately adequate 4.0(8.9%) and adequate 41(91.1%) post intervention. Paired sample t-test revealed that the mean post-test knowledge score regarding first aid is significantly higher ( $77.25 \pm 3.53$ ) than that of mean pretest knowledge score ( $39.57 \pm 6.82$ ) ( $P < 0.001$ ); mean posttest practice score was significantly higher ( $85.35 \pm 7.29$ ) than mean pretest practice score ( $30.56 \pm 8.61$ ) ( $P < 0.001$ ). There is highly increased in Average Percent of correct Answers in knowledge and practice post intervention in relation to pre intervention in all first aid items, there is no significant correlation between education and knowledge practice score pre and post since p-value  $> 0.05$ . The result of the study showed effectiveness of the first aid health education program in improving teacher's knowledge, and is highly effective in improving practice, supported hypotheses.

**Keywords:** Educational program of first aid, First aid management, Knowledge and practices of teachers, Primary school teachers

**Abbreviation:** WHO: World health organization; FA: First aid; HEP: Health Education Program; STP: Structured Teaching Program; USA: United State of America; UofK: University of Khartoum

## INTRODUCTION

First aid is an immediate and temporary treatment of victims with sudden illness or injury while awaiting the arrival of medical aid<sup>(1)</sup>. Children are susceptible group in the community to health-related emergencies and

accident such as physical injuries or complications of chronic conditions. The World Health Organization (WHO) has stated a fact that injuries are the leading cause of death and disability among school-age youth

about 10 – 25% of injuries occur to children while they are in school, and around 25% of emergency department visitors are children with special health care needs<sup>(2)</sup>. Almost 22 million children in the United States are injured each year, and an estimated 10–31% of these injuries occur in and around schools and school teachers trained school's staff about emergency and first aid management have an important role to play in reducing the risk factors that can cause injuries<sup>(3)</sup>.

Schoolchildren are at a particularly higher risk in community to accidents and injuries at school. A study revealed that in a cohort of school children, the majority of injuries (88%) were directly related to physical activity. Moreover, almost 20% of all physical activity-related injuries occurred during school days<sup>(4)</sup>. Unintentional injuries continue to be the fifth leading cause of death worldwide and cause of death in children between 1 to 21 years old thus basic schools require comprehensive program of emergency management, and early and appropriate treatment of injuries can help reduce morbidity and mortality through proper first aid management.<sup>(5)</sup>

Children spend most of time in school, pediatric emergency such as behavioral crises, accidents and intentional injuries are likely to occur and teachers have constant contact with students and most of teachers have been faced with health problems involving requiring first aid intervention, first aid and basic life support are so important, and training basic first aid should be compulsory in all schools<sup>(6)</sup>. So it is important for school teacher to know first aid and how to utilize it in proper manner, without any delay as a first aid save person's life so it is always better as it is said that "Preparedness is a key element of first aid"<sup>(7)</sup>

School age children (5-14 years) constitute about 30% of the total population in Sudan<sup>(8)</sup>. As future teachers need to be acquainted with school health and emergency events, trace data not available in knowledge of teachers regarding first aid and emergency situation in absence of doctors or nurses and no researcher in Sudan have pursued this line of investigation, but In 1998 a national workshop was held and school health became a branch of primary health care directorate, and the workshop recommend training of school teacher in school health for each to overcome the shortage in school health.

Other study show that the training program was effective in significant improvement of knowledge and practice score regarding first aid management of selected minor injuries among primary schools teachers and most of the time primary school teachers experience minor injuries such as sprain, strain, minor burn and epistaxis, etc., and they always need first aid care to prevent complications and school teachers are the nearest one's to start first aid<sup>(9)</sup> and also studies have been emphasized that lack of adequate medical providers which can lead to loss of life among schools children<sup>(10)</sup>.

## Problem statement

According to my experience in community nursing field, I am inspired to pursue this study in an attempt to explore the school base training regarding first aid for basic school teachers. The researcher designed, implement and evaluate the effects of school base regarding first aid among basic school teachers in AL-matama Locality-River Nile State- Sudan, to compensate the absence of residence medical providers (physicians, medical assistants /or school nurses).

Lack of physicians, medical assistants /or school nurses for schools in Sudan Education System requires school health education trained teachers for doing duties of first aids in schools. Teachers spent more time with students and most of teachers have been faced student injuries which require first aid intervention<sup>(7)</sup>.

Previous study had stated that unintentional injuries occurring in the childhood are global problem and ordered as first cause of death and disabilities and at least 875,000 children aged below 18 years died because of unintentional injuries annually, therefore improvements in access and quality of pre-hospital and essential first aid and rehabilitation are important measures for reducing the severity of injuries<sup>(11)</sup>

## Justification

1- School life is an important part in children's life, which has a direct effect on their physical health, and majority of injuries occurs during schools hours<sup>(4)</sup>.

2- Improve of knowledge and practice of basic schools' teachers in first aid and emergency at schools by implementing the research projects concerning is recommended by several studies-

3- Lacks of health care professional on site to respond to individual student medical emergencies in Sudan Education System of basic school level, and there not racedata and little is known about first aid and emergency program in basic schools in Sudan.

## Research question

What is the effect of training program on the level of knowledge and practice of basic school teacher's regarding first aid?

## Hypotheses

### For knowledge

**H<sub>0</sub>-1:** There is no significant effect of first aid program on basic school teacher's knowledge regarding first aid

program.

**H<sub>1-1</sub>:** There is a significant effect of first aid program on basic school teacher's knowledge regarding first aid program.

### For practice

**H<sub>0-2</sub>:** There is no significant effect of first aid program on basic school teacher's practice regarding first aid program.

**H<sub>1-2</sub>:** There is a significant effect of first aid program on basic school teacher's practice regarding first aid program.

## The Objectives of the Study

### General Objectives

To evaluate the effect of educational training program (ETP) of first aid on school teachers' knowledge, practice in Governmental Basic Schools AL-matama Locality-River Nile State.

### Specific Objectives

- 1) To assess the knowledge and practice of basic school teachers in governmental basic school regarding first aid program.
- 2) To implement an educational and training program of first aid for basic school teachers
- 3) To evaluate the effect of the educational program of first aid in achievement of basic school teachers' knowledge practice.

## Literature

Review of literature is an essential component of the research process. Relevant literature from various perspectives like primary school teachers, programmed teaching on level of knowledge and expressed practice on first aid management are focused explaining the first aid management among primary school teachers. Review of literature in this study has been organized under the following heading:

- 1- Studies Related to knowledge and expressed practices regarding first aid management
- 2- Studies Related to effectiveness of programmed teaching on first aid management among school teachers.

## Studies Related to knowledge expressed practices regarding first aid management among school teachers

Nour Eldaim Elnoman Elbadawi et al. (2019) conducted a cross sectional study on schools in Sudan among primary schools' teachers. The data was collected using self-administered questionnaire to 384 teachers, Cluster sampling technique was used. 44% of school teachers had good knowledge, 33% had fair knowledge and 22% had poor knowledge. 100% had positive attitude toward the first aid training, and 98% strongly agree to establish first aid courses. Regarding the practice part, about 34% of the participants had contact with pediatric emergencies, 30.7% was epistaxis and 15.9 % was fractures which were more common, so knowledge and practice regarding some fatal conditions were extremely poor. The study, suggested that knowledge regarding first aid management among teachers should be improved<sup>(12)</sup>.

Ali E. Mansour et al (2019) conducted a study in 310 a systematic chosen primary school from Qassim region, Saudi Arabia. All teachers of the selected schools were included in the study. The data were collected by self-administered questionnaire. 22.3% of the participants could confidently carry out first aid procedures. Three-quarters of the participants did know what to do after a pupil faints, while 47.7% of the teachers did know what to do in the event bleeding, the results indicated that 22.3% of the participants could confidently carry out first aid procedures. Three-quarters of the participants did know what to do after a pupil faint, while 47.7% of the teachers did know what to do in the event bleeding. However, what appears to be lacking is the practical training for the basic procedures. This requires government or policy intervention to increase the number of individuals acquiring actual training for first-aid procedures<sup>(13)</sup>.

Rohitash Kumar et al (2015): conducted a descriptive research design among the primary school teachers. Convenient sampling method was first used to identify suitable subjects. Data collection tools are structured questionnaire schedule which consisted of 27 items and demographic variables. A standardized collection of demographics was performed and participants were given the mentioned questionnaire to indicate knowledge on first aid. The results showed that 40 subjects completed the questionnaire; the study shows that teachers had good knowledge of first aid management and that students of primary schools are at a great advantage of safety by this knowledge. The mean score of 19.17 indicates that the teachers were aware of most of the basic principles of first aid, irrespective of their background. Authors recommends that: A similar study can be conducted in different community to find out the significant difference between rural and urban primary school teachers, survey on knowledge of first aid management could be done among general public or on

mothers and The same study can be conducted in the large sample size<sup>(14)</sup>.

Dr. Anuradha, S (2018): conduct a study among school teachers at India. To create awareness about different accidents of children at primary school premises and their first aid management. The samples consisted of 30 high school teachers selected, it was an evaluative research study with one group pre- test and post –test design conducted. The analysis showed that improvement of knowledge occurred after administering structured teaching program (STP) on first aid management, in comparison of pre and posttest parameters showed significant improvement in knowledge regarding first aid management, paired t test in pre and posttest knowledge of teachers is 1.01836, which is significant at 0.05 levels, and the structured teaching was quite effective in enhancing the knowledge of teachers on first aid management<sup>(15)</sup>.

Sunil D Kumar et al (2013): conducted Cross sectional study for 9 months in 40 randomly selected schools of Mysore. Teachers working in these schools, who had minimum one year experience, were included. The details regarding perception and practices, events requiring first aid were obtained by using self-administered, pretested questionnaire. The result showed that out of 262 school teachers, 255 (97.3%) had a never heard of a terminology first aid. Among those who had heard of first aid 201 (78.8%) had replied that first aid has to be given in case of wounds whereas only 77 (30.2%) were aware that even fainting needs first aid care. Overall perception and practice regarding first aid among school teachers was found to be poor. Wound was found to be the commonest event requiring the first aid care in the school. The perception and practices of school teachers on first aid was found to be poor. Wound was found to be the commonest event requiring first aid followed by fainting<sup>(10)</sup>.

Hussein M.A. Al-Tameemi et al (2017): conduct a descriptive cross-sectional study among Primary School Teachers, A 302 primary school teachers were selected randomly, the result showed that 287 (95%) of participants had total fair knowledge and only 15 (5%) of participant teachers had poor knowledge, besides no one of them had good knowledge. With regard to teachers' attitudes towards first aid, the results showed that 282 (93.4%) of the teachers commonly had a positive attitude toward first aid. The final conclusion and summary of the study showed unsatisfactory knowledge about first aid in spite of teacher retaining a good general knowledge about the goals and benefits of first aid, thus the establishment of mandatory training sessions for teachers at the beginning of each academic year is intensely recommended. which seems due to lack of knowledge and awareness about these situations where it can be improved through first aid programs and educational sessions or at least through health

bulletins<sup>(16)</sup>.

Rohitash Kumar et al (2015):conducted a study was to assess the knowledge of primary school teachers regarding first aid management of minor accidents among children (5-10 Years) at selected primary schools of Ambala district Haryana. Descriptive research design was used for the study 40 sample primary school teachers chosen from different primary schools. Both government and private primary schools were selected for the study Sample was taken by convenient sampling technique. The tool was structured questionnaire schedule which consisted of 27 items and demographic variables. The data was collected from teachers. The results show that most of the primary school teachers (52.5%) had moderate knowledge score (16- 21), followed by 37.5 percent teachers who had excellent knowledge score (21 -27), a small portion (10%) of school teachers had poor knowledge. The study shows that structured teaching program is necessary to improve knowledge regarding first aid management<sup>(14)</sup>.

Mamathahosapatna et al (2020):This study was carried out to create mindfulness and to assess the knowledge of first aid among primary school teachers in the Udupi district- India. The existing aptitude level in faculty in Udupi to oversee first aid is insufficient. The problem needs to be addressed and the addition of first aid education in the teacher's training curriculum is recommended. Periodic updating and revision of the techniques need to be done by organizing seminars and workshops for teachers. The majority of school teachers had a low knowledge about first aid management but their enthusiasm to go through training and then to teach others and administer first aid services in real-life circumstances was readily apparent. The present study suggests that the teachers have the time, aptitude and inclination to undergo training in first aid, but they don't have access to a training facility or resource persons<sup>(17)</sup>.

Navjot Kau et al (2017): conducted of Non-experimental Descriptive design was used. The population under the survey was assigned teachers working in Government school of District Monali. Non-probability purposive sampling technique was used. 40 samples were selected for the study including both males and females

Results shows that majority of the teachers were having average knowledge about the first aid i.e. 12.5% has good scores, 77.5% has average and 10% has poor scores. Most of the participants in the study were females (married) of the age group between 31 years to 40 years residing mostly in semi urban areas with a post graduate degree.

The study, recommended that: The study can be done in large population to generalize the findings, Comparison between the government and private school teachers regarding the knowledge of First Aid Management can be done, Randomized sampling technique can be done in

future study and Experimental study can be done to assess the effectiveness of workshop regarding the knowledge through pretest and posttest(18).

Shukir S. Hasan et al (2016): conducted Across sectional descriptive design study was conducted in ten primary schools, which were randomly selected from Erbil city- Iraq- A special questionnaire was constructed, which consisted of three parts. Chi square test of association (Fisher's test) was used to compare proportions. A p value  $\leq 0.05$  was considered as statistically significant. The study found that there was incorrect knowledge among study sample as most of teachers had moderate to low knowledge with significant association between years of experience and level of knowledge. Moreover, teacher's attitude was significantly associated with their age, marital status, educational background and levels of experience. The study concluded that the most of teachers had low to poor knowledge regarding first aid, and their attitude toward first aid was good. A special training course to improve teacher's knowledge and attitude regarding choking and been recommended(19).

#### **Studies Related to effectiveness of programmed teaching on first aid management**

**Shereen Ahmed Qalawa1 et al (2021):** conducted a quasi-experimental study to evaluate the effectiveness of the first aid training program package for teachers of secondary industrial technical schools on their performance atin Damietta City- Egypt, The sample for the study comprised of 50 industrial technical school teachers selected by purposive sampling technique. The study finding revealed that there was a statistically significant improvement ( $P < 0.0001$ ) in the mean score of the total study sample's knowledge regarding first aid. Post and follow up implementation of the program were  $80.0 \pm 9.9$  and  $71.9 \pm 11$ . There was a statistically significant improvement ( $P < 0.0001$ ) in the mean score of the study sample's overall practice with respect to first aid. Post and follow up implementation of the program were  $75.2 \pm 9.7$  and  $74.3 \pm 11.4$  compared to pre implementation of the program which was  $60.1 \pm 6.2$ . The study concluded that implementation of training program package for industrial technical schoolteachers improved their performance regarding first aid with recommendation of continues training(20).

**Senay Karadag Arli (2017):** conducted a pretest-posttest control group design, is experimental in nature. It was conducted with 24 experimental group participants and 20 control group participants. The participants' first aid knowledge levels were assessed through a questionnaire administered as pretest. Following this, the experimental group was provided with theoretical and practical education on first aid. Then all the participants were administered the posttest.

The found that there was a significant difference between pretest and posttest scores of the experimental group ( $z = -4.215$ ,  $p < 0.01$ ). This result indicates that the first aid education given to the experimental group was effective. And concluded that Teachers, who are always with children, need basic first aid education so that they can do first aid in case of an accident or injury. First aid practices are very important because with simple interventions, it can be possible to prevent death or further injuries. In conclusion, the basic first aid education given to the teachers increased the knowledge level of the teachers<sup>(21)</sup>.

**Awad S. al-Samghan, S.B.F.M (2015):** conducted a cross-sectional study and descriptive study design was applied among primary school teachers at governmental primary schools for boys in Abha City, Kingdom of Saudi Arabia. A self-administered questionnaire was designed by the researchers, which included socio demographic data and knowledge about first-aid measures for the most common incidents among school children. The study included 187 teachers. Their ages ranged between 25 and 58 years with a mean of  $41.5 \pm 7.4$  years. Fifty-three teachers (28.3%) attended a course on first-aid. Of them, 33 (62.3%) reported that these courses included practical training. About half of the teachers (52.4%) had satisfactory knowledge about bleeding, and 31% had satisfactory knowledge level of Knowledge about first aid is not satisfactory among teachers of primary schools for boys in Abha, kingdom of Saudi Arabia (KSA) so the study recommended that First aid educational and training programs should be introduced at school<sup>(4)</sup>.

**Linto M Thomas et al (2015):** conducted A Quasi experimental evaluative study using one group pretest – post-test research design non-probability convenient sampling technique was used to select 60 Primary school teachers working at selected primary schools of Ernakulam district- India, The result reveals that the overall score was 19.00 in the pre-test and 26.03 in the post test, 100% of primary school teachers had inadequate knowledge in the pre-test, after distribution of Self-instructional module Primary school Teachers 13 (21.67%) had moderately good knowledge and 47 (78.33%) had excellent knowledge regarding selected conditions of first aid. Paired 't' test showed that there was a significant improvement between pre-test and post test scores with 't' value of 22.30,  $P < 0.05$ . On the basis of the findings of the study, it is recommended that the following studies can be conducted. A similar study may be conducted on a larger population for generalization of findings. Studies may be conducted to evaluate the effectiveness of information booklet versus other method of teaching on selected first aid measures. A study may be conducted to assess the existing knowledge and practice of primary school teachers in relation to applying the selected first aid measures<sup>(22)</sup>.

**Jaklein R. Younis Amal El-Abassy (2015):** conducted a study to assess effectiveness of video assessed teaching (VAT) & lecture methods in improving knowledge and skills regarding first aid management. Comparative research design was used for this study. Simple random sample of 200 primary school teachers was included. Settings: The study was carried out at four primary schools in Shebin - Elkom town and EL Shohadaa town, western Alaska islands Menoufia Governorate. Structured knowledge questionnaire was administered regarding first aids measures. Tool two: A five points Likert- scale structured performance check list was used to assess degree of improvement in primary school teachers' management skills regarding first aid for children's school day accidents after utilization of Video-assisted teaching method versus lecture method. The study showed a statistically significant improvement at (P<0.05) level in total knowledge score of primary school's teachers undergoing video-assisted teaching method regarding first aid of children regarding school day accidents (28.68±3.77) compared to teachers undergoing traditional lectures (12.77±5.00). Utilization OF video – assisted teaching method was succeeded in achieving significant improvement in the primary schools teachers knowledge and skills regarding first aid of children's school day accident compared to traditional lecture method<sup>(23)</sup>.

**Nabila Hassan (2015):** conducted an intervention study, the sample is convenience type and included 50 governorate kindergarten teachers. Data were collected using questionnaire to test teacher's knowledge concerning first aid and an observational checklist to assess their practice towards first aid of common emergency problems as wounds, fractures, epistaxis, chocking and bleeding. Results: The study results revealed that high significant improvement of knowledge and practice of the studied group in the post and follow up intervention in comparison to pre intervention. Additionally, the knowledge Mean and SD for pre, post and follow intervention were 22.2 ± 5.0, 35.7 ± 4.7 and 33.3 ± 5.3 respectively. Also, the total practice was improved in post and follow up intervention compared to pre intervention as cleared by mean and SD of 17.4 ± 6.6, 16.1 ± 7.8 and 9.2 ± 5.1 respective evaluate the effectiveness of health educational program on the pediatric first aid knowledge and practice among kinder garden teachers<sup>(1)</sup>.

## MATERIALS AND METHODS

### Design of study

A pre and post Intervention study.

### Study area

The study conducted in basic schools, AL-matama Locality -River Nile State. AL-matama Locality is one of 7localities of River Nile State. It has area of **11723** km<sup>2</sup> and an estimated population of **192,053**. It consists of 3 administrative units. (Tayba. AL-matama and Wad Hamid).

And Reason for selection this area is accessible and it has and urban and rural character.

### Study Population

Male and female basic schools' teachers in the area of study.

### Inclusion criteria

All age of male and female teachers in governmental basics schools in administrative unit of AL-matama Locality.

### Exclusion criteria

- Teacher who works administrator and director of education authority office in locality.
- Teacher who in annual leave.

### Variables under study

- **Dependent variable:** knowledge and practice of basic schools' teachers regarding first aid.
- **Independent variable:** training program of first aids.

### Sampling Technique

### Sample size calculation

Has been adopted in School of math -Uofk to satisfy the main objective of assessing the effect of training program regarding first aid among basic school teachers in AL-matama locality-River Nile State-Sudan,

Sample size for comparing two group for continuous data in sample size of clinical studies was used<sup>(24)</sup> and the total number of subjects required is calculated using the formula:

$$N_{Pairs} = \frac{2(z_{1-\alpha/2} + z_{1-\beta})^2}{\Delta_{Continuous}^2} + \frac{z_{1-\alpha/2}^2}{2} \quad (1)$$

Where

$$\Delta_{Continuous} = \frac{\delta_{Plan}}{\sigma_{Difference}}$$

and:

$N_{Pairs}$	The required sample size.
$\alpha$	The significant level.
$z_{1-\alpha/2}$	The value from the normal distribution related to and representing the confident interval.
$1 - \beta$	Power of the test.
$z_{1-\beta}$	The value from the normal distribution related to and representing the power of the test.
$\delta_{Plan}$	The anticipated difference of means between before and after intervention means.
$\sigma_{Difference}$	The standard deviation of the paired difference.

A previous study found that the mean score of primary school teachers knowledge, before the training program is 2.15(with standard deviation 0.6), and after the program the mean became 2.71(with standard deviation 0.49)<sup>(22)</sup>.

For this study we assume:

- $\delta_{Plan} = 2.71 - 2.15 = 0.56$
- $\sigma_{Difference}$  is estimated by the standard deviation before relaxation program which equal to 0.6, since the standard deviation of the paired difference was not found.
- The power of the test  $1 - \beta$  is set to 0.95, and hence  $z_{1-\beta}$  is equal to **1.645**.
- The significant level  $\alpha$  is set to .01, and hence  $z_{1-\alpha/2}$  is equal to **2.58**.
- $\Delta_{Continuous} = \frac{.56}{0.6} = 0.93$ .

Therefore, the total required sample size using the above formula is **45** subjects.

### Sample size allocation

To allocate the **45** subjects to the three administrative unit, proportional allocation is used as shown in Table 1 below:

Allocation of subjects

Administrative unit name	Total number of teachers in each administrative unit	Sample allocation	The number of schools in t sample
1-AL-matama administrative unit	447 (39%)	.385 * 45	11.28 ≈ 11
2-Tayba administrative unit	378 (33%)	.326 * 45	13.90 ≈ 14
3- Wad Hamid administrative unit	336 (28%)	.289 * 45	16.61 ≈ 17
<b>Total</b>	<b>1161</b>	<b>45</b>	<b>45</b>

### Sampling Method

Non probability convenience sampling technique was used to select teachers in sample in each administrative unit in AL-matama locality.

Total 45 teachers across the locality from three administrative unit were included in the study.

1-AL-matama administrative unit = 11 teachers

2- Tayba administrative unit = 14 teachers

3- Wad Hamid administrative unit = 17 teachers

### Data collection tools and techniques

#### Tool one

Data was collected by the investigator using structured close ended questionnaire to evaluate the teacher's knowledge scale and to assess teacher performance first aid providing.

Two stages data collection: pre-intervention and immediate post-intervention using the same questionnaire (knowledge scale and practical checklist) which consist of three parts.

Part: Data related to socio-demographic data and characteristics as teacher's age, gender, marital status, education level and experience of teachers.

Part II: Data related to teacher's knowledge regarding first aid.

#### Scoring System

Teacher's knowledge data were scored as following: true answer score (1 mark), I don't know score (2 marks), while false answer scored (3 marks). The total level of knowledge scores for teaches categorized as follows: (0 to 49.0) inadequate, (50 to 74) moderately adequate and (75 to 100) adequate knowledge.

Part III: Data related to teacher's practice regarding first aid.

Teacher's practice data were scored as following: true answer score (1 mark), I don't know score (2 marks), while false answer scored (3 marks). The total level of practice scores for teaches categorized as follows: (0 to 49.0) inadequate, (50 to 74) moderately adequate and (75 to 100) adequate knowledge.

#### Tool two

FA program construction for primary schools' teachers form three administrative unit.

The program was conducted in three phases:

### First phase

Assessment phase: assessment for knowledge and practice done by using questionnaire and checklist for collecting data pre intervention.

### Second phase (implementing phase)

The implementing phase of the program: the general objective of the program to improve teacher's knowledge and practice regarding FA. The content of the program including about FA, types FA which may require in school environment, sign and symptoms of some disorders which may happen in schools, and illustration of practice required was done.

Two sessions per week for two weeks total hours are 12 hours for total sessions per three hours that was done in each administrative unit after consent obtained from locality and schools where the training program takes place as follows:

About 11 participants were attended according to sample representing in AL-matama administrative unit, 14 participants were attended according to sample representing in Tayba administrative unit and 17 participants were attended according to sample representing in Wad Hamid administrative unit,

Representing sample for each above administrative unit was selected by using Non probability convenience sampling technique as mentioned above in sampling method.

The program was done in one of school classroom equipped with lighting and ventilation in AL-matama and Wad Hamid administrative unit, but the program was done in youth club in Tayba administrative unit, more than representing sample number was attending in Tayba administrative unit and training was done for all but questionnaire was distributed to representing sample only from teachers.

In each administrative unit, an orientation about the educational program was given including a simple explanation of the program, its importance to acquire knowledge and skill useful, lecture's time and the educational materials to give the participants the full idea about the phases of the application of the program in order to facilitate for their contribution. verbal consent was taken from the participants after verbal explanation of the aim of the study and the information will be confidingly, and they have clear to continue or stop at any time they wish. Then the questionnaires were distributed to teachers who agreed to participate in this study to assess knowledge and practice pre- intervention.

implement the educational programs, which consists of a theoretical and a practical part using various teaching methods. training program was done in the theoretical and practical part, equipment for practical

training was brought from Shendi University – faculty of nursing sciences for practical training such as CPR model and vital signs. In First week, the theoretical part was presented, and the practical part was presented in the second week, two session per week, each session had taken about three hours. The training program was presented in using different teaching methods and using many teaching aids: lectures, videos, group discussion, asking question, presenting of images and flip chart. This education material was given to participants in form of booklet, some of which were sent to them by WhatsApp media.

### Third phase

Here began the evaluation phase of training program which was performed Immediately using the same tools before implementing the program to evaluate the effect of he program on the research sample by comparing the level of knowledge and skills regarding first aid after implementing of the program. On the other hand, knowledge and skills were measured without applying the training program as in the training group, which confirms the impact of the training program.

### Data analysis methods

SPSS version 25 was used, Descriptive statistical analysis for Scio-demographic data Categorical data present as frequency and percentages and numerical data present as mean and standard deviation and T test to determine the level of knowledge, and practice change after interventions also Correlation and Coefficient was done with P value less than 0.05

### Ethical approval

Official consent obtained from the Graduate College Medical and Health Studies Board University of Khartoum, from the Head office of community health nursing department leader.

Also, official consent obtained from administrator and director of education authority office in locality and verbal consent was done from participants in the study, that: they can withdraw at any time and the right of them protected with high confidentiality during filling questionnaire.

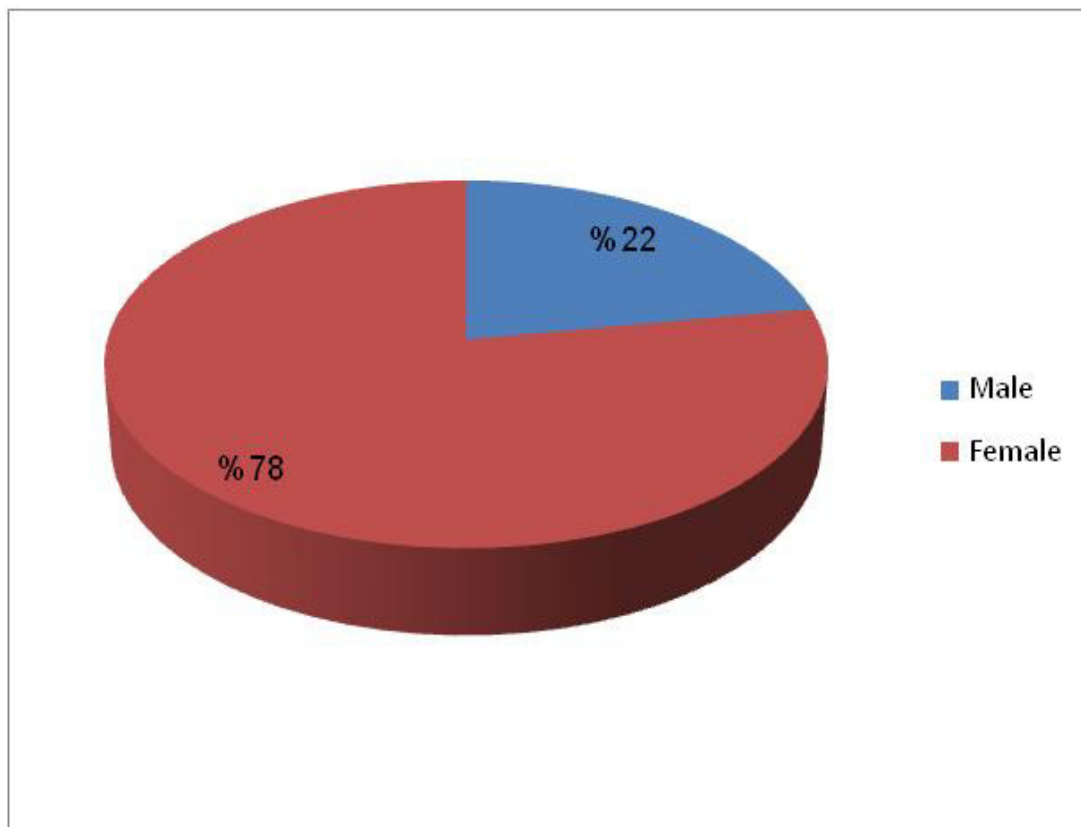
### RESULTS

In this study, experimental approach was adopted to assess the effectiveness of Specific Training Program on



**Table 1.** Distribution of study sample by gender (n = 45)

	Frequency	Percent
Male	10	22.2
Female	35	77.8
<b>Total</b>	<b>45</b>	<b>100.0</b>

**Figure 1.** Distribution of study sample by gender(n = 45).

knowledge and practice of primary school teachers regarding first aid and first response of incidence occur in school environment by using at selected schools in River Nile state- AL-matama locality. The samples were 45 teachers (pre and post operative intervention) the data collected were tabulated, analyzed and interpreted by using descriptive and inferential statistics. Analysis was done based on the objective and hypothesis of the study. A two-tailed p value at 0.05 was taken as the level of significance.

Data of the knowledge of first aid, types, first response of teacher regarding student with injury contains 23 questions and is practice data were mentioned in (5 tables) in form of checklist, respectively. Where data were monitored, analyzed and compared pre- and postoperatively.

**The results of the current study were presented as the following sequence**

**PART ONE: Demographic characteristics of study groups, which includes**

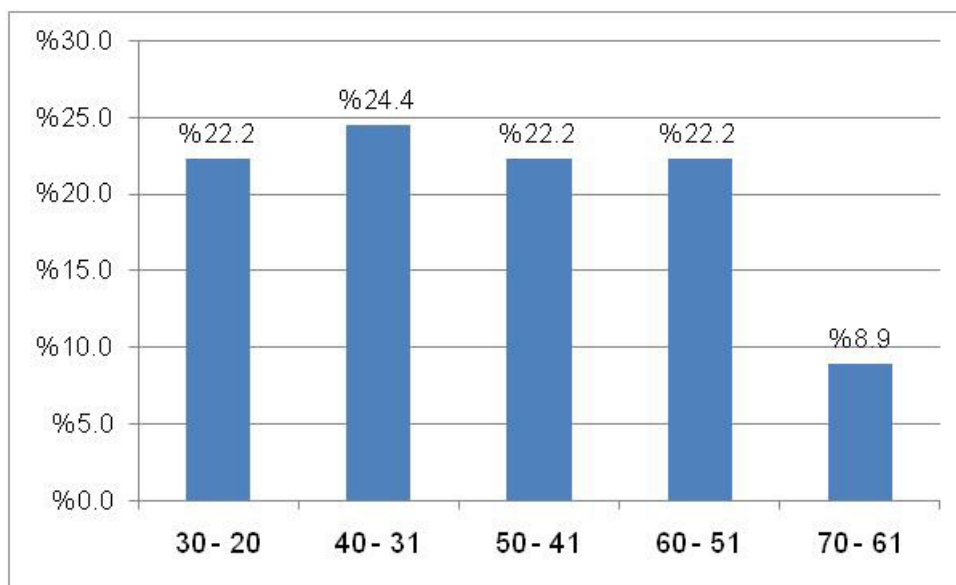
- Comparison demographic characteristics of the participants teachers in pre- and post-operative group

**PART TWO: Knowledge of pre- and post-operative group regarding first aid which includes:**

- Assessment of the participants' baseline scores of knowledges before implementation the training program for the groups (pre and post).

**Table 2.** Distribution of study sample by age(n = 45)

	Frequency	Percent
20 - 30	10	22.2
31 - 40	11	24.4
41 - 50	10	22.2
51 - 60	10	22.2
61 - 70	4	8.9
<b>Total</b>	<b>45</b>	<b>100.0</b>



**Figure 2.** Distribution of study sample by age(n = 45).

- Comparison of groups before and after implementation of the training program in knowledge.
- Comparison of grades overall total knowledge, between the groups (pre and post) of the training program.
- Comparison of intervention the groups before and after implementation of the training program in knowledge.
- Comparison of grades overall total knowledge and practice between group after implementation of the training program

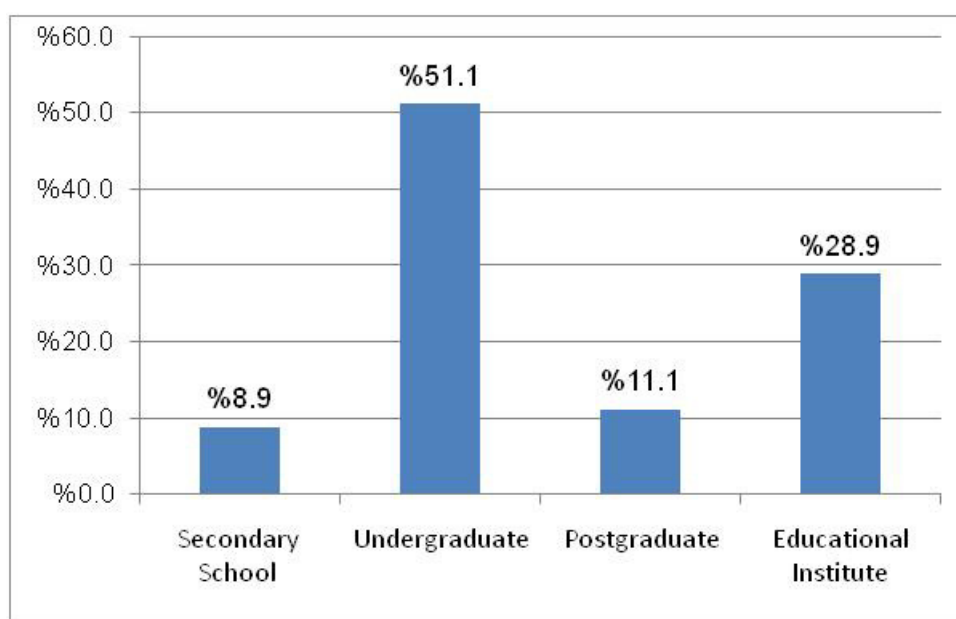
**PART THREE: Performance in practice of the groups, which includes**

- Assessment of the participants' baseline scores of practices pre and immediate post of implementation the training program.
- Comparison of interventional group before implementation of the training program (pre) and after program (post) in practice

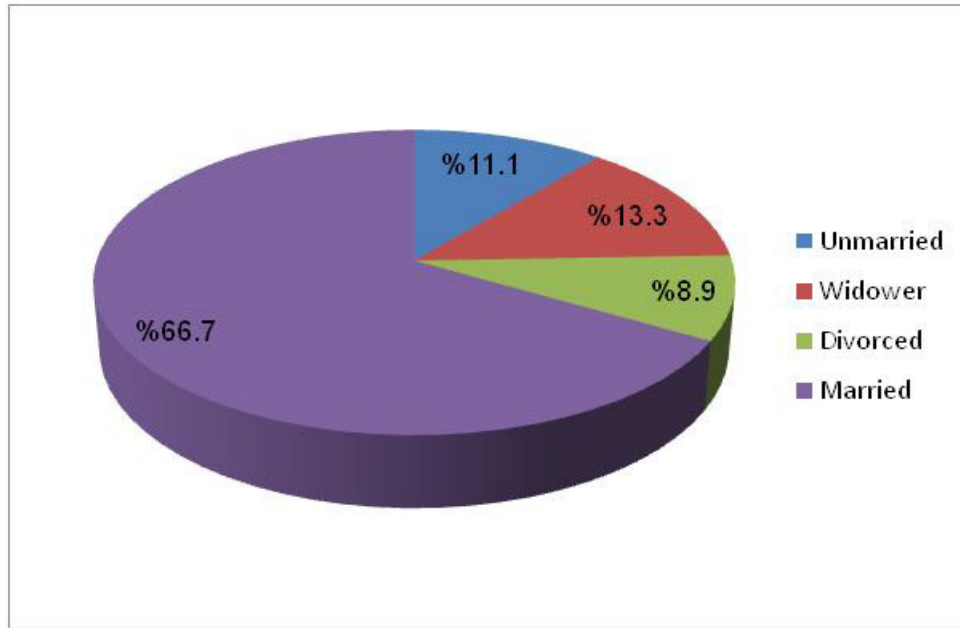
- Comparison of interventional group before implementation of the training program (pre) and immediate (post) after program in practice. Table (1) and figure (1) shows that (78%)of respondents are female and (22%) of respondents are male. Table (2) and figure(2): Shows that majority of respondent's age between (31-40years) and about (8.9%) of respondent's age between (61-70 years). Table (3) and figure (3): Shows most of participant (51.1%) having undergraduate degree certificate of B.Sc. of Education, (8.9%) and (28.9%) having Educational institute certification in education, (11.1%) having postgraduate degree certificated and (8.9%) having secondary school certificates Table (4) and figure (4): Shows majority of participant (66.7%) are married, (13.3%) Widower, (11.1%) unmarried and (8.9%) divorced. Table (5) and figure (5): shows majority of participant (37.8%) having 11 – 20 years of experiences in education, (26.7%) having one to 10 years, (22.2%) having 21 to 30 years of experience, (8.9%) having less than one years and just (4.4%) having experience for 31 to 40 years

**Table 3.** Distribution of study sample by age Education(n = 45).

	<b>Frequency</b>	<b>Percent</b>
Secondary School	4	8.9
Undergraduate	23	51.1
Postgraduate	5	11.1
Educational Institute	13	28.9
<b>Total</b>	<b>45</b>	<b>100.0</b>

**Figure 3.** Distribution of study sample by age Education(n = 45):**Table 4.** Distribution of study sample by Marital Status(n = 45).

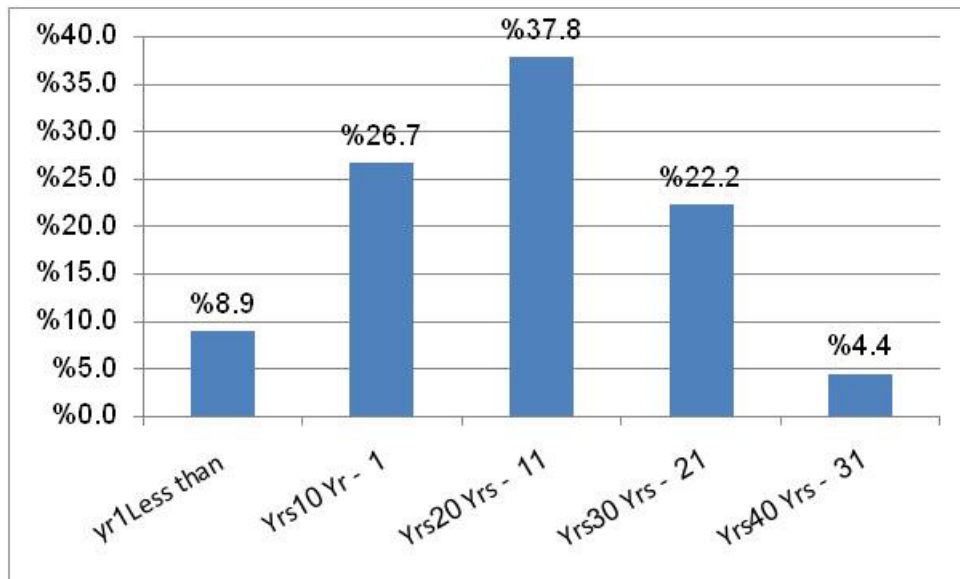
	<b>Frequency</b>	<b>Percent</b>
Unmarried	5	11.1
Widower	6	13.3
Divorced	4	8.9
Married	30	66.7
<b>Total</b>	<b>45</b>	<b>100.0</b>



**Figure 4.** Distribution of study sample by Marital Status(n = 45).

**Table 5.** Experience in the field of education(n = 45).

	Frequency	Percent
Less than 1yr	4	8.9
1 Yrs. - 10 Yrs.	12	26.7
11 Yrs. - 20 Yrs.	17	37.8
21 Yrs. - 30 Yrs.	10	22.2
31 Yrs. - 40 Yrs.	2	4.4
<b>Total</b>	<b>45</b>	<b>100.0</b>



**Figure 5.** Experience in the field of education(n = 45)

**Table 6.** Demographic characteristics  
Average percent of correct answer:

S.NO	Questions	Average percent of answer	
		YES (Correct)	NO (incorrect)
01	Did you receive a training course in first aid?	35.6%	64.4%
02	Did you face an emergency situation that required first aid in your school?	88.9%	11.1%
03	Did you think that teacher training in first aid is very necessary to save life of the student	88.9%	11.1%
04	Did you think the school environment have a significant role in injuries of students?	74.4%	25.6%

**Table 7.** Definition of First aid (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Immediate medical care.	27	60.6%	5	11.1%	13	28.9%	32	71.1%	4	8.9%	9	20.0%
The first medical procedure to work at the scene of the event to prevent complications.	16	35.6%	25	55.6%	4	8.9%	37	82.2%	6	13.3%	2	4.4%
Initial assistance provided to injured person.	7	15.6%	30	66.7%	8	17.8%	44	97.8%	1	2.2%	0	0.0%
Medical care provided by any trained person.	23	51.1%	12	26.7%	10	22.2%	32	71.1%	10	22.2%	3	6.7%
<b>Average Percent of correct Answer</b>	<b>40.7%</b>						<b>88.4%</b>					

In table (6): Shows that more half (64.4%) of participants didn't you receive a training course in first aid and majority of participants (88.9%) facing and emergency situation that required first aid in your schools and also about (88.9%) of participants think that that teacher training in first aid is very necessary to save life of the student and also most of participants about (74.4%) Saied that school environment has a significant role in injuries of students.

Table(7) : Shows the knowledge of participant regarding definition of first aid, the average correct answer is (40.7%) pre intervention and the average correct answer is (88.4%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (8):Shows the knowledge of participant regarding sign of severe allergic reactions, the average correct answer is (39.9%) pre intervention and the average correct answer is (78.85%) post intervention of first aid

program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (9): Shows the knowledge of participant regarding sign of mild allergic reactions, the average correct answer is (43.9%) pre intervention and the average correct answer is (85.6%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (10): Shows the knowledge of participant regarding first aid of student with Asthma with difficulty in breathing, the average correct answer is (41.1%) pre intervention and the average correct answer is (73.3%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (11): Shows the knowledge of participant regarding first aid of bleeding, the average correct answer is (41.7%) pre intervention and the average correct answer is (75%) post intervention of first aid program, expresses

**Table 8.** Which of the following sign of severe allergic reactions(n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Appearance of rash all over the body.	31	68.9 %	6	13.3 %	8	17.8 %	39	86.7 %	4	8.9 %	2	4.4 %
Pallor.	11	24.4 %	24	53.3 %	10	22.2 %	42	93.3 %	3	6.7 %	0	0.0 %
Dizziness and cyanosis in the extremities of the body and around the mouth.	7	15.6 %	28	62.2 %	10	22.2 %	39	86.7 %	6	13.3 %	0	0.0 %
Loss of consciousness and difficulty of breathing.	12	26.7 %	13	28.9 %	20	44.4 %	21	46.7 %	13	28.9 %	11	24.4 %
<b>Average Percent of correct Answer</b>	<b>33.9%</b>						<b>78.85%</b>					

**Table 9.** Which of the following sign of mild allergic reactions? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Redness and itching in the eyes	32	71.1 %	5	11.1 %	8	17.8 %	42	93.3 %	1	2.2 %	2	4.4 %
Sneezing.	11	24.4 %	25	55.6 %	9	20.0 %	40	88.9 %	5	11.1 %	0	0.0 %
Runny nose.	11	24.4 %	26	57.8 %	8	17.8 %	37	82.2 %	7	15.6 %	1	2.2 %
Rashes on some parts of the body.	25	55.6 %	9	20.0 %	11	24.4 %	35	77.8 %	4	8.9 %	6	13.3 %
<b>Average Percent of correct Answer</b>	<b>43.9%</b>						<b>85.6%</b>					

**Table 10.** What is the first aid for a student who suffers from asthma and has difficulty breathing with a bluish mark on the extremities of his body and an increase in breathing rate? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
The student is referred to an emergency and asthma treatment unit at the school or the nearest health center.	14	31.1 %	11	24.4 %	20	44.4 %	22	48.9 %	13	28.9 %	1	2.2 %

Table 10. Continue

The student is given medication if there are approved medications with him.	14	31.1 %	20	44.4 %	11	24.4 %	35	77.8 %	9	20.0 %	1	2.2 %
Encourage the student to sit quietly and breathe deeply and slowly through the nose and exhale through the mouth.	19	42.2 %	18	40.0 %	8	17.8 %	39	86.7 %	5	11.1 %	1	2.2 %
If the student's condition worsens, you must call an ambulance immediately.	27	60.0 %	5	11.1 %	13	28.9 %	36	80.0 %	2	4.4 %	7	15.6 %
<b>Average Percent of correct Answer</b>	41.1%						73.3%					

Table 11. What is the first aid when there is bleeding that is not controlled by a gauze bandage?(n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Cover the wound with sterile gauze and apply firm pressure with a bandage as a last resort if the bleeding is not stopped by the bandage.	20	44.4 %	13	28.9 %	12	26.7 %	27	60.0 %	12	26.7 %	6	13.3 %
The sterile gauze bandage is covered by a compression bandage to apply pressure to the wound.	16	35.6 %	15	33.3 %	14	31.1 %	37	82.2 %	8	17.8 %	0	0.0 %
The compressor to stop bleeding (tourniquet) is used only in the case of arterial bleeding that is difficult to control with a gauze bandage.	16	35.6 %	24	53.3%	5	11.1 %	40	88.9 %	4	89.9 %	1	2.2 %
Elevate the affected area of the body above the level of the heart	23	51.1 %	13	28.8 %	9	20.00 %	31	68.9 %	11	24.4 %	3	6.7 %
<b>Average Percent of correct Answer</b>	<b>41.7%</b>						<b>75%</b>					

that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table(12): Shows the knowledge of participant regarding first aid a student who unable to breathe and unconscious, the average correct answer is (41.9%) pre

intervention and the average correct answer is (76.7%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (13):Shows the knowledge of participant regarding

**Table 12.** What is the first thing you do if you find a student unable to breathe and unconscious?(n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Verify the scene of the accident and the victim and send another person to contact the emergency unit in the area.	16	35.6 %	12	26.7 %	17	37.8 %	24	53.3 %	12	53.3 %	9	20.0 %
Tilt the head back and raise the chin.	21	46.7 %	16	35.6 %	8	17.8 %	45	100.0 %	0	0.0 %	0	0.0 %
Look, listen, and feel for 5 seconds.	20	44.4 %	17	37.8 %	8	17.8 %	38	84.4 %	6	13.3 %	1	2.2 %
Close the student's nose and open his mouth wide and give the injured student two rescue breaths until the chest rises clearly.	17	37.8 %	15	33.3 %	13	28.9 %	31	68.9 %	9	20.0 %	5	11.1 %
<b>Average Percent of correct Answer</b>	<b>41.9%</b>						<b>76.7%</b>					

**Table 13.** If a student is exposed to a superficial burn, what is first aid?(n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Pour a large amount of cold water on the affected part	23	51.1 %	8	17.8 %	14	31.1 %	38	84.4 %	6	13.3 %	1	2.2 %
Cover the affected area with a damp cloth	16	35.6 %	18	40.0 %	11	24.4 %	42	93.3 %	3	6.7 %	0	0.0 %
Don't use ice	10	22.2 %	17	37.8 %	18	40.0 %	41	91.1 %	3	6.7 %	1	2.2 %
Use a loose, light bandage	11	24.4 %	13	28.9 %	21	46.6 %	25	55.6 %	11	24.4 %	9	20.0 %
<b>Average Percent of correct Answer</b>	<b>33.6%</b>						<b>81.1%</b>					

first aid of student exposed to a superficial burn, the average correct answer is (33.6%) pre intervention and the average correct answer is (81.1%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post) P< 0.001.

Table (14): Shows the knowledge of participant regarding first aid of student exposed to suffocation by a foreign, the average correct answer is (36.7%) pre intervention and the average correct answer is (73.3%) post

intervention of first aid program, expresses that there were significance differences between responders (pre and post) P< 0.001.

Table (15): Shows the knowledge of participant regarding first aid of student suffering from diabetes with sign of hypoglycemia, the average correct answer is (44.5%) pre intervention and the average correct answer is (81.7%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post) P< 0.001.



**Table 14.** What is the first aid if a student is exposed to suffocation by a foreign body or while eating with the inability to speak and the presence of a strange voice and he is conscious? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Place the injured student's back in front of me, wrap it around my arms, and press down on the ribs to release the swallowed object.	10	22.2%	16	35.6%	19	42.2%	22	48.9%	12	26.7%	11	24.4%
Press five times inward until the foreign body is removed.	8	17.8%	26	57.8%	11	24.4%	39	86.7%	6	13.3%	0	0.0%
If the student loses consciousness, perform CPR	26	57.8%	11	24.4%	8	17.8%	42	93.3%	3	6.7%	0	0.0%
Contact the school administration and the student's family	22	48.9%	7	15.6%	16	35.6%	29	64.4%	10	22.2%	6	13.3%
<b>Average Percent of correct Answer</b>	<b>36.7%</b>						<b>73.3%</b>					

**Table 15.** If there is a student in the school suffering from diabetes, and this student suddenly becomes sweating and breathing deeply with a rapid pulse and he is conscious, what first aid do you do? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
I give the student juice	34	75.6%	6	13.3%	5	11.1%	36	80.0%	4	8.9%	5	11.1%
Give instant sweets like chocolate	20	44.4%	24	53.3%	1	2.2%	44	97.8%	1	2.2%	0	0.0%
I give immediate glucose	13	28.9%	24	53.3%	8	17.8%	40	88.9%	5	11.1%	0	0.0%
Contact the school administration and the student's family	13	28.9%	13	28.9%	19	42.2%	27	60.0%	7	15.6%	11	24.4%
<b>Average Percent of correct Answer</b>	<b>44.5%</b>						<b>81.7%</b>					

Table (16):Shows the assessment knowledge of participant regarding first aid of student suffering from diabetes with sign of hypoglycemia, the average correct answer is (44.5%) pre intervention and the average correct answer is (81.7%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (17):Shows the assessment knowledge of participant regarding first aid of student suffering from eye injury with vision impairment, the average correct answer is (38.3%) pre intervention and the average correct answer is (77.2%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

**Table 16.** If you find that a student complains of an unknown foreign body in his ear and this body cannot be seen in the outer ear, what first aid do you do? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
I'm not trying to get the foreign body out	5	11.1%	19	42.2%	21	46.7%	19	42.2%	12	26.7%	14	31.2%
Reassure the injured student	7	15.6%	31	68.9%	7	15.6%	37	82.2%	7	15.6%	1	2.2%
Contact the health unit or ambulance	32	71.1%	8	17.8%	5	11.1%	43	95.6%	2	4.4%	0	0.0%
Contacting the school administration and the student's family	24	53.3%	10	22.2%	11	24.4%	33	73.3%	8	17.8%	4	8.9%
<b>Average Percent of correct Answer</b>	<b>37.8%</b>						<b>73.3%</b>					

**Table 17.** What is the first aid if a student suffers an eye injury with vision impairment and eye scratches? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Do not wash the eyes of the injured student	14	31.1%	14	31.1%	17	37.9%	22	48.9%	15	33.3%	8	17.8%
Cover the eye with a sheet or cover such as a cup to prevent rubbing of the eye	13	28.9%	21	46.7%	11	24.4%	41	91.1%	2	4.4%	2	4.4%
Do not let the student touch his eye completely.	19	42.2%	19	42.2%	7	15.6%	41	9.1%	3	6.7%	1	2.2%
Call an ambulance or health unit whenever possible	23	51.1%	8	17.8%	14	31.1%	35	77.8%	9	20.0%	1	2.2%
<b>Average Percent of correct Answer</b>	<b>38.3%</b>						<b>77.2%</b>					

Table (18): Shows the assessment knowledge of participant regarding first aid of student suffering from presence of a foreign body in his eye like sand, the average correct answer is (35.6%) pre intervention and the average correct answer is (76.1%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (19): Shows the assessment knowledge of participant regarding first aid of student who developed fainting state, the average correct answer is (35%) pre

intervention and the average correct answer is (77.2%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (20): Shows the assessment knowledge of participant regarding first aid of student who has been affected by strain, dislocation or sprains one of his legs, the average correct answer is (39.5%) pre intervention and the average correct answer is (78.3%) post intervention of first aid program, expresses that there were significance differences between responders (pre

**Table 18.** If you find a student suffering from the presence of a foreign body (such as sand) in his eye, what is the first action required of you for this student as a first aid? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Do not let the student touch his eye completely.	19	42.2%	19	42.2%	7	15.6%	27	60.6%	10	22.2%	8	17.8%
Call an ambulance or health unit whenever possible	23	51.1%	8	17.8%	14	31.1%	37	82.2%	5	11.1%	3	6.7%
Do not let the student rub the eye with his fingers.	12	26.7%	21	46.7%	12	26.7%	42	93.3%	2	4.4%	1	2.2%
Have the student lie on his side and tilt his head toward the affected eye	10	22.2%	30	66.7%	5	11.1%	31	68.9%	11	24.4%	3	6.7%
<b>Average Percent of correct Answer</b>	<b>35.6%</b>						<b>76.1%</b>					

**Table 19.** What is the first thing you do if a student developed fainting state and does not regain consciousness immediately and without any visible injury to his body? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Keep the student in a flat position or lying on his back	20	44.4%	19	42.2%	6	13.3%	38	84.4%	7	15.6%	0	0.0%
Raise the student's feet.	27	60.0%	12	26.7%	6	13.3%	44	97.8%	1	2.2%	0	0.0%
Loosen the clothes around the neck and waist.	7	15.6%	28	62.2%	10	22.2%	38	84.4%	6	13.3%	1	2.2%
Keep the airway clean and do not give anything by mouth	9	20.0%	19	42.2%	17	37.8%	19	42.2%	13	28.9%	13	28.9%
<b>Average Percent of correct Answer</b>	<b>35%</b>						<b>77.2%</b>					

and post)  $P < 0.001$ .

Table (21): Shows the assessment knowledge of participant regarding first aid of student suffers from head

injury, the average correct answer is (39.5%) pre intervention and the average correct answer is (73.9%) post intervention of first aid program, expresses that

**Table 20.** What is the first aid for a student who has been affected by strain, dislocation or sprains one of his legs? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Do not allow the student to put his weight on the injured part or try to use the injured part	10	22.2 %	13	28.9 %	22	48.9 %	23	51.1 %	12	26.7 %	10	22.2 %
Support and gently lift the affected part, if possible.	22	48.9 %	16	35.6 %	7	15.6 %	44	97.8 %	0	0.0 %	1	22.2 %
Putting a piece of ice to reduce swelling.	25	55.6 %	13	28.9 %	7	15.6 %	45	100.0 %	0	0.0 %	0	0.0 %
Contacting the school administration and the student's family	14	31.1 %	12	26.9 %	19	42.2 %	29	64.4 %	7	15.6 %	9	20.0 %
<b>Average Percent of correct Answer</b>	<b>39.5%</b>						<b>78.3%</b>					

**Table 21.** What do you do if a student suffers from head injury with irritability and vomiting? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Tilt the head and body of the student to one side while keeping the head and neck in a straight position with the student's body.	14	31.1 %	19	42.2 %	12	26.7 %	37	82.2 %	4	8.9 %	4	8.9 %
Call an ambulance	35	77.8 %	7	15.6 %	3	6.7 %	43	95.6 %	2	4.4 %	0	0.0 %
Check breathing by looking at the movement of the chest and listening for breathing as well as feeling the pulse by touch.	15	33.3 %	20	44.4 %	10	22.2 %	38	84.4 %	6	13.3 %	1	2.2 %
If the student stops breathing, give artificial respiration (rescue breath).	7	15.6 %	22	48.9 %	16	35.6 %	15	33.5 %	17	37.8 %	13	28.9 %
<b>Average Percent of correct Answer</b>	<b>39.5%</b>						<b>73.9%</b>					

there were significance differences between responders (pre and post)  $P < 0.001$ .  
 Table (22): Shows the assessment knowledge of participant regarding first aid of student has injury in his neck or back, the average correct answer is (33.3%) pre

intervention and the average correct answer is (75.6%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .  
 Table (23): Shows the assessment knowledge of parti-

**Table 22.** If you suspect that a student has injured his neck or back, you must: (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Ask the student to lie on his back.	10	22.2%	20	44.4%	15	33.3%	22	48.9%	16	35.6%	7	15.6%
A cloth support is placed on either side of the head to prevent neck movement.	10	22.2%	25	55.6%	10	22.2%	41	91.1%	3	6.7%	1	2.2%
Try not to move the neck and back until the arrival of the ambulance.	13	28.9%	24	53.3%	8	17.8%	39	86.7%	5	11.1%	1	2.2%
Call the ambulance or health unit	27	60.0%	13	28.9%	5	11.1%	34	75.6%	5	11.1%	6	13.3%
<b>Average Percent of correct Answer</b>	<b>33.3%</b>						<b>75.6%</b>					

**Table 23.** If a student accidentally ingests a chemical or toxic substance, what is first aid? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
If there is a poison center, you should contact it and follow the instructions.	6	13.3%	13	28.9%	26	57.8%	15	33.3%	13	28.9%	17	37.8%
Do not help a student vomit unless instructed by the area poison control center.	1	2.2%	30	66.7%	14	31.1%	30	66.7%	14	31.1%	1	2.2%
call an ambulance	35	77.8%	4	8.9%	6	13.3%	40	88.9%	4	8.9%	1	2.2%
Send a sample of the causative substance or vomit to find out the poisoning substance	18	40.0%	10	22.2%	17	37.8%	38	84.4%	3	6.7%	4	8.9%
<b>Average Percent of correct Answer</b>	<b>33.3%</b>						<b>68.3%</b>					

participant regarding first aid of student who ingest a chemical or toxic substance, the average correct answer is (33.3%) pre intervention and the average correct answer is (68.3%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (24): Shows the assessment knowledge of participant regarding first aid of student who had recurrent seizures of unknown cause, the average correct answer is (36.1%) pre intervention and the average correct answer is (75%) post intervention of first aid

program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ . Table (25): Shows the assessment knowledge of participant regarding sign of shock, the average correct answer is (47.2%) pre intervention and the average correct answer is (83.9%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ . Table (27): Shows the assessment knowledge of participant regarding infection control during first aid proving, the average correct answer is (42.7%) pre

**Table 24.** One of the students had recurrent seizures of unknown cause and the interval between each seizure and the other was less than five minutes. What do you do as a first aid? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
The student is referred to the health care office	11	24.4 %	11	24.4 %	23	51.1 %	22	48.9 %	13	28.9 %	10	22.2 %
After the seizure stops, the airway must be kept clean	10	22.2 %	23	51.1 %	12	26.7 %	38	84.4 %	6	13.3 %	1	2.2 %
Do not place a pillow under the injured student's head	12	26.7 %	26	57.8 %	7	15.6 %	40	88.9 %	4	8.9 %	1	2.2 %
Call an ambulance immediately	32	71.7 %	6	13.3 %	7	15.6 %	35	77.8 %	6	13.3 %	4	8.9 %
<b>Average Percent of correct Answer</b>	<b>36.1%</b>						<b>75%</b>					

**Table 25.** Signs of shock include. (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Cold body of the student or the injured	20	44.4 %	11	24.4 %	14	31.1 %	30	66.7 %	9	20.0 %	6	13.3 %
Nausea and dizziness	26	57.8 %	14	31.1 %	5	11.1 %	39	86.7 %	2	4.4 %	4	8.9 %
The pulse is fast but weak	19	42.2 %	23	51.1 %	3	6.7 %	44	97.8 %	1	2.2 %	0	0.0 %
Rapid breathing	20	44.4 %	16	35.6 %	9	20.0 %	38	84.4 %	5	11.1 %	2	4.4 %
<b>Average Percent of correct Answer</b>	<b>47.2%</b>						<b>83.9%</b>					

**Table 26.** What is the first aid you do if you find a student unconscious for no apparent causes, such as a wound? (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Keeps the student lying on the ground or in a flat place.	10	22.2 %	12	26.7 %	23	51.1 %	33	73.3 %	10	22.2 %	2	4.4 %

Table 26. Continue

Raise the feet 8 to 10 inches	18	40.0 %	15	33.3 %	12	26.7 %	41	91.1 %	3	6.7 %	1	2.2 %
Loosen the clothes around the neck and waist.	18	40.0 %	17	37.8 %	10	22.2 %	38	84.4 %	6	13.3 %	1	2.2 %
Keep the airway clean and call an ambulance	17	37.8 %	15	33.3 %	13	28.9 %	21	46.7 %	11	24.4 %	13	28.9 %
<b>Average Percent of correct Answer</b>		<b>35%</b>						<b>73.9%</b>				

Table 27. The most effective measure to reduce the spread of germs for a first aid provider is: (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Turn off the main power switch.	24	53.3 %	11	24.4 %	10	22.2 %	30	66.7 %	14	31.1 %	1	2.2 %
Check the pulse.	12	26.7 %	21	46.7 %	12	26.7 %	44	97.8 %	1	2.2 %	0	0.0 %
CPR if needed.	18	40.0 %	18	40.0 %	9	20.0 %	38	84.4 %	6	13.3 %	1	2.2 %
Call an ambulance immediately.	23	51.1 %	8	17.8 %	14	31.1 %	32	71.1 %	6	13.3 %	7	15.6 %
<b>Average Percent of correct Answer</b>		<b>42.7%</b>						<b>83.9%</b>				

intervention and the average correct answer is (83.9%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$

Table (26):Shows the assessment knowledge of participant regarding first aid of student exposed to electrical socket, the average correct answer is (42.8%) pre intervention and the average correct answer is (80.0%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

Table (29): Shows the assessment knowledge of participant regarding first aid of student who develop nosebleed or epistaxis, the average correct answer is (40.4%) pre intervention and the average correct answer is (76%) post intervention of first aid program, expresses that there were significance differences between responders (pre and post)  $P < 0.001$ .

### Knowledge Score

For each respondent we take the sum of all variables with correct answer of that knowledge and divide it by the maximum number (92) expressed as percentage so the knowledge score can reach maximum value of 100 if all answers of that knowledge are correct.

The knowledge score has been categorized into three groups as: Inadequate (0 - 49.9), Moderately adequate (50 - 74) and adequate (75 - 100).

**In table (30):**shows in pre-test out 45 teachers 44 (97.8%) of them are having inadequate knowledge, 1 (2.2%) of them are having moderate knowledge and 0 (0.0%) of them are having adequate knowledge regarding first aid management. In posttest out 45 teachers 0 (0.00%) of them are having inadequate knowledge, 08(17.8%) of them are having moderate knowledge and 37 (82.2%) of them are having adequate knowledge

**Table 28.** First aid of child exposed to electrical socket in his classroom when the switch is on and has been electrocuted(n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Turn off the main power switch.	24	53.3 %	11	24.4 %	10	22.2 %	30	66.7 %	14	31.1 %	1	2.2 %
Check the pulse.	12	26.7 %	21	46.7 %	12	26.7 %	44	97.8 %	1	2.2 %	0	0.0 %
CPR if needed.	18	40.0 %	18	40.0 %	9	20.0 %	38	84.4 %	6	13.3 %	1	2.2 %
Call an ambulance immediately.	23	51.1 %	8	17.8 %	14	31.1 %	32	71.1 %	6	13.3 %	7	13.3 %
<b>Average Percent of correct Answer</b>	<b>42.8%</b>						<b>80.0%</b>					

**Table 29.** First aid for nosebleeds in children is: (n = 45)

	Pre						Post					
	True		I don't Know		False		True		I don't Know		False	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Keep the student seated and leaning forward.	25	55.6 %	12	27.7 %	8	17.8 %	36	80.0 %	8	17.8 %	1	2.2 %
Press the nose for five minutes.	27	60.0 %	10	22.2 %	8	17.8 %	42	93.3 %	3	6.7 %	0	0.0 %
Putting compresses on the nose and the front of the head.	8	17.8 %	19	42.2 %	18	40.0 %	40	88.9 %	5	11.1 %	0	0.0 %
Contact the health unit if the bleeding continues.	12	26.7 %	10	22.2 %	23	51.1 %	19	42.2 %	16	35.6 %	10	22.2 %
<b>Average Percent of correct Answer</b>	<b>40.0%</b>						<b>76.1%</b>					

**Table 30.** Knowledge category pre and post

	Pre		Post	
	Frequency	Percent	Frequency	Percent
Inadequate	44	97.8%	0.0	0.0%
Moderately adequate	1	2.2%	8	17.8%
Adequate	0	0.0%	37	82.2%
Total	45	100.0%	45	100.0%



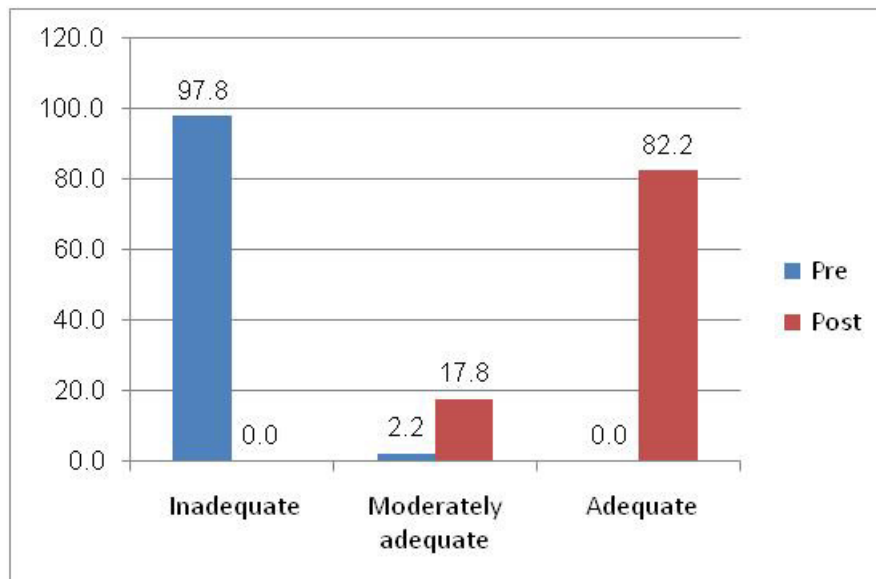


Figure 6. Knowledge category pre and post

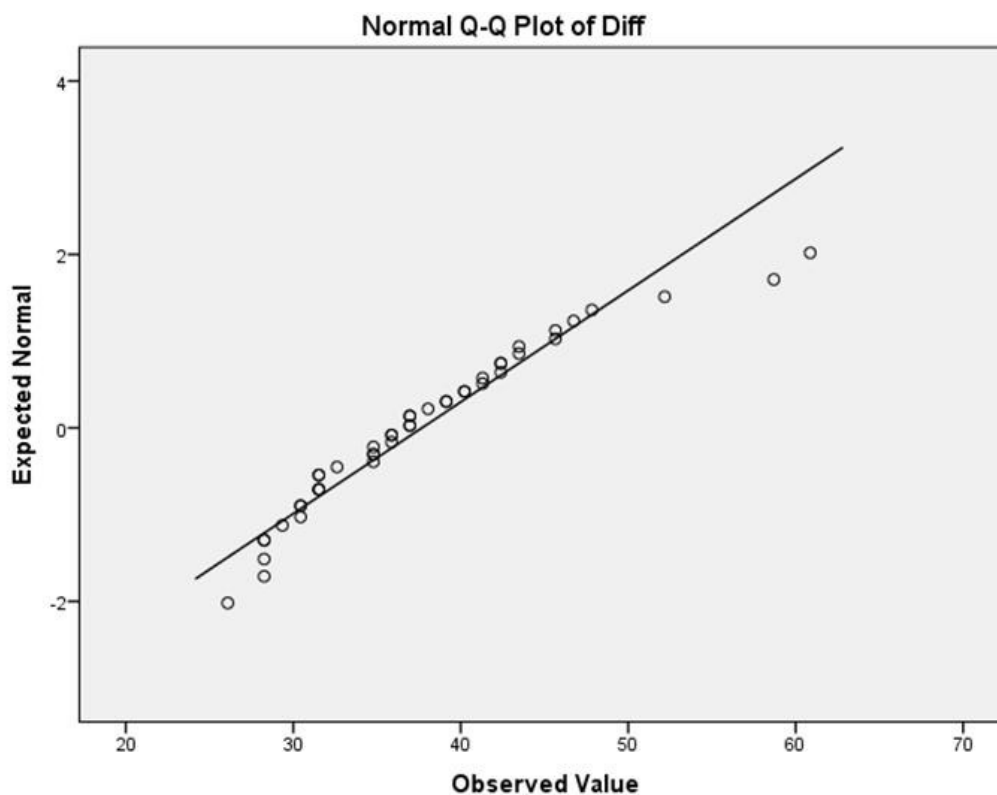


Figure 7. Q – Q plot for difference in knowledge score

regarding first aid management.

Figure (6): shows in pre-test out 45 teachers 44 (97.8%) of them are having inadequate knowledge, 1 (2.2%) of them are having moderate knowledge and 0 (0.0%) of them are having adequate knowledge regarding

first aid management. In posttest out 45 teachers 0 (0.00%) of them are having inadequate knowledge, 08(17.8%) of them are having moderate knowledge and 37 (82.2%) of them are having adequate knowledge regarding first aid management.

**Table 31.** Paired sample t-test of knowledge score

	Mean	N	Std. Deviation	t	P-Value
Knowledge score pre	39.57	45	6.82119	32.53	<0.001
Knowledge score post	77.25	45	3.52519		

**Table 32.** First aid of minor injuries. (n = 45)

	Pre				Post			
	Done		Not Done		Done		Not Done	
	Count	%	Count	%	Count	%	Count	%
. Hand washing	32	71.1%	13	28.9%	31	68.9%	14	31.1%
Wear gloves.	24	53.3%	21	46.7%	38	84.4%	7	15.6%
Clean the wound with clean gauze to check for a foreign object.	4	8.9%	40	88.9%	39	86.7%	6	13.3%
Wash the wound with soap and water for at least a minute	7	15.6%	38	84.4%	43	95.6%	2	4.4%
Place an appropriate antiseptic, such as iodine, by using cotton	15	33.3%	30	66.7%	43	95.6%	2	4.4%
Stop venous hemorrhage by raising the affected site higher than the heart level.	13	28.9%	32	71.1%	38	84.4%	7	15.6%
Cover the wound with a clean bandage.	37	82.2%	8	17.8%	33	73.3%	12	26.7%
<b>Average Percent of correct Answer</b>	<b>41.9%</b>				<b>84.12%</b>			

**Table 33.** For first aid and emergency in case of not breathing (unconscious). (n = 45)

	Pre				Post			
	Done		Not Done		Done		Not Done	
	Count	%	Count	%	Count	%	Count	%
Check the victim's location.	19	42.2%	26	57.8%	33	73.3%	12	26.7%
Send someone else to call the ambulance.	16	35.6%	29	64.4%	40	88.9%	5	11.1%
Look, listen for breathing and feel pulse for 5 minutes	2	4.4%	43	95.6%	44	97.8%	1	2.2%
Close the student's nose and open his mouth wide.	1	2.2%	44	97.8%	43	95.6%	2	4.4%
Give the student two batches of breath until his chest rises clearly	4	8.9%	41	91.1%	45	100%	0	0.0%
Check for a response (movement - cough) for 10 seconds	16	35.6%	29	64.4%	37	82.2%	8	17.8%
<b>Average Percent of correct Answer</b>	<b>21.5%</b>				<b>89.6%</b>			

### Normality test of knowledge score

Before conducting paired sample t-test, it is must to test normality of the difference between pre and post knowledge score which is the main assumption of t-test. The Kolmogorov-Smirnova test of normality showed that

data of knowledge score difference is normally distributed since p-value = 0.165 which is greater than 0.05.

It is observed that from the above figure data is normally distributed since most points are on or closer to normality line.

Table 31. shows that the pre-test knowledge scores of

**Table 34.** First aid and emergency in case of suffocation (not unconscious). (n = 45)

	Pre				Post			
	Done		Not Done		Done		Not Done	
	Count	%	Count	%	Count	%	Count	%
Make the student's back front me and make my arm around the student and press down the ribs to remove the foreign body.	8	17.8%	37	82.2%	34	75.6%	11	24.4%
Press five times inward until you remove the foreign body	7	15.6%	38	84.4%	34	75.6%	11	24.4%
<b>Average Percent of correct Answer</b>	<b>16.7%</b>				<b>75.6%</b>			

**Table 35.** First aid and emergency in case of suffocation (unconscious). (n = 45)

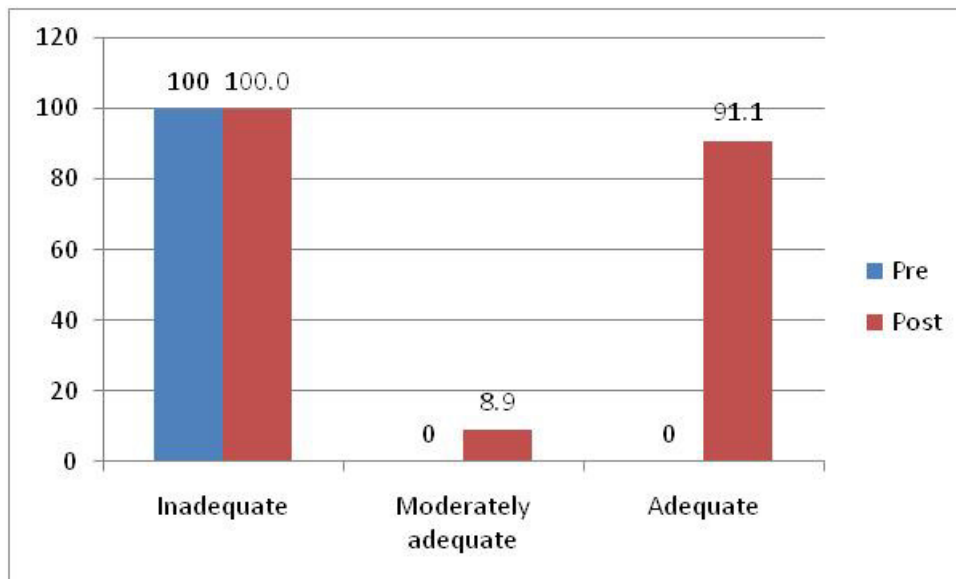
	Pre				Post			
	Done		Not Done		Done		Not Done	
	Count	%	Count	%	Count	%	Count	%
Call the ambulance.	42	93.3%	3	6.7%	32	71.1%	13	28.9%
The student is placed on the back with support the neck and head.	29	64.4%	16	35.6%	36	80.0%	9	20.0%
Open the airway by lifting the jaw and tilting the head back	1	2.2%	44	97.8%	43	95.6%	2	4.4%
Look, listen and feel the breathing for 3 to 5 seconds	2	4.4%	43	95.6%	43	95.6%	2	4.4%
Give artificial breathing	2	11.1%	43	95.6%	41	91.1%	4	8.9%
If you fail to give artificial respiration replace the student by lifting the jaw and tilting the head.	5	2.2%	40	88.9%	29	64.4%	16	35.6%
Sit on your knees parallel to the pelvic area of the victim	1	2.2%	44	97.8%	43	95.6%	2	4.4%
Place the injured hands on the area just above the navel and below the diaphragm.	1	2.2%	44	97.8%	41	91.1%	4	8.9%
I press the abdomen to try to get out the foreign body from the throat	1	6.7%	44	97.8%	43	95.6%	2	4.4%
Check the presence of the foreign body by moving the lower jaw and lowering the tongue to see the foreign body.	3	64.4%	42	93.3%	38	84.4%	7	15.6%
Try to remove the foreign body if it is seen	29	60.0%	16	35.6%	30	66.7%	15	33.3%
Try to squeeze the abdomen and make artificial breathing until you remove the foreign body.	27	60.0%	18	40.4%	30	66.7%	15	33.3%
<b>Average Percent of correct Answer</b>	<b>26.4%</b>				<b>83.2%</b>			

teachers provide data like Mean, 39.57 and Standard deviation 6.82119. The post-test knowledge score provide data with Mean 77.25 and Standard Deviation was 3.52519. Compared to the pre-test and post-test the knowledge had increased. Paired t value in pre-test and

post-test knowledge of teachers is 32.53, which is significant at 0.05 levels and The mean of knowledge score post intervention 77.25 is higher than pre intervention. It shows the effect of structured teaching program.

**Table 36.** Cardiopulmonary resuscitation (CPR): (n = 45)

	Pre				Post			
	Done		Not Done		Done		Not Done	
	Count	%	Count	%	Count	%	Count	%
Call the ambulance.	21	46.7%	24	53.3%	30	66.7%	15	33.3%
Head tilt, chin lift and observe breathing.	5	11.1%	40	88.9%	44	97.8%	1	2.2%
Give two doses of breathing (from mouth to mouth).	6	13.3%	39	86.7%	45	100.0%	0	0.0%
Place your hand in the middle of the chest	25	55.6%	20	44.4%	44	97.8%	1	2.2%
Push the chest 2 inches (30 times).	35	77.8%	10	22.2%	42	93.3%	3	6.7%
<b>Average Percent of correct Answer</b>	<b>40.9%</b>				<b>91.12%</b>			



**Figure 8.** Practice category

The results of paired sample t-test show that there is highly significant difference between knowledge score pre and post intervention since p-value <0.001. The mean of knowledge score post intervention 77.25 is higher than pre intervention.

The practice score has been categorized into three groups as:

- Inadequate:** 0 to 49.9
- Moderately adequate:** 50 to 74
- Adequate:** 75 to 100

**PRACTICE**

**Practice Score**

For each respondent we take the sum of all variables with correct answer of that practice (done correctly) and divide it by the maximum number (32) expressed as percentage so the knowledge score can reach maximum value of 100 if all answers of that practice are correct.

	Pre		Post	
	Frequency	Percentage	Frequency	Percentage
Inadequate	45	100%	0.0	00.0%
Moderately adequate	0.0	00.0%	4.0	8.9%
Adequate	0.0	00.0%	41.0	91.1%
<b>Total</b>	45.0	100	45.0	100.

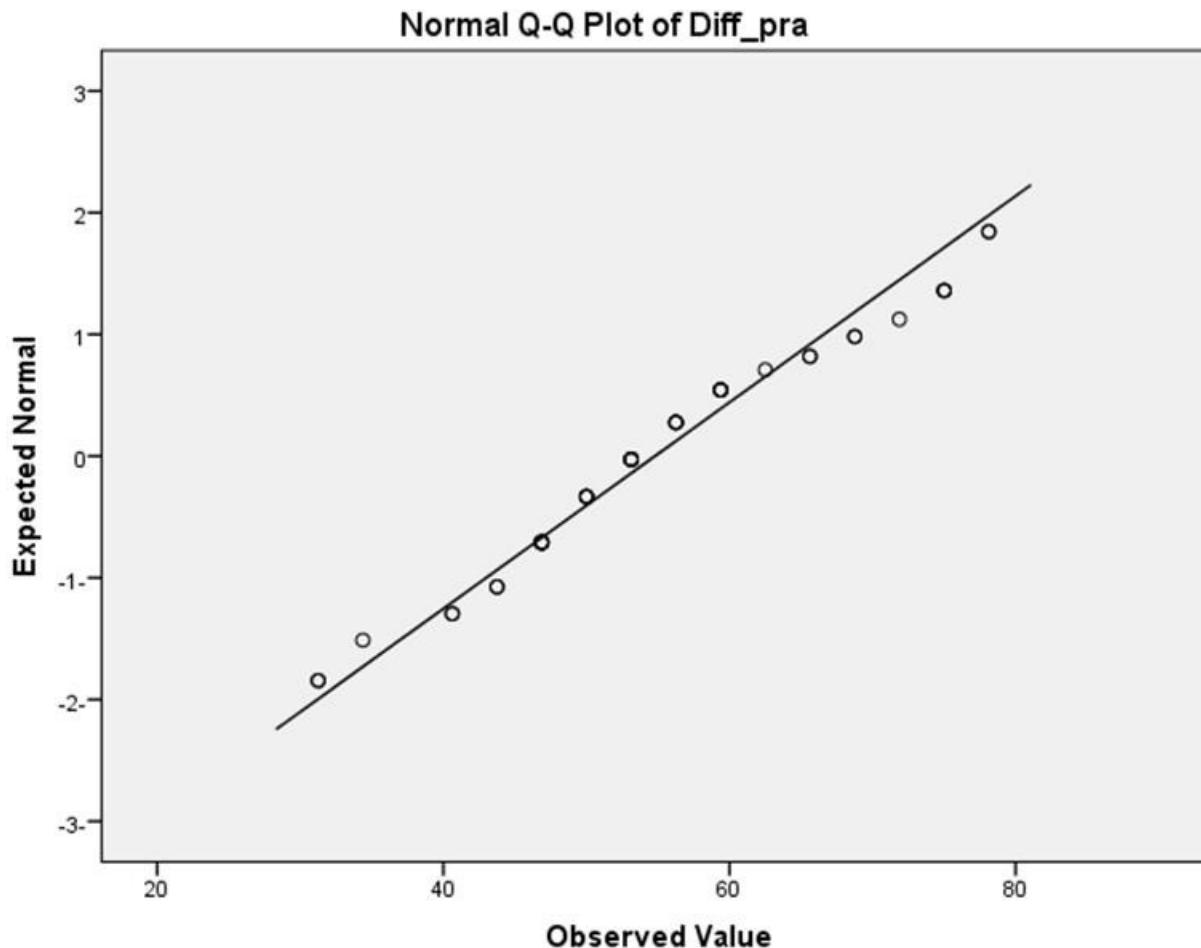


Figure 9. Q – Q plot for difference in practice score

### Normality test of practice score

Before conducting paired sample t-test, it is must to test normality of the difference between pre and post practice score which is the main assumption of t-test.

The Kolmogorov-Smirnova test of normality showed that data of practice score difference is normally distributed since p-value = 0.137 which is greater than 0.05.

It is observed that from the above figure data is normally distributed since most points are on or closer to normality line. Table 37

The results of paired sample t-test show highly significant difference in practice score pre and post intervention since p-value < 0.001.

The mean of practice score post intervention is 85.35 compared to only 30.56 pre intervention

### Analysis of Correlation

There is no significant correlation between education and

practice score pre and post since p-value > 0.05, also there is no significant correlation between years of experience and practice score pre and post since p-value > 0.05. Table 38

The results of paired sample t-test show highly significant difference in practice score pre and post intervention since p-value < 0.001.

The mean of practice score post intervention is 85.35 compared to only 30.56 pre intervention

### Analysis of Correlation

Spearman rank correlation is used to measure the relationship between education, experience and knowledge score pre and post.

There is no significant correlation between education and knowledge score pre and post since p-value > 0.05, also there is no significant correlation between years of experience and knowledge score pre and post since p-value > 0.05

**Table 37.** Practice category

	Mean	N	Std. Deviation	t	P-Value	P-Value
Practice score pre	30.56	45	8.61	31.15100	<0.001	<0.001
Practice score post	85.35	45	7.29			

**Table 38.** Spearman rank correlation between education, experience and practice score pre and post(n = 45)

			Education	Experience in the field of education
Level of Education	Correlation Coefficient		1.000	.420**
	Sig. (2-tailed)		.	.004
	N		45	45
Experience in the field of education	Correlation Coefficient		.420**	1.000
	Sig. (2-tailed)		.004	.
	N		45	45
Spearman's rho	Practice score pre	Correlation Coefficient	-.010-	.023
		Sig. (2-tailed)	.951	.882
		N	45	45
	Practice score post	Correlation Coefficient	.199	.339
		Sig. (2-tailed)	.189	.023
		N	45	45

**Table 39.** Paired sample t-test of practice score: (n = 45)

	Mean	N	Std. Deviation	t	P-Value
Practice score pre	30.56	45	8.61	31.15100	<0.001
Practice score Post	85.35	45	7.29		

**Table 40.** Spearman rank correlation between experience, education and knowledge score pre and post

			Education	Experience in the field of education
Level of Education	Correlation Coefficient		1.000	.420**
	Sig. (2-tailed)		.	.004
	N		45	45
Experience in the field of education	Correlation Coefficient		.420**	1.000
	Sig. (2-tailed)		.004	.
	N		45	45
Spearman's rho	Knowledge score pre	Correlation Coefficient	-.217	-.051
		Sig. (2-tailed)	.152	.739
		N	45	45
	Knowledge score post	Correlation Coefficient	-.052	.047
		Sig. (2-tailed)	.733	.761
		N	45	45

## DISCUSSION

Based on the information on that is currently accessible, there are very few studies conducted in this topic in Sudan. And the majority of national and international studies that have been published have found that school teachers are not knowledgeable in first aid and are thus unprepared to handle situations involving injured in

school<sup>(5)</sup>, and therefore unable to deal with the cases of injured student in school environment.

The purpose of this study was to evaluate the research hypothesis, which states that basic school teachers' first aid knowledge and skills will improve with the implementation of a training program. The study's findings support this theory because teachers' knowledge increased dramatically and their abilities also improved

as a result of this information.

Forty-five participants were chosen to take part in the program in this study; no participants were dropped or excluded, therefore 45 teachers remained in the program until the post-test was completed.

The study's conclusions are described in the sections that follow: **A) Demographic characteristics B) Baseline assessment of teachers' first aid knowledge and skills regarding first aid C) Testing of hypotheses**

### **A- Demographic characteristics**

The results of this study showed that there were more female participants than male participants. This conclusion may be explained by the fact that most basic school teachers in most other nations are women (17). From the perspective of the researcher, these results may indicate that women are more inclined than men to enroll in a first aid program and that they want to learn everything there is to know about first aid and school injuries. They also want to know how to handle everyday incidents that happen to them at home.

The result show that twenty four percent is greater number of responders are between (31 – 40) years old, at this age teachers had good experience in education and deal with the injuries that may occurs in school environment, the upper age limited same as study done by Gaikwad Grace Garten at India, most of responders age (31-40) years with (26%)(25), also similar result of Non-experimental Descriptive study design conduct by Shradha Gachche et al (2019) Reveals that most of the teachers were from the age group of between 31 years to 40 years of age<sup>(26)</sup>.

According to Saad Mohammed et al. (2018), who investigated "Training of first aid for teachers of primary schools at Ismailia city – Egypt," two thirds of the teachers had bachelor's degrees, which is consistent with the findings of the current study, which show that more than half of the teachers (51%) had a bachelor's degree (27).(28). The findings show that 60% of respondents are married, which is in line with research published in 2017 by Neama Mohamed El Magrabi et al., who found that 85% of respondents are married after conducting a quasi-experimental study in Assiut City, Egypt.(29).

Selman Hussain Faris et al.'s (2019) comparable cross-sectional descriptive study conducted in Iraq found that 48.3% of the study sample, or 79% of the sample, had 10-29 years of experience in teaching. Thirty-seven percent of the study's participants had greater teaching experience—between 11 and 20 years(30).

In the current study, over half of the teachers were found to have not previously attended training courses on accident prevention and first aid; this finding was consistent with Shaima Shaban Mohamad et al (2018) findings. They found that more than half of the studied

teachers didn't attend training course of first aid before (31)., The current study's findings were consistent with a quasi-experimental study conducted in Egypt by Shereen Ahmed et al. (2021) that evaluated the effectiveness of a first aid training program package on teacher performance at secondary industrial technical schools. The study found that 86% of the teachers had never received any first aid training(20), The majority of participants in the current study (88.9%) reported having encountered an emergency requiring first aid at their schools. This is consistent with a cross-sectional study conducted in Ethiopia by Wubet Taklual et al. (2020), which found that 75.5% of participants had encountered a kid in need of first aid. (32). Additionally, the majority of participants (74.4%) stated that the school environment has a big influence in student injuries, and roughly (88.9%) thought that teacher training in first aid is extremely vital to save a student's life.

The present study's results, which examined the relationship between the teachers' practices and their demographic characteristics, showed that there was no statistically significant correlation between the teachers' pre- and post-knowledge and their experiences; additionally, there was no significant relationship between years of experience and knowledge score pre- and post-since  $p$ -value  $> 0.05$  and between education and knowledge score pre- and post-since  $p$ -value  $> 0.05$ .

### **B- Baseline assessment of teachers' knowledge and practice regarding first aid:**

#### **1) Baseline knowledge assessment:**

Baseline knowledge assessment: After the program was implemented, there was an improvement in the average percentage of correct answers for the majority of first aid knowledge items as well as in the total mean scores of knowledge, with statistically significant differences at ( $p$ -value 0.0001) between the pretest and immediate post-test, according to the current study.

The knowledge scorer of population in the study has been categorized into three groups as inadequate (0-49), moderately adequate (50 – 74) and adequate (75-100) (33) , so pre-and post-intervention knowledge scores improved for all 45 primary school teachers in the study, with the majority having inadequate (poor) knowledge (97.8%), moderately adequate knowledge (2.2%), and adequate knowledge (0.0%). These findings were corroborated by Santhosh Kumar J in India (2019) when evaluating the impact of a planned teaching program on knowledge. In reference to Safety and First Aid Procedures for Specific Emergency Situations Among Teachers, the findings indicated that prior to and following the intervention, there was an improvement in the knowledge scores for inadequate (0.0%), moderately

adequate (73.6%), and adequate (59.9%) responses (33). (0.0%), somewhat sufficient (0.0%), and fully sufficient (100%)(33).

These results are consistent with those of Arli Senay Karadag (2017), who investigated the effects of basic first aid education on teachers' knowledge level using a pretest-posttest control group design. The study found a significant difference between the pretest and posttest scores of the experimental group ( $z = -4.215$ ,  $p < 0.01$ ). This outcome suggests that the experimental group's first aid instruction was successful.

<sup>(21)</sup>. Additional cross-sectional A 2019 study by Yossra Kalaf Hanoon revealed that 77% of teachers lacked basic first aid knowledge<sup>(5)</sup>.

This research was in conflict with that of Nour Eldaim Elnoman et al. (2019), who in order to evaluate the knowledge, attitude, and practice (KAP) of 384 primary school teachers in 32 schools in the Bahri location of Sudan, a descriptive cross-sectional study was conducted. The results showed that 44% of teachers had good knowledge<sup>(12)</sup>. According to research conducted by Dr. Anuradha, S. (2018), who examined the impact of a structured teaching program on first aid management among high school teachers at Piler, Andhra Pradesh, India, the pre-test mean score of knowledge in the current study was 39.57, while the post-test mean score of 77.25 indicates a significant increase in knowledge on first aid management. The author further reports that the pre-test mean score of 18.27, as opposed to the post-test mean score of 28.67, indicates a significant increase in knowledge on first aid management<sup>(15)</sup>.

. In order to evaluate nursery school teachers' knowledge and practices regarding first aid measures for common childhood accidents, a pre/post research design was implemented in nursery schools representing Minia city, Egypt, according to Shaima Shaban Mohamad et al. (2018). The study concluded that there was an observed increase in the teachers' knowledge and practices regarding first aid following program implementation<sup>(31)</sup>.

A further study is in a cross-sectional study design, Jemebere et al. (2022) evaluated first aid knowledge and related factors among governmental primary school teachers in Hawassa, Southern Ethiopia. Their findings were consistent with the current study, which found that 172 (76.8%) of the teachers in primary schools lacked knowledge of first aid (34). Since  $p\text{-value} > 0.05$ , there is no significant link found in the correlation study between years of experience and knowledge score pre and post, nor between education and knowledge score pre and post. when doing an analysis of correlation.

### Baseline Practice assessment

Baseline Practice Assessment: Our research showed that, in the immediate posttest compared to the pretest,

there was a highly statistically significant difference in the studied teachers' performance regarding common first aid scenarios, such as minor injuries, cases of not breathing with unconscious state, suffocation with conscious and unconscious child, and performance in CPR and total first aid practice.

Shaima Shaban Mohamad et al. (2018) conducted a pre/post research study to assess the knowledge and practice of Nursery School Teachers in Egypt. The study found that the total mean scores of practices after implementation of the program with statistically significant differences at ( $p\text{-value} 0.0001$ ) between pretest, immediate posttest. The study confirmed that: the mean of overall initial practice assessment for the study group was  $(85.35 \pm 7.29)$  post intervention compared to only  $(30.56 \pm 8.61)$  pre intervention. The results of the paired sample t. test show a highly significant difference in practice score pre and post intervention since  $P\text{-value} < 0.001$ .

The absence of effective emergency care training practices in the curriculum of quality education, the lack of first aid teacher training programs in primary schools, the dearth of instructional materials such as instructional posters or films that demonstrate first aid procedures, and the shortage of supplies and equipment in Sudan's designated in primary schools can all be blamed for the lack of first aid knowledge and practices among teachers in the pre-test.

The study's findings were corroborated by El-Wardany et al. (2017), who found statistically significant differences in the preparatory school teachers' performance levels ( $p\text{-value} = .000^*$ ). Their study focused on the impact of a training program regarding first aid knowledge and practices among teachers in Assiut City.(29).

The study's findings were incongruent with Nour Eldaim Elnoman Elbadawi et al. (2019) conducted a descriptive cross-sectional study to evaluate the knowledge, attitude, and practice (KAP) of 384 primary school teachers in 32 schools in the Bahri locality of Sudan. The study's findings regarding the practice section showed that roughly 34% of the participants had contact with pediatric emergencies..<sup>(12)</sup>. During studying correlation between the teachers' practice and their demographic characteristics the present study results revealed there is no significant correlation between education and practice score pre and post since  $p\text{-value} > 0.05$ , also there is no significant correlation between years of experience and practice score pre and post since  $p\text{-value} (> 0.05)$ .

### C- Hypothesis testing

$H_0-1$ =There will be no difference between pre-program test and post program-test mean knowledge scores regarding first aid program for primary school teachers at



selected governmental basic school.

Given that there was a significant difference in the mean knowledge scores of basic school teachers' first aid program between the pre- and post-program tests, the alternative hypothesis is accepted and the null hypothesis is rejected. The paired t value for teachers' pre- and post-test knowledge is 32.53, which is significant at 0.05 levels (P value). The pre-program test mean knowledge score of 39.57 climbed to 77.25 at the post program exam.

## CONCLUSIONS

\*There were no statistically significant differences existing between the groups (pre. and post test) with regard to demographic characteristics variables.

\*More than half of the participants did not receive any training at all.

\*The assessed base line level of participants' first aid knowledge and practice was inadequate.

\*The degree of knowledge exceeded the degree of practical skill. This could be because most teachers have not been in life-threatening situations when they needed first aid; it could also be because they lack confidence in themselves in such situations and are afraid of first aid procedures.

\*The training program was designed and executed, and its efficacy was evaluated via a single test subsequent to its implementation.

\*The program helped basic school teachers acquire new skills and knowledge, as evidenced by the highly statistically significant differences (P value <0.001) between pre- and post-program intervention.

\*The participants expressed great gratitude for the theoretical and practical training, which clarified many of the things they had not known before. Their ability to administer first aid will increase as a result.

## RECOMMENDATIONS

\*Recommendations to the Federal Ministry of Health: The Department of School Health ought to offer ongoing instruction and training programs on first aid to educators in order to facilitate the prompt handling of injuries and crises.

\*Recommendations made to Sudan's Ministry of Education: First aid procedures and knowledge has to be included in the curricula of school health.

\*To the local department of education:

\*The schools that were visited during the study period lacked a clinic or first aid station to handle students in case of medical emergencies, so efforts should be made and instructional materials like booklets and posters should be sent to both teachers and students.

\*To enhance their first aid knowledge and skills, teachers should receive posters, brochures, maps, equipment, and supplies from the school administration.

\*In similar settings, researchers should set up health education and training programs to improve the first aid knowledge and abilities of elementary school teachers.

\*Strongly urge the Local Government and Ministry of Education to assign properly qualified nurses to work in schools.

\* Nurses, particularly those who have the health educator role, should visit schools in some certain intervals and give basic first aid education.

\* The mass media and teaching directorate should provide comprehensive program regarding chocking at the beginning of new academic year.

\* The current study recommends establishing mandatory courses for training teachers on first aid, using incentives for encouraging teachers to learn first aid.

\*Continuous implementation of educational training programs for teachers regarding first aid for the early prevention and management of injuries and accidents among students

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