

Effectiveness of First Aid Training Program Package on Teacher Performance at Secondary Industrial Technical Schools

Shereen Ahmed Ahmed Qalawa¹, MahaMoussa Mohamed Moussa², Naglaa Ibrahim Mohamed Gida³, ¹Professor of Medical-Surgical Nursing, Faculty of Nursing, Port Said University, Egypt, ¹Associate professor of Medical-Surgical Nursing, Nursing College, Qassim University, KSA, ^{2,3}Assistant professor of Community Health Nursing, Faculty of Nursing, Port Said University, Egypt

Background: In the supervision and prevention of health hazards, teachers of secondary industrial techniques have an important role. Therefore, due to their curiosity, lack of experience, those teachers are exposed to injuries and accidents. **Aim of the study:** to evaluate the effectiveness of the first aid training program package for teachers of secondary industrial technical schools on their performance. **Design:** A Quasi- experimental study design was used in this study. **Setting:** the current study was done in Farsckour industrial technical secondary school in Damietta City on all available teachers is using three tools: **First tool:** A questionnaire with two main components: the first part involved socio-demographic data and the second part involved knowledge of industrial technical school teachers about first aid. **Second tool:** Psychological and coping questionnaire. **Third Tool:** common emergency problems in the Observational Checklist. It included two parts: assessment of the safety of the school environment and assessment of schoolteachers' practice regarding first aid. **Results:** 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 ± 9.9 and 71.9 ± 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 ± 9.7 and 74.3 ± 11.4 compared to pre implementation of the program which was 60.1 ± 6.2 . **Conclusion:** implementation of training program package for industrial technical schoolteachers improved their performance regarding first aid. **Recommendations:** Continuous

implementation of educational training programs for secondary teachers regarding first aid for the early prevention and management of injuries and accidents among students.

Key words: *Teachers, Secondary school, first aids, Training Program, package, performance*

Introduction

Injuries among school students are regarded as one of the world's most serious health care issues today because they can cause lifelong disability or even death. First aid and basic life support are important top reserving their lives and minimising the impact of injuries until assistance is found (Pathak et al , 2018) .

The teachers of secondary industrial technical schools have a critical part in the care of students, supervision, and the prevention of health risks. They are exposed to various occupational hazards and many issues, such as mechanical, chemical, physical, and psychological problems, in fulfilling their roles. These teachers had to be well educated in first aid and emergency control to save the lives of students (Essers et al, 2018, and Tziaferi et al., 2016). Statistically, the secondary industrial technical schools constitute 28% of total education in Egypt. Teachers are exposed to injuries and accidents due to student curiosity, absence of experience and increased mobility. Furthermore, more than 350,000 students lose their lives each year due to accidental occupational injuries, according to global health risks. Men bear more than 90 % of this injury burden. 8% of the total unintentional injury burden for men aged 15-59 years is attributable to work-related injuries in high-income countries and 18 % in low- and middle-income countries (WHO,2016).

In addition, mechanical and chemical hazards such as poor housekeeping and fires, working at dangerous heights, working with hot items, working in cold environments, or using poorly maintained equipment are rational threats to health. In addition, noise, vibration, inappropriate light levels, damaging dust or stress, working with a chemical substance, hazards of common daily products from cleaning agents, glues and correction fluids to industrial solvents, dyes, pesticides, or acids, also pose problems. In addition, unguarded moving parts of machinery, hazardous fumes, electricity, moving vehicles or moving heavy loads, untidy workplaces and poor maintenance are certain hazards. In addition to other hazards, there is also extreme noise or the risk of exposure to chemical substances (Health& Safety Authority, 2016). Sleep disturbances, pain in some parts of the body such as back, arms and legs, changes in appetite, circulatory, digestive, auditory, visual, and respiratory disturbances, are potential problems, while physical hazards are considered to be bodily pain and biological disturbances (Ahmed et al. 2010).

In addition, a negative self-perception, as a view of life in general, loss of self-confidence and

control, feeling of emptiness, bitterness, and defeat, crying for no cause, depression, long-lasting feeling of misery, negative image of oneself, reflects psychological hazards. (Awodele et al. 2014). While social risks include a sense of isolation and difficulties in family relationships, social life, difficulties with relationships, selfishness towards others, social isolation, difficulty in making personal life decisions, and uncontrolled aggression (Ismail et al, 2017 and Hirca, 2017).

First aid is a separate action carried out in an emergency situation that requires early assistance or action given at the accident site to someone who is injured or suddenly ill before the ambulance arrives (Oliveira et al, 2017). The first aid provider should temporarily protect them from the danger, obtain medical care and call an ambulance in the case of severe injury or illness (Hirca, 2017).

Since teachers are likely to perform first aid in school accident cases, they participate in subject-matter courses to manage any incorrect behaviour in case of accidents. (Malta et al, 2017 and Galindo et al, 2018). Furthermore, in order for the education and training program to have a greater chance of competence in first aid delivered, it's essential that they identify the risk conditions of the situation. Thus, when considering that health education strategies can be planned and implemented by nurses for community empowerment, the experience of teachers with first aid gains importance (Al Hosis et al, 2013 and AlYahya et al, 2019). It empowers indirectly students who become injured in an accident or emergency situation until help arrives (Masih et al , 2018).

As a result, nurses as educators play an important role in improving the nation's health. Educating teachers is therefore an essential part of the role of the nurse in every school, community, workplace, and home environment (Okefor and Alamina, 2018). Health education and first aid training involve not only providing information, but also enabling changes in attitudes related to health. Using health education and teaching principles, the nurse can help teachers achieve their health objectives in a manner that is consistent with their personal lifestyles, values, beliefs and protect students (Ammirati et al. 2014 and Wahdan et al, 2016).

The aim of this study: to evaluate the effectiveness of the first aid training program package on the performance of secondary industrial technical student teachers in schools.

Significance of study:

In Egypt, there is little research regarding the training programs of first aid knowledge and practice measures among schoolteachers. Current research has noticed that teachers had inadequate knowledge and improper practices in emergency situations and accidents. School staff members are frequently called upon to provide help in early emergency actions for saving a student's life (Abo Elsoud et al , 2018).

Theoretical framework:

An integration between Grounded theory (GT) and Hammond’s model of cognitive continuum theory which grounded theory is selected for the current study which investigates the influence of knowledge generation on illness, situational interventions, recognising emerging problems and providing solutions for them, human health and well-being in view of certain environmental circumstances affecting nurse investigators. While the cognitive continuum theory model of Hammond is regarded as an intuitive-interpretive model, the intuitive-analytical model and the analytical-intuitive model are quasi-rational cognition models and the analytical-systematic model is needed to analyse the problem and the corrective action based on a good decision-making approach (Bjørk and Hamilton, 2011) (figure 1).

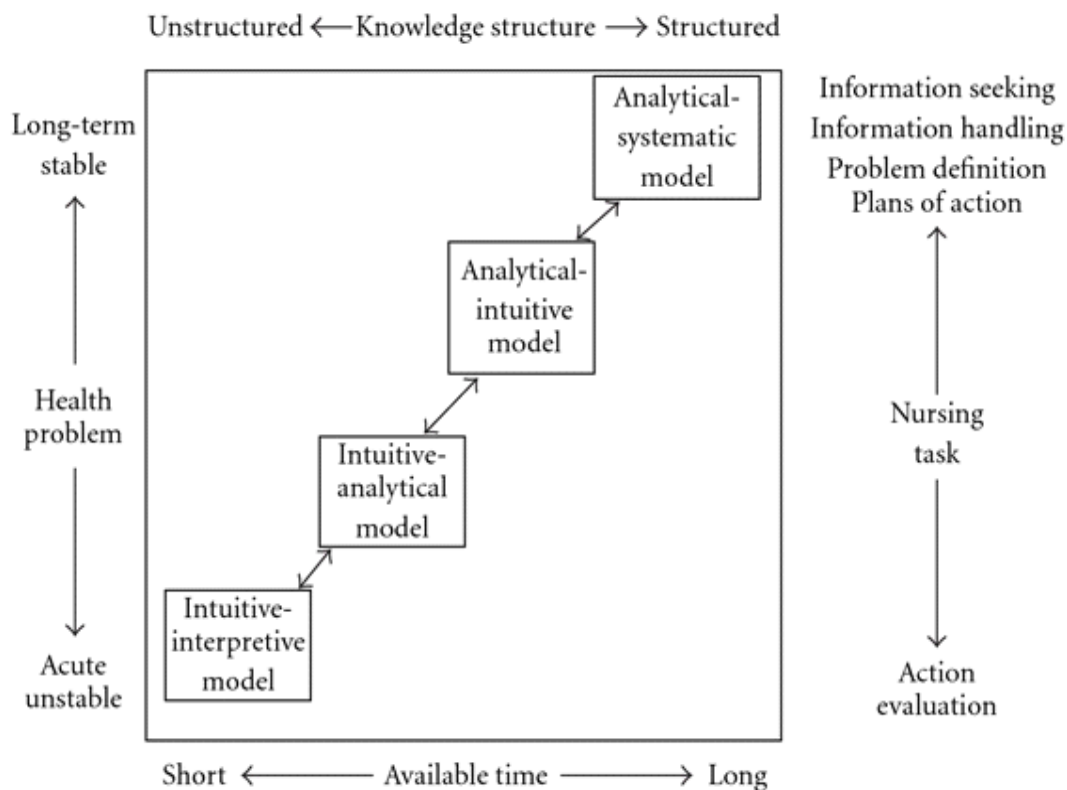


Fig 1 . Nursing decision making theory depend on Hammond’s model of cognitive continuum theory (1996, p.235) (Salanterä, e-mail correspondence 2004-5).

Hypothesis:

There will be an improvement of secondary industrial technical teachers ‘performance post implementation of the first aid training program package compared to Pre-implementation of the training program package.

Subjects and Methods

Design: To conduct the study, a Quasi experimental design was used.

Setting: This study was done at the Farsckour Secondary Industrial Technical Education School at Damietta city. The school includes 5 departments (decoration and advertising, carpentry and furniture, concrete, building and engineering and finishing / building). One department will be chosen randomly from them.

Sample: Damietta city consists of 5 secondary industrial technical educational districts. It included Damietta, New Damietta, Farsckour , El Zark and Kaf Sad. In both educational districts, there was only one secondary industrial technical education school. At the first stage one district was randomly selected from them. The one school randomly chosen was the Farsckour Secondary Industrial Technical Education School 50 teachers work in the decoration and advertising departments also attend the previously chosen school during the study period. This department was decoration and advertising and there were 50 teachers working in this department (25 practical decoration 25 decoration and advertising).

Tools of Data Collection:

Three adapted tools were used in the current study based on current methods (WHO, 2016; Arli & Yildirim, 2017; and El Magrabi et al, 2017). After reviewing the related literature, it was designed by the investigator and reviewed by the supervisors and written in Arabic for data collection. Tool I. An interview questionnaire. It included two parts. Part 1: Demographic characteristics of teachers such as name, age, gender, years of experience, and training courses. Part II was used to assess the teachers' knowledge regarding first aid and basic life support and consists of two specific parts. The first one involved questionnaires that covered the common types and risks of secondary school accidents and injuries, common health problems and information on dealing with evaluation, principles during the process of transferring the injured and their management. The second part includes assessment of a teacher's knowledge regarding school environmental hazards such as chemical hazards, physical and psychological hazards, and mechanical hazards. It comprised of general knowledge about first aid (12 questions), wounds (7 questions), burns (6 questions), CPR or basic life support and choking(8 questions), bleeding and epistaxis (6 questions), fractures (5 questions),poisoning, fainting and sunstroke (6 questions).The scoring system of these questionnaires includes two point scales to evaluate each question of the knowledge sheet. Score 0 was given for the wrong answer and 1 for right answer. There was a total score of was 50 points. It was categorised into three levels: low knowledge > 30%, moderate knowledge 30 to 60% and high knowledge < 60%.

Tool II: Psychological and coping questionnaire (WCQ).It includes a scale that was adopted from Folkman and Lazarus (1988).It was used to estimate cognitive and behavioural

manners. The scale consists of 33 items divided into three subscales: positive coping (15 items), avoidant coping (10 items), and alleviating coping (8 items) on a 4 point Likert scale ranging from 0 to 3, where 0= not used, 1 = used somewhat, 2 = used quite a bit and 3 = used a great deal what the enough, cope with the demands of situation. The standardized Alfa coefficient for the 35 items WCQ was 0.94. The standardised coefficient for factors ranged from 0.76 to 0.84.

Tool III: First Aids observational checklist. It was carried out in the pre-test and post-test to evaluate the teacher's practice regarding first aid. This tool consisted of 78 statements in a checklist that covered nine procedures. This included: wounds (11), burns (9), CPR or basic life support (12), choking (9), bleeding and epistaxis (12), fractures (8), poisoning (8), fainting and sunstroke (9). Scoring system: done was taken as one point (1), not done was taken as zero (0). These points were converted to a percentage. Teachers' practice items were considered as satisfactory if the result was 60% or more and unsatisfactory if it was less than 60%.

Operational design

Preparatory phase:

Advanced national and international related literature and theoretical knowledge of several aspects of the study using books, articles, internet were reviewed to improve the study tools for data gathering. Validity of the tools: Content validity was performed through the opinion of five experts from the Health Nursing department to ascertain relevance and completeness. Pilot Study: In order to evaluate the applicability of the tools, five teachers (10 percent) worked in the secondary industrial technical education school. In terms of rewording and rephrasing some items for more transparency, the necessary modifications have been made. In the study sample, the pilot subjects were involved. The reliability of the tool was tested by evaluating its internal consistency. The Cronbach alpha coefficient was 0.68, which is quite acceptable compared to similar instruments, it proved to have good reliability (Joseph et al, 2015).

Fieldwork:

Official permissions to perform the study was gained by fulfilling the official steps required to get the approval for performing the study from the Dean of Faculty of Nursing in Port Said University. Written consent was obtained from the director of secondary industrial technical education school in order to perform the study. The aim of the study was explained to each participant (teacher) and its procedures. Informed verbal consent was obtained after briefing them with their rights to refuse or withdraw, and after reassuring them about anonymity and confidentiality. The teachers who tested positive were discretely informed and counselled. Data was collected from the selecting settings by the researchers within 6 months which

started from the beginning of January to the end of June 2019. This period was determined for data collection by the availability of the researcher and the study respondents. The questionnaire was filled out by the teachers (participants). The previous mentioned settings were visited by the researchers two days/week (Saturday and Thursday) from 10.00 am to 2.00 pm. Each teacher had explained to them the purpose of the study and how to complete the study tools and were assured that all the information they will provide is trustworthy and that it will only be used for scientific purposes. The members of the research team were present the whole time. It takes 30-45 minutes for each teacher to complete the tools.

Program Phases:

The purpose of the program was to improve first aid knowledge and the practice of teachers working in secondary industrial technical schools. Implementation of the First Aid Training Program package includes 4 main phases as follows:

Phase I: Assessment phase:

This phase included interviewing the teachers in the waiting area during break time to collect baseline data. The researchers welcomed the teachers at the beginning of the interview and introduced themselves to each person involved in the study. This was based on baseline data obtained using textbooks, articles, and periodicals from the pre-program evaluation and review of current and past, local, and international related literature on various aspects of teacher issues.

Phase II: planning phase: The program content and simple Arabic media (in the form of the program booklet, posters, and visual materials as video clips and images) were prepared by the researchers for schoolteachers according to the study based on their learning needs from the pre-intervention assessment. The theoretical & practical frameworks outline includes concepts, kinds, signs, and symptoms of injuries, causes, and first aid protection techniques. Also, general practical knowledge regarding wounds, burns, CPR or basic life support and choking, bleeding and epistaxis, fractures ,poisoning, fainting and sunstroke, was included. The practical framework outline includes accidental injuries, bleeding care, caring of unconsciousness persons, accidental burn and fracture care, technique of lifting, handling, and transporting injured person. The researchers also prepared an explanation booklet to assist participants with self-learning with the title “Teachers First Aid “that was specifically developed and printed by the researchers on the basis of a literature review and the assessment phase results.

Phase III: Implementation phase: Two sessions were included, one for the theoretical part and one for the practice part. These were divided into two one-hour weekly sessions for knowledge and two and a half hours for practice sessions. Teachers are classified into 5 groups. Each group had 10 teachers, and the program implementation was carried out

separately for each group. The program's total duration was 17.30 hours. For each group, the weekly sessions were held for 6 weeks. According to the times and place of attendance accessible, each group usually attends between 10.00 AM and 2.00 PM in the afternoon. Different teaching techniques have been used, such as short lectures, group discussion, role play, demonstration, and re-demonstration. Pamphlets and various audio visual materials were also used; as well as handouts, images, and posters to simplify each subject's teaching. The required facilities were also found. The booklet addressed the focus on first aid. At the beginning of the lecture, the booklet was distributed to teachers, and they were encouraged to read it after the lecture and use the first aid manoeuvres in their practice.

Phase V: The evaluation phases were conducted immediately after the First Aid Training Program package was implemented (Post-test). Then, after 6 months, the retention of knowledge and influence of the First Aids Training Program package was re-evaluated compared to the baseline level (Follow-up). This was performed using the same questionnaire form (Tool I, II, III).

IV. Statistical Design:

Data analysis:

Data analysis was carried out using the Statistical Package for Social Sciences (SPSS, version 22.0). Descriptive statistics were used to summarise demographic data presented using frequency tables and expressed as percentages, mean and standard deviation for quantitative variables. Qualitative categorical variables were compared using paired t test. The Spearman rank correlation for ranked ones (Correlation between teachers' pain, perception, coping and anxiety scores and their personal characteristics). For all analyses, a p-value lower than 0.05 was considered statistically important.

Results:

Table 1 shows that 66% of teachers were male, 82% of them were in age group of 40-50 years. 86% of them hadn't previously got any training courses on occupational health and safety. 76% studied occupational health and safety during the training period with 80% of them perceived no importance in the training received. 80% of them perceived that it was a necessary to make ongoing training courses on the health risks related to each profession. Finally, 62% have found sources of information regarding occupational health and safety.

Table 2. Revealed that the majority of teachers (94%) were exposed to chemical risks during training. Asthma and other respiratory diseases is more exposed than other diseases respectively. While 46% suffered headache as a physical risk, 28% suffered psychological pressure and nervous tension as a psychological risk. Lastly, 40% suffered back pain as a mechanical risk during training.

Table 3 Noted that only 44% of industrial technical teachers wear personal protective equipment, such as gags (20%). 68% clarified that they haven't had any follow-up supervision regarding PPE . However, 40% of them follow the system in the order of machinery and used tools. 46% report for the usual check-up work of machinery as a measure to avoid high machines sounds and lastly 30% of them made a health check-up every 3 months

According to the research Hypothesis, the present result revealed:

Table 4. Revealed that there is a statistically significant differences between a teacher's general procedure and total knowledge scores in post and the follow-up training program package implementation phases compared to pre-test (Ps= 0.0001).

Table 5. Revealed that there are statistically significant differences between all teachers' practice scores regarding first aids to wounds, choking , epistaxis, fractures, burns and total practice scores in post , follow-up training program package implementation phases compared to pre-test (Ps= 0.0001)

Table 6. Clarified that there is a relationship between a teacher's socio-demographic characteristics and knowledge scores in items related to duration of job experience and take a training of first aids with 0.050 and 0.046 respectively

Table 7. Clarified that there is a positive correlation between a teacher's total knowledge and their practice scores in post and the follow-up training program package implementation phases compared to pre-test with Ps= 0.000 ,.0029, .011, 0.008, 018 respectively

Table (1): Socio-demographic characteristics of the studied industrial technical school teachers

Socio-demographic characteristics	Studied teachers (n=50)	
	No.	%
Gender		
Male	33	66.0
Female	17	34.0
Age (years)		
Less than 40	2	4.0
40-<50	41	82.0
50-≤60	7	14.0
Min-Max, Mean±SD	37.0-60.0	45.6±5.8
Semester		
1	15	30.0
2	22	44.0
3	13	26.0

Duration of experience (years) Min-max, Mean±SD	1.0-34.0	21.3±8.5
Studied occupational health and safety during your training period		
No	12	24.0
Yes	38	76.0
Got any training courses on occupational health and safety		
No	43	86.0
Yes	7	14.0
Importance of the training received		
Not beneficial	40	80.0
Beneficial	10	20.0
Necessary to make ongoing training courses on the health risks related to each profession		
No	10	20.0
Yes	40	80.0
#Source of occupational health and safety		
Experience	31	62.0
Training courses	6	12.0
TV	16	32.0

#Categories are mutually exclusive

Table (2): Distribution of occupational hazards and safety among the studied industrial technical schoolteachers

occupational hazards and safety	Studied teachers (n=50)	
	No.	%
Exposure to chemical risks during training		
No	3	6.0
#Yes	47	94.0
Asthma	22	44.0
Allergy of the nose	13	26.0
Allergy of the eye	15	30.0
Infections and skin diseases	12	24.0
Respiratory diseases (pneumonia)	20	40.0
Other	2	4.0
Most signs exposure to physical risks during training		
No	8	16.0
#Yes	42	84.0
Headache	23	46.0
Burns	7	14.0
Electric shocks	10	20.0
Hearing problems	6	12.0
Other	4	8.0
Exposed to psychological risks during training		
None	8	16.0
Yes	42	84.0
Frequent absence	10	20.0

Psychological pressure and nervous tension	14	28.0
Dissatisfaction	8	16.0
Family problems	6	12.0
Exposed to mechanical risks during training?		
No	9	18.0
#Yes	41	82.0
Varicose veins	10	20.0
Fractures	5	10.0
Back pain	20	40.0
Sprains	5	10.0
Tear of a ligament	5	10.0
Neck pain	17	34.0
Other	6	12.0

#Categories are mutually exclusive

Table (3): Distribution of occupational safety Precaution among the studied industrial technical schoolteachers

Student practices for security and safety procedures	Studied teachers (n=50)	
	No.	%
Use of personal protections		
No	28	56.0
#Yes	22	44.0
Helmet	9	18.0
Gloves	7	14.0
Glasses	7	14.0
Gags	10	20.0
Other	3	6.0
Presence of a supervisor to observe use of PPE		
No	34	68.0
Yes	16	32.0
#Measures done to avoid hazards		
Obligation to wear protections	20	40.0
Follow the guidelines	13	26.0
Follow the system in the order of machinery and used tools	23	46.0
Report the officials when you see any error	20	40.0
Maintain the cleanliness of housing	19	38.0
#Measures done in case of the chemical substance spills		
Obligation to wear personal protections	19	38.0
Informing the officials	18	36.0
Remove them carefully	22	44.0
Do not know	4	8.0
#Measures to avoid high machine sounds		
Reporting for the usual check-up work of machinery	31	62.0
Personal use of protections	21	42.0
Inform specialists	18	36.0
Periodic check-up during the study		
No	30	60.0

Yes	20	40.0
Annually	3	6.0
Every 6 months	2	4.0
Every 3 months	15	30.0

#Categories are mutually exclusive

Table 4: Statistical difference of the teachers' Knowledge regarding first aid in all phases of training program (n= 50)

Knowledge	Phase						X ² (P)
	Pre-test		Post test		Follow up test		
	No	%	No	%	No	%	
General knowledge							
Low	27	54.0	14	28.0	16	32.0	X ² =26.533 P<0.0001*
Moderate	19	38.0	6	12.0	6	12.0	
High	4	8.0	30	60.0	28	56.0	
Mean ± SD	50.2±17.2		74.8±23.9		68.5±22.6		
Procedure knowledge							
Low	23	46.0	4	8.0	13	26.0	X ² =31.596 P<0.0001*
Moderate	15	30.0	9	18.0	8	16.0	
High	12	24.0	37	74.0	29	58.0	
Mean ± SD	61.9±16.8		82.0±12.7		73.2±16.6		
Total knowledge							
Low	24	48.0	2	4.0	8	16.0	X ² =56.258 P<0.0001*
Moderate	21	42.0	9	18.0	19	38.0	
High	5	10.0	39	78.0	23	46.0	
Mean ± SD	58.8±13.1		80.0±9.9		71.9±11.5		

X²: Friedman test for related samples

*significant at P≤0.05

Table 5: Statistical difference of the teachers' practice regarding first aids of all types of accidents

Practice about first aid	Phase						Q (P)
	Pre-test		Post test		Follow up test		
	No	%	No	%	No	%	
Wound							
Unsatisfactory	33	66.0	8	6.0	16	32.0	X ² =41.243 P<0.0001*
Satisfactory	17	34.0	42	84.0	34	68.0	
Mean ± SD	57.8±12.3		77.8±22.2		73.0±16.9		
Choking							
Unsatisfactory	23	46.0	5	10.0	6	12.0	X ² =49.067 P<0.0001*
Satisfactory	27	54.0	45	90.0	44	88.0	
Mean ± SD	59.5±10.9		81.8±16.0		75.5±14.1		
Epistaxis							
Unsatisfactory	23	46.0	7	14.0	6	12.0	X ² =42.039 P<0.0001*
Satisfactory	27	54.0	43	86.0	44	88.0	
Mean ± SD	58.8±9.8		77.6±15.8		72.2±15.6		
Fracture							

Unsatisfactory	31	62.0	7	14.0	11	22.0	X ² =66.251 P<0.0001*
Satisfactory	19	38.0	43	86.0	39	78.0	
Mean ± SD	59.7±5.8		72.3±10.9		79.3±14.2		
Burn							
Unsatisfactory	25	50.0	8	16.0	24	48.0	X ² =28.043 P<0.0001*
Satisfactory	25	50.0	42	84.0	25	50.0	
Mean ± SD	64.7±17.4		76.0±17.5		61.9±13.6		
Total practice							
Unsatisfactory	27	56.0	4	8.0	6		X ² =64.120 P<0.0001*
Satisfactory	22	44.0	46	92.0	44	88.0	
Mean ± SD	60.1±6.2		75.2±9.7		74.3±11.4		

X²:Friedman test for related samples *significant at P≤0.05

Table 6 :Relationship among teacher knowledge and their demographic data after the implementing the educational program

Socio-demographic data	Knowledge			
	Mean	SD	F	P
Age (years)				
20	13.9	8.0	1.7	P=0.190
30	14.9	6.2		
40+	9.7	5.9		
Gender				
Male	13.6	7.3	t=0.12	P=0.881
Female	13.3	7.2		
Duration of experience				
Less than 5	13.0	6.2	7.2	P=0.050*
5	13.2	8.0		
10	18.3	7.9		
And more 10	18.3	8.8		
Training at first aid				
Yes	12.8	7.2	t=2.2	P=0.046*
No	18.0	6.3		
Importance of the training received				
Not beneficial	9.8	0.0	t=0.83	P=0.443
Beneficial	18.8	6.5		

F: One WAY ANOVA t: Student t-test * P < 0.05 (significant) Interquartile Range

Table 7: Correlation among teacher's knowledge and their practice scores regarding first aid of accident types

Practice scores	Pre-test				Post test				Follow up-test			
	General knowledge		Practical knowledge		General knowledge		Practical knowledge		General knowledge		Practical knowledge	
	r	P	R	P	r	P	r	P	r	P	r	P
Physical	-0.078	0.589	0.176	0.222	0.274	0.054	0.509	<0.0001*	0.326	0.021	0.338	0.016*
Mechanical	0.085	0.556	0.001	0.996	0.241	0.091	0.007	0.963	0.260	0.069	0.156	0.280
chemical	-0.022	0.881	0.065	0.653	0.217	0.130	0.149	0.302	0.233	0.104	0.067	0.644
Practice total	-0.020	0.893	0.131	0.363	0.309	0.029*	0.358	0.011*	0.374	0.008*	0.018	0.334

r: Spearman Rho correlation coefficient

*significant at $p \leq 0.05$

Discussion

School teachers are the most immediate care giver for the students in the event of any emergency. Attempts to increase knowledge and improve skills required to manage common conditions could result in the prevention of injuries and further complications among secondary industrial technical students (Bolling et al, 2011). Therefore, the current study aimed to assess the effectiveness of first aid training program package for teachers of secondary industrial technical student's schools on their performance

Regarding the demographic characteristics of teachers, the current study indicated that more than half of the teachers were male, and more than two third were in the age group of 40-50 years. The majority of them hadn't previously got any training courses on occupational health and safety and perceived no importance in the training received. However, it was a necessary to make ongoing training courses on the health risks related to each profession. Finally more than half have experience with sources of information regarding occupational health and safety.

Regarding exposure to risks and hazards, the current study revealed that the majority of teachers were exposed to chemical risks during training. More specified that Asthma and other respiratory diseases is more exposed than other diseases. While nearly half of them suffered headaches as a physical risks, more than one quarter of them suffered psychological pressure and nervous tension as a psychological risk and back pain as a mechanical risk during training. These findings are in line with Ayonga (2016). Teachers, staff and students should be educated in the use of firefighting equipment, because they are inadequately prepared for fire emergencies. The study recommended school training with proper firefighting equipment and make them available in case of an emergency situation.

Concerning protective measures, the current study revealed that more than one quarter of industrial technical teachers wear personal protective equipment (PPE), namely gags. More than half of them haven't any follow-up supervision of using PPE. Nearly half of them follow the system in the use of machinery and tools, and report for the usual health check. These findings are in line with Afeez (2016) and Geetha (2016) who concluded that there is a need for required devices in training electrical/electronic students in Nigeria technical colleges and recommend that efforts should be made by stakeholders of education and curriculum development to integrate the relevant skills on liability detection and diagnosis of electrical/electronic appliances into the curriculum of technical colleges of Nigeria.

In India, Joylene, Lolita Soares, 2013 revealed inadequate knowledge and poor attitudes among junior health assistants regarding infection control measures and personal protective equipment, which reflects the need for effective knowledge and attitude enhancement among junior health assistants in order to prevent hazards associated with infections.

In relation to a teacher's knowledge regarding first aid, the present study found that there are a statistically significant differences between a teacher's general, procedural, and total knowledge scores in post & follow-up training program package implementation phases comparing to pre-test. These findings were supported by Abo Elsoud et al (2018), who found that primary school teachers' knowledge and practice regarding first aid improved in the post and follow up of the program compared to pre implementation of the program. There is a clear need for teacher training programs to be continued in order to manage emergencies early. Also, these findings were supported by Kaur et al (2017) in District Mohali, Punjab, who shows that the majority of the teachers who had average knowledge before the program about first aid was 12.5% and 77.5% after the program.

Linto and Sathya (2015) concluded that the teachers' average post-test knowledge scores for first aid (17.83) were significantly higher than the average pre-test information score (11.9) and the teaching program was successful in enhancing the information of teachers. These findings are in line with Kaur et al (2017). In contrast, in Iran, Kolahi et al (2018) concluded that teachers' knowledge of epilepsy was insufficient, and have positive attitudes toward people with epilepsy. It could be better and improved if they had proper knowledge and took an appropriate first-aid measures training program.

Concerning the practice of first aids for all forms of accidents and injuries, the current study indicated that there are statistically significant differences between all teachers' practice scores regarding first aids to wounds, choking, epistaxis, fractures, burns and total practice scores in post and follow-up training program package implementation phases compared to pre-test. These findings follow Meral and Aly(2016) who highlighted a magnitude of implemented training programs regarding disaster management and first-aid for school teachers.

In Korea, Lee and Oh (2018) highlighted the improvement of childcare teachers' emergency coping skills by considering six main areas of training programs, mainly the definition of safety accidents, an approach based on children's developmental phases, and emergency measures for teachers to deal effectively in emergency situations. In addition, the instruction approach to improving practical confidence among childcare teachers in terms of first aid performance, as well as improving their knowledge of first aid measures, was important. Adrien (2017) concluded in their study that first aid and its training helped develop proper attitudes towards helping an injured person, reducing risks, and saving lives as related injury.

Regarding the relationship between socio-demographic characteristics of teachers and their knowledge scores, the current study revealed that there is a relationship between the socio-demographic characteristics of teachers and knowledge scores, particularly in items related to the duration of work experience and first aid training. These findings follow with Linto and Sathya (2015) who discovered that there is association between pre-test knowledge score and the selected demographic variable.

In relation to teacher' total practice scores and their total knowledge, the current study revealed a positive correlation between a teacher's total knowledge and their practice scores in post and follow-up training program package implementation phases compared to pre-test . These findings are in the same line as Mostafa and Momen (2014), and Abd El-Hay et al (2015), who concluded that after first aid and basic life support training programs for industrial secondary technical schools were implemented, there was a significant improvement in the mean score of knowledge and practice.

In addition, Awad Allah et al (2017)found that the implementation of the first-aid and disaster management training program is a valuable tool for improving the knowledge and practice of teachers and it is important to implement those primary school teacher programs to protect children's lives. In West Bengal, Bandyopadhyay et al (2017) emphasised that successful skill training in the curriculum regarding the proper and timely management of accidents is not important only for the school children but also for the community as a whole and necessitates keeping a first-aid package and medicines at both at home and school to save lives. In Syria, Abozeed et al (2019) revealed that the implementation of the disaster management program had a statistically significant improvement on primary school teachers' knowledge and skills.

These results are in contrast with Reveruzzi (2015)in Turkey, Ganfure et al (2018) in Addis Ababa, Ethiopia and Bandyopadhyay et al (2017),who have similarly reported that more than half of the first aid knowledge and practices of teachers were at a poor level and most of them have not previously studied accurate first aid knowledge. A teacher who has previously received first aid training courses was only theoretical and without practical training and applications.

Finally, training programs and workshops regarding disaster should be provided for schoolteachers on a standard basis using mass and social media with modern technologies (Abozeed et al, 2019). As part of the school health curriculum, school nurses have an essential role in providing basic emergency lifesaving skills for students and teachers. Students need to acquire sufficient knowledge and practice to manage common injuries and accidents at school (Geetha, 2016).

Conclusion:

Based on the research results, the implementation of first aid educational program package for secondary teacher's school showed a significant increase and improvement of the teacher's level of knowledge and towards an obvious improvement in their practice and corrective actions towards all forms of injuries or accidents.



Recommendations:

There is a clear need for an instructional scheme or the kind of guidelines offered on simple media to those teachers to decrease hazards and problems related to delayed first Aids following an injury or accident. Efforts should be carried out and educational materials such as booklets and posters should be delivered to both students and teachers. Additionally, it is necessary that first aid courses must be a part of the curricula in industrial secondary schools. Further studies on applying first aids in schools in more regions are needed.

Declaration of Interest

No conflicts of interest are reported by the authors. The content and writing of the paper are the sole responsibility of the authors.

Acknowledgements

Thanks to the participants who provided this study with valuable information and time. We would also like to extend our appreciation to all teachers' field staff for their cooperation and assistance during the study process.



REFERENCES

- Abd El-Hay, S. A., Ibrahim, N. A., & Hassan, L. A. (2015). Effect of Training Program Regarding First Aid and Basic Life Support on the Management of Educational Risk injuries among Students in Industrial Secondary Schools. *IOSR Journal of Nursing and Health Science*, 4(6): 32-43.
- AboElsoud, M. S. A., Ahmed, H. A. H., Ahmed, A. M. A. W., & Farg, H. K. (2018). Training on First Aid for Teachers of Primary Schools At Ismailia City. *Journal of Nursing and Health Science*, 7(5):28-38.
- Abozeed, B. E., Toama, Z. T., Mohamed, A. A., & Ibrahim, A. F. A. E. F. (2019). Effect of Implementing a Training Program on the Performance of Primary School Teachers Regarding Disaster Management in Al Malikeyeh-Syria. *International Journal of Innovative Research in Medical Science*, 4(03): 221-229.
- Adrien N, Onesphore H. (2017) Evaluation of first aid knowledge among elementary school teacher in Burundi. *International Journal of Sports Sciences and Fitness*; 5(2):304. Available from: <https://www.ijssf.org/PDF/v05issue02abs13.pdf>
- Afeez, Y. S. (2016). Fault Detections and Diagnosis of Electrical/Electronic Appliances Training Requirement of Technical Colleges as a Tool for Empowering Electrical Engineering Trade Students in Nigeria. *Industrial Engineering Letters .ISSN 0581-2225(online)* 6(10):45-55.
- Ahmed, H. O., & Newson-Smith, M. S. (2010). Knowledge and practices related to occupational hazards among cement workers in United Arab Emirates. *The Journal of the Egyptian Public Health Association*, 85(3-4): 149-167.
- Al Hosis, K. F., Mersal, F. A., & Keshk, L. I. (2013). Effects of job stress on health of Saudi nurses working in Ministry of Health hospitals in Qassim region in KSA. *Life Science Journal*, 10(1): 1036-1044.
- AlYahya A., I, Almohsen, A., H, AlSaleem, A., I, Al-Hamid, M., M Arafah, M., A, Al Turki, Y., A, Aljasser, A., A and Alkharfi, A., M (2019). Assessment of knowledge, attitude, and practice about first aid among male school teachers and administrators in Riyadh, Saudi Arabia. *Journal of Family Medicine and Primary Care*. Feb; 8(2): 684–688.
- Ammirati, C., Gagnayre, R., Amsallem, C., Némitz, B., & Gignon, M. (2014). Are school teachers able to teach first aid to children younger than 6 years? A comparative study. *BMJ open*, 4(9). e005848. doi: 10.1136/bmjopen-2014-005848
- Arli, S. K., & Yildirim, Z. (2017). The Effects of Basic First Aid Education on Teachers' Knowledge Level: A Pilot Study. *International Journal of Caring Sciences*, 10(2): 813.
- Awad Allah, M., Salem, G., & Said, R. (2016). Enhancement of Disaster Management and First Aid Rules for Primary School Teachers in Egypt. *Journal of High Institute of Public Health*, 46(2): 61-68.
- Awodele, O., Popoola, T. D., Ogbudu, S. B., Akinyede, A., Coker H. A. B., Akintonwa, A. (2014). Occupational hazards and safety measures amongst the paint factory workers in Lagos, Nigeria. *Safety and Health at Work of Journal*. 5(2):106-11. doi: 10.1016/j.shaw.2014.02.001. Epub 2014 Apr 4.



- Ayonga, I. N. (2016). An Investigation Of Fire Emergency Preparedness In Kenyan Schools: A Case Study of Public Secondary Schools in Nairobi (Doctoral dissertation, University of Nairobi).p.7-37.
- Bandyopadhyay, L., Manjula, M., Paul, B., & Dasgupta, A. (2017). Effectiveness of first-aid training on school students in Singur Block of Hooghly District, West Bengal. *Journal of family medicine and primary care*, 6(1): 39.
- Björk, I. T., & Hamilton, G. A. (2011). Clinical decision making of nurses working in hospital settings. *Nursing research and practice*, 2011 : 1-8. <https://doi.org/10.1155/2011/524918>.
- Bollinget, C., Barboza, S. D., Mechelen, W. V., Pasmán, H. R.. (2019). Letting the cat out of the bag: athletes, coaches and physiotherapists share their perspectives on injury prevention in elite sports. *British Journal of Sports Medicine*.54(14):1-8. <http://orcid.org/0000-0003-3285->
<http://dx.doi.org/10.1136/bjsports-2019-100773>
- El Magrabi, N. M., Elwardany Aly, S., & Khalaf, S. A. R. (2017). Impact of training program regarding first aid knowledge and practices among preparatory schools' teachers at Assiut City. *Journal of Nursing Education and Practice* ,7(12): 89-97.
- Essers S, Schöffl V, Heggie TW, Küpper T. Secondary Prevention in School Sports – Does Teachers' First Aid Education Meet the Recommendations in Class? (2019). *Dtsch Z Sportmed*; 70(11): 270-277. doi:10.5960/dzsm.2019.395
- Folkman, S., Lazarus, R. S., Moore, A. D., & Stambrook, M. (1988). Ways of Coping Questionnaire: Sampler Set: Manual, Test Booklet, Scoring Key. *Ways of Coping Questionnaire-revised*. Consulting Psychologists.
- Galindo Neto, N. M., Carvalho, G. C. N., Castro, R. C. M. B., Caetano, J. Á., Santos, E. C. B. D., Silva, T. M. D., & Vasconcelos, E. M. R. D. (2018). Teachers' experiences about first aid at school. *Revista Brasileira de Enfermagem*, 71, 1678-1684.
- Ganfure G., Ameya G., Tamirat A. First aid knowledge, attitude, practice, and associated factors among kindergarten teachers of Lideta sub-city Addis Ababa, Ethiopia. *PLoS One*. 2018;13:e0194263.
- Geetha C. Knowledge on selected first aid measures among schoolchildren, Puducherry, *International Journal of Applied Research*.2016; 2(2): 504-506.
- Health and Safety Executive (HSE). 2016. "Respiratory Protective Equipment at Work." Practical Guide, no. HSG53 (Fourth edition): 1–59. <http://www.hse.gov.uk/pubns/priced/hsg53.pdf>
- Hirca, N. (2017). Does teachers' knowledge meet first aid needs of Turkish schools? Review of Turkish literature. *Journal of European Education*, 2(2): 16-23.
- Ismail, A. R., Hamzah, N. A., Makhtar, N. K., Daud, K. A. M., Khidzir, N. Z., Hassan, N. H. C., & Mansor, M. A. (2017). Risk assessment in infrastructure in educational institution: A study in Malaysia. In 4th International Conference on Mechanical Engineering Research (ICMER2017), IOP Conf. Series: Materials Science and Engineering Vol. 257, p. 012056
- Joseph, N., Narayanan, T., bin Zakaria, S., Nair, A. V., Belayutham, L., Subramanian, A. M., & Gopakumar, K. G. (2015). Awareness, attitudes and practices of first aid among school teachers in Mangalore, south India. *Journal of primary health care*, 7(4): 274-281.
- Joylene, L. S. (2013). Effectiveness of video assisted teaching on knowledge and attitude regarding



- infection control and use of personal protective equipment among junior health assistants at selected phc's bengaluru (Doctoral dissertation). Rajiv Gandhi University of Health Sciences, Bangalore, Karnataka. p.14-40
- Kaur N, Savitri, Kaur M (2017) A Descriptive Study to Assess the Level of Knowledge Regarding the First Aid Management among School Teachers in Selected Schools of District Mohali, Punjab. *Journal of Health and Medical Informatics* 8: 288. doi: 10.4172/2157-7420.100028
- Kolahi, A. A., Ghorbanpur-Valukolaei, M., Abbasi-Kangevari, M., & Farsar, A. R. (2018). Knowledge, attitudes, and first-aid measures about epilepsy among primary school teachers in northern Iran. *Acta Neurologica Scandinavica*, 138(1): 85-92.
- Lee, J., Oh, W. O., Lee, J., & Oh, W. O. (2018). Effects of a First Aid Coaching Program on First Aid Knowledge, Confidence, and Performance of Child Care Teachers. *Child Health Nursing Research*, 24(3): 310-318.
- Linto A · and Sathya, P. (2015). Effectiveness of Planned Teaching Programme on knowledge Regarding First Aid for the Common Ailments among School Teachers at Selected Primary Schools in Mangalore. *International Journal of Nursing Education*, 7(2): 31-33. doi: 10.5958/0974-9357.2015.00068.
- Malta, D. C., Silva, M. M. A. D., Mascarenhas, M. D. M., Sá, N. N. B. D., Morais Neto, O. L. D., Bernal, R. T. I., ... & Gawryszewski, V. P. (2017). The characteristics and factors of emergency service visits for falls. *Revista de saude publica*, 46(1): 128-137.
- Masih, S., Sharma, R. K., & Kumar, A. (2018). Knowledge and practice of primary school teachers about first aid management of selected minor injuries among children. *International Journal of Medicine and Public Health*, 4(4): 458-462. doi: 10.4103/2230-8598.144114
- Mersal, FA., & Aly, RA (2016). Developing disaster management and first aid guidelines for school teachers in Cairo Egypt. *Journal of Nursing Education and Practice*, 6(7): 41.
- Mostafa, N.S., & Momen M. (2014). Occupational health and safety training: knowledge, attitude and practice among technical education students. *Egyptian Journal of Occupational Medicine*, 38(2): 153-165.
- Okefor, C. U., & Alamina, F. E. (2018). A qualitative study on psychosocial hazards among health care workers in a tertiary health facility in South-South Nigeria. *Annals of Ibadan postgraduate medicine*, 16(1): 23-29.
- Oliveira, M. R., Leonel, A. R. A., Montezeli, J. H., Gastaldi, A. B., Martins, E. A. P., & Caveião, C. (2015). Conception of undergraduate nursing students on the practice of health education on first aid. *Revista da Rede de Enfermagem do Nordeste*, 16(2): 150-8.
- Pathak A, Agrawal N, Mehra L, Mathur A and Diwan V. (2018). First Aid Practices and Health-Seeking Behaviors of Caregivers for Unintentional Childhood Injuries in Ujjain, India: A Community-Based Cross-Sectional Study. *Children*; 5(9):124
- Reveruzzi, B. (2015). The protective mechanisms of first aid training within a school-based program for early adolescents (Doctoral dissertation, Queensland University of Technology).
- Tziaferi, S. G., Sourtzi, P., Kalokairinou, A., Sgourou, E., Koumoulas, E., & Velonakis, E. (2011). Risk assessment of physical hazards in Greek hospitals combining staff's perception, experts' evaluation and objective measurements. *Safety and health at work*, 2(3): 260-272. doi:



10.5491/shaw.2011.2.3.260.

Wahdan M.M., Sayed A.M., AbdElaziz K.M. Prevalence of injuries among high school students in Eastern and Western parts of Cairo, Egypt. *Injury*. 2016;47:2650–2654

World Health Organization. (2016). International first aid and resuscitation guidelines 2016. https://www.ifrc.org/Global/Publications/Health/First-Aid-2016-Guidelines_EN.