Effect of Training Program Regarding First Aid and Basic Life Support on the Management of Educational Risk injuries among Students in Industrial Secondary Schools

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Abstract:

Background: Students' awareness about first aid and basic life support constitute of life saving and protection form injuries. As injuries remain a threat to school students particularly in industrial secondary schools, therefore first aid and basic life support are important for them to be able to deal properly with these injuries.

Aim of the study: was to assess the effect of training program on students 'knowledge and practice regarding first aid and basic life support in industrial secondary schools.

Material and methods: The study used a quasi experimental design to collect data from two selected industrial secondary schools that representing the two educational sectors at Tanta City, Elgharbia Governorate, which named; the textile and mechanical secondary school.

Sample: A convenient sample of 60 students who divided as following; 30 female students from all classes in textile secondary school and 30 male students from all classes in mechanical secondary school.

Tools: Two tools used for data collection, Too(1); an interview questionnaire to assess student's knowledge regarding first aid and basic life support and tool (2); observational check list sheet related to first aid and basic life support performance.

Results: As a result of this research, it was determined that all students has poor mean score of knowledge and practice regarding first aid and basic life support. Post program more than half of them had good mean score of knowledge and 86.7% of them had good mean score of practice.

Conclusion and Recommendation: Based on the findings of the study, there were significant improvement in the mean score of knowledge and practice. So it is necessary to improve wide-spreading of first aid and basic life support training programs to whole industrial secondary technical schools due to their occupational hazards. Constant and practical of this program by nurses must take an effective role in training program.

Key words: first aid, basic life support, training program and industrial secondary schools.

I. Introduction

Injuries among school students are considered as one of the most serious health problems facing the world today because it can result in life long disability or even death. So that first aid and basic life support becomes as important as preserving their life and minimizing the consequancies of injuries until help is obtained[1]. In the whole world, at least 875000 school students aged below 18 years die because of unintentional injuries yearly and more than 95% of these deaths occur in countries with low and middle income levels, more serious injuries have been reported at schools[2]. According to the World Health Report, the burden of the disease due to injuries has increased from about 12% in 1990 to 15% in 2000 and expected to increase to about 20% by 2020 [2]. For about industrial injuries at school, the International Labor Organization defines it as an event which causes some certain damage or injury which is not expected. Previous research showed that 80-90% of school industrial injuries stem from human errors, while 10-20% of these injuries occur due to environmental conditions [3,4].

Injuries which commonly occur at schools setting are the leading cause of death for school students in the school-going age all over the World [5]. Early and appropriate management of such emergencies and injuries can help to reduce morbidity and mortality rate [6]. Properly administered first aid can mean the difference between life and death, rapid versus prolonged recovery and temporary versus permanent disability[7]. Also providing cardiopulmonary resuscitation training in schools and university settings has been widely recommended as a long-term strategy to educate the wider community [8-13]. In their day to day life, school students often suffer from injuries like cuts, sprains, burns, insect bites, choking, epileptic fits, nose bleeds, in the same time various incorrect management associated with these injuries still exist among them [14]. These results indicate that the number of injuries can be decreased by training school students about possible dangers and establishing safe working conditions [4].

In the general, school students have poor knowledge about safe working conditions during injuries, so most of them must be motivated to learn about first aid and basic life support which are components of chain survival for a person experiencing a life threatening injuries [15]. First aid is the initial assistance or management given at the site of accident to someone who is injured or suddenly taken ill to save their life before the arrival of ambulance [16]. Basic life support is an essential emergency care component that should be provided for all cardiac arrest victims with no definite contraindications until provision of full medical care at hospitals [17]. First aid provider should be trained to be able to assess the situation quickly and calmly, deal with life threatening conditions meanwhile protecting him/ herself from the danger, obtain medical aid and call an ambulance in case of serious injury or illness [18].

Basic first aid training prepares students to react to situations and provide immediate, efficient management for a wide variety of incidents as; chocking, breathing and circulation emergencies, respiratory and cardiac arrest, fracture of bone, muscle injuries, bleeding and cardiopulmonary resuscitation training [19]. Students attending in training program constitute a high risk group for exposure to accidents due to danger of their learning conditions [15]. Providing of knowledge and training about correct management of injuries and illnesses to students is important for two causes; first, it will improve their health knowledge which in turn may lead to healthy and save life. Second, they may be used as a change agent in the family and community [20]. So the school should prepare students to meet these needs which including; assistance to victims, quickly emergency response, care for their own safety, and the safety of victims and witnesses [21].

School nurses play an important role in the providing students with basic emergency lifesaving skills as part of the school health program [22,23]. It is essential that the students possess adequate knowledge and practice for management of commonly occurring injuries and illnesses at the school. So the introduction, acquisition, and reinforcement of basic emergency lifesaving skills training during the school years may heighten students' confidence to respond to an emergency situation and may provide updating for these skills after high school graduation [24]. Therefore the aim of this study was to assess the effect of training program on students' knowledge and practice toward first aid and basic life support in secondary industrial schools.

Significance of the study:-

Because school health learning in industrial secondary schools give limited emphasis for first aid and basic life support in the educational curriculum plan, in the same time students in these schools spend most of their educational day within a school environment, which is most likely setting for injuries due to usual work in this school as; bleeding, asthma attacks, epileptic, fracture ect.. that may require first aid procedures. So it is necessary to conduct our study to train those students about first aid and basic life support to be able to deal safely with these injuries and also update their knowledge and skills in the light of recent first aid guidelines.

II.   Aim of the study

Assess the effect of training program on students'knowledge and practice regarding first aid and basic life support in the industrial secondary schools.

III.   Material and methods:

Research hypothesis:-

A training program about first aid and basic life support for industrial secondary school students may improve their knowledge and practice.

3.1 Research design;

A school based quasi-experimental study design was used.

3.2 Settings;

The study was conducted in two secondary schools selected randomly from four industrial secondary schools which representing two educational sectors at Tanta City (East & West), Elgharbia Governorate, these schools are; the textile secondary school and the mechanical secondary school. The criteria for selection of schools were based on schools where students were studied and trained on dangerous subjects in the curriculum study plan.

3.3 Subjects;

A convenient sample of (60) students from two selected previous industrial secondary schools were obtained. From each school (30) students were invited to be included in the study who divided as following; (30) female students from all classes in the textile secondary school and (30) male students from all classes in the mechanical secondary school.

<u>*Inclusive criteria;*</u>
-Students who are available during the study.
-Students who are willing to participate in the study.

3.4 Study Tools:
　　　The current study used two tools which was developed by the researchers based on related study conducted by **Fahmy N.M.(2011)** [2] and current related literature [25-28] , to assess students' knowledge and practice toward first aid and basic life support in industrial secondary schools at pre, immediate and 1-month post training program, They were as following;
Tool I: An interview questionnaire; It was consisted of two parts**;**
Part (1): socio-demographic characteristics of the students such as: name, age, gender, academic year, father and mother education and residence.
Part (2): Knowledge questionnaire sheet: was developed by the researchers to gather students knowledge regarding first aid and basic life support; the questionnaires covered the common types of secondary school accidents and injuries and their management as the following; general knowledge about first aid (8 questions), fractures (4 questions), bleeding and wound (4 questions), burn (5 questions), fainting & epilepsy (2 questions), poisions (5 questions), diabetic coma & asthma (5 questions) and chocking & basic life support (7 questions).
Scoring system of these questionnaires: - The researchers were used two point scales to measure each question of the knowledge sheet: (0) for wrong answer and (1) for right answer. Total score of knowledge was (40) points, it was categorized into three levels; poor knowledge > 50%, fair knowledge 50-70% and good knowledge < 70%. The higher the score the better knowledge for first aid and basic life support.
Tool II- Observational checklist sheet; this tool was consisted of (66) statements that was covered nine procedures related to; fracture (10 steps), chocking (5 steps), CPR (9 steps), wound and bleeding (6 steps), burn (7 steps), fainting (7 steps), epilepsy (8 steps), poisions (5 steps), diabetic coma (5 steps) and asthma (5 steps).
Scoring system of these questionnaires: - The researchers used two point scales to measure each step of the practice (1) mark was given for done step and (zero) for not done step, with a total score of (66), it was categorized into three levels; poor practice > 50%, fair practice 50-70% and good practice < 70%. The heigher the score the better the performance for first aid & basic life support.

3.5 Methods of data collection:
　　　The necessary approval was obtained from the Directorate of Ministry of Education for Headmasters and directors of the two selected schools at Tanta City, Elgharbia Governate. Informed consent was obtained from every student who included in the study after explanation the aim of the study and assuring them of confidentiality of the collected data. Confidentiality was maintained by the use of code number instead of name and the right of withdrawal was reserved. The developed tools were tested for its content validity and reliability by a jury of five expertise's in different fields of Medical & Surgical Nursing and Community Health Nursing at Faculty of Nursing in Tanta University, The experts' responses were represented in four points rating score ranging from (4-1); 4= strongly relevant, 3= relevant, 2= little relevant, and 1= not relevant. Validity of the questionnaires based on experts opinions were calculated and found to be = (98%). The reliability for the study tools was calculated by Cronbach's alpha, it was 0.897 for tool (1) and 0.980 for tool (II). A few changes were made for a few unclear words. A pilot study was conducted on (6) students to test the tools for its clarity, organization, applicability and to determine the length of time needed to collect the data. The necessary modifications were done. Those students were excluded from the study sample. Data collection for this study was carried out in the period from February 2015 to May 2015.

Procedure of data collection:
- Pre program assessment test for the students' knowledge and practice about first aid and basic life support were done by the researchers to detect their learning needs in *the 1ˢᵗ week* before starting the program for each school. Needs were taken into consideration when preparaing the training program content. Knowledge sheet was filled by the students within 30 minutes and observational check list was filled by the reasearchers within 50 minutes for each students.
-The program was done by the researchers to ensure providing complete and accurate knowledge and practice to all students about first aid and basic life support. The instructional material which are used in the process of teaching were included the booklet prepared by the researchers through literature review [29-33] , video tapes, power point presentation that containing information about first aid, demonstration using real objects as bandage, splints and simulator as CPR doll. A booklet was given to each student at the end of sessions to refresh their knowledge.
-Each school was visited by the researchers separately at different days, and the students were divided into two group at each school, each group was included 15 students. The training program was covered in (16) sessions;

each session lasts for 2 hours, 2 days per a week for a period of 8 weeks. *1st and 2nd week* two groups were given *4 sessions* about theoretical knowledge regarding first aid and basic life support which covered; general knowledge about first aid and its bag, fractures, bleeding, wound, burn, fainting, epilepsy, poisions, basic life support and diabetic coma as following; in the first week two sessions was carried out in the textile secondary school and in the second week two sessions was carried out in the mechanical secondary school.

- In the following *6 weeks (12 sessions)* were given to the students regarding performane of first aid and basic life support by using videos demonstration, cardiopulmonary resuscitation doll, role play situation and practical demonstration according to the following sequence; (fracture, chocking, CPR , wound and bleeding, burn, fainting, epilepsy, poisions, diabetic coma and asthma on a Little manikin. The performance was done as following; *in the 3rd , 5th,7th* weeks the sessions were carried out for the students in the textile secondary school and *in the 4th , 6th, 8th* weeks the sessions were carried out for the students in the mechanical secondary school.

Post-test evaluation phase;

Immediately post program and after one month period, the researchers were reassessed knowledge and performance of the students related to first aid and basic life support to test if there is any improvement and retained knowledge and practice over time among the participants. The students were not aware of the scheduled assessment beforehand. The time of evaluation the observers told the student to imagine being in the educational class when his friend was injured and he perform first aid and basic life support procedure for him.

IV.   Methods of data analysis:

All data were collected, coded, tabulated and subjected to statistical analysis. Statistical analysis is performed by statistical Package SPSS in general (version 20), also Microsoft office Excel is used for data handling and graphical presentation. Quantitative variables are described by the Mean, Standard Deviation (SD), while qualitative categorical variables are described by proportions and percentages. Descriptive statistics are used to analyze the response to individual items and the respondents' characteristics. Chi-square and P- value test used. Linear coefficient correlation was used to examine the correlation between knowledge and practices total scores.

V.   Results:

Table (1) shows the distribution of the studied students according to their socio-demographic characteristics. As regard to age, the table shows that the highest percentages of the students (40.0%, 38.3%) were in the age group (15- 16 and 19) years old respectively. In relation to gender and academic year, the table shows that half of students were male and another half were female and highly percentages of them (46.7%) were from students in the first year. Regarding father and mother education the table reveals that about (48.3%, 38.3%) of students respectively were belonged to secondary educated parents. For residence, the table shows that more than half of students (58.3%) were from rural area. In addition, three quarters (75%) of students had not any previous knowledge about first aid and basic life support and the remaining quarter (25%) that had knowledge was received it from school health clinic.

Figure (1) shows the level of knowledge among studied students' regarding meaning, objectives, precautions and bag of first aid at pre, immediate and 1-month post training program. The figure shows that there was significant improvement in the level of knowledge among students regarding meaning, precautions and bag of first aid from (44.4%) preprogram to (100%) immediate post program and after 1- month post training program there was slightly decrease in knowledge to bout (88.9%).

Table (2) shows the level of knowledge among studied students' regarding first aid and basic life support at pre, immediate and 1-month post training program. This table reveals that there was highly statistically significant improvement in the level of knowledge regarding first aid and basic life support as following; immediately post training program the improvement in the level of knowledge were from poor level (11.7%) to (36.7, 51.7%) fair and good level respectively. After 1- month post training program the improvement in the level of knowledge were from poor level (15.0%) to (30 and 55%) fair and good level respectively at P = 0.001.

Figure (2) shows the mean score of total knowledge among students regarding first aid and basic life support at pre, immediate and 1-month post training program. The figure reveals that there was significant difference in the mean score of total knowledge which was observed at pre, immediate and after 1-month training program as following; (11.90 $\pm$ 4.05, 31.57 $\pm$ 5.21 and 30.30 $\pm$ 5.32) respectively at P=0.001.

Table (3) shows the distribution of studied students according to their mean score of total first aid practice at pre, immediate and 1-month post training program. Highly statistically significant difference in the mean score of total practice regarding different items of first aid related to fracture, bleeding, burn, fainting, epilepsy, poisoning, hypoglycemia and asthma was observed at pre, immediate and post training program where p = 0.001.

Table (4) shows the distribution of studied students according to their mean score of total basic life support practice at pre, immediate and 1-month post training program. The table reveals that there was highly statistically significant difference in the mean score of total practice regarding different items of basic life support (chocking and cardiopulmonary resuscitation) at pre, immediate and post training program at p = 0.001.

Table (5) shows the level of total practice score among studied students regarding first aid and basic life support at pre, immediate and 1-month post training program. This table shows that there was highly statistically significant improvement in the level of total practice regarding first aid and basic life support as following; immediately post training program the improvement in the level of total practice were from poor level (0.00%) to (13.3, 86.7%) moderate and good level respectively. After to 1- month post training program the improvement in the total level of practice were from poor level (0.00%) to (21.7 and 78.3%) moderate and good level respectively at P = 0.001.

Table (6) shows the correlation between total knowledge and total practice scores among studied students at pre, immediate and 1-month post training program. The table shows that there were statistically significant improvement in the score of total knowledge and total practice of the studied students regarding first aid and basic life support with positive correlation between their knowledge and practice throughout the study at P = 0.004.

Table (1): Distribution of studied students according to their socio-demographic characteristics.

Socio-demographic Characteristics	The studied students (n=60)	
	No	%
Age		
15- 16	24	40.0
17- 18	13	21.7
19	23	38.3
Range	15-19	
Mean ± SD	17.45 ± 1.48	
Gender		
Male	30	50.0
Female	30	50.0
Academic year		
First year	28	46.7
Second year	12	20.0
Third year	20	33.3
Father Education		
Illiterate	13	21.7
Elementary education	15	25.0
Secondary	29	48.3
University	3	5.0
Mother Education		
Illiterate	18	30.0
Elementary education	16	26.7
Secondary	23	38.3
University	3	5.0
Residence		
Rural	35	58.3
Urban	25	41.7
Previous knowledge about first aid and basic life support		
No	45	75.0
Yes	15	25.0
If yes Source of knowledge (n=15) School health clinic	15	100.0

Figure (1): Level of knowledge among studied students' regarding meaning, objectives, precautions and bag of first aid at pre, immediate and 1-month post training program
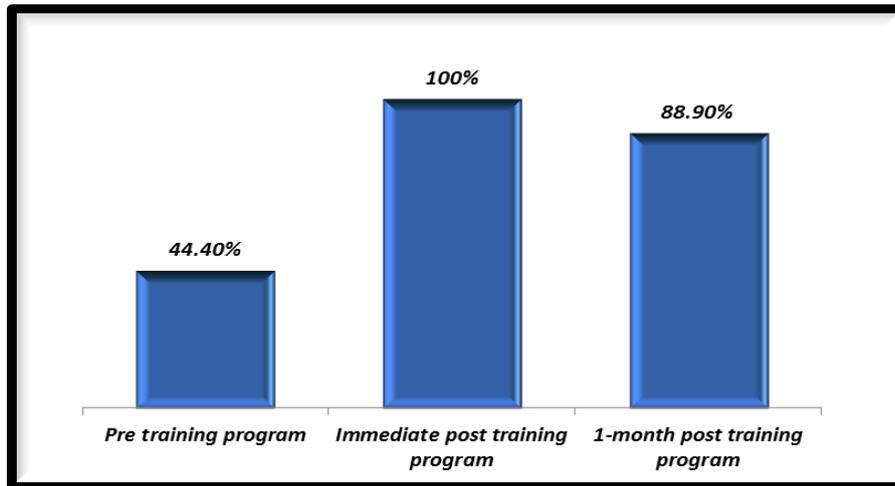

Table (2): Level of knowledge among studied students' regarding first aid and basic life support at pre, immediate and 1-month post training program.

Total knowledge score	Study sample (n=60)						X2 P
	Pre- program (I) (n= 60)		Immediate post- program (II) (n= 60)		1-monthes post- program (III) (n= 60)		
	N	%	N	%	N	%	
Good	0	0	31	51.7	33	55	
Fair	0	0	22	36.7	18	30.0	92.30
Poor	60	100.0	7	11.7	9	15.0	0.001**
Range	5-21		21-40		20-37		

Figure (2): Mean score of total knowledge among students regarding first aid and basic life support at pre, immediate and 1-month post training program
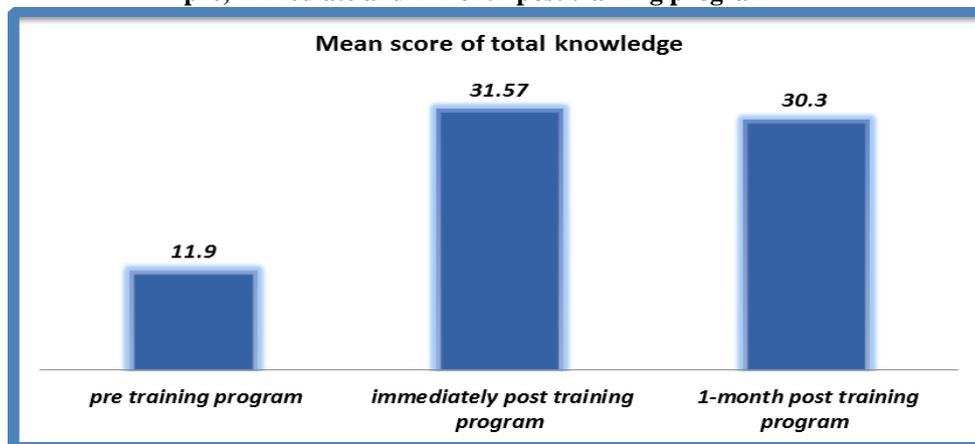
Table (3): Distribution of studied students according to their mean score of total first aid practice at pre, immediate and 1-month post training program

practice items	Study sample (n=60)			X2 P
	Pretest Mean ± SD	Immediate post test Mean ± SD	1- months post test Mean ± SD	
Total mean score of fracture	0.65 ± 0.86	8.75 ± 1.29	8.68 ± 1.52	98.64 0.001**
Total mean score of bleeding	0.92 ± 0.67	5.43 ± 0.72	4.88 ± 1.36	99.67 0.001**
Total mean score of burn	0.17 ± 0.37	6.08 ± 0.94	5.72 ± 1.16	98.88 0.001**
Total mean score of fainting	0.42 ± 0.49	6.22 ± 0.99	6.47 ± .79	100.65 0.001**
Total mean score of epilepsy	0.05 ± 0.22	7.43 ± 1.06	6.67 ± 1.39	102.20 0.001**
Total mean score of poisoning	0.25 ± 0.43	3.57 ± 1.24	4.30 ± .97	98.25 0.001**
Total mean score of hypoglycemia	0.65 ± 0.48	4.47 ± 1.21	5.08 ± 0.12	101.39 0.001**
Total mean score of asthma	0.80 ± 0.73	3.93 ± 0.97	4.10 ± 0.79	99.37 0.001**

**Highly significant, p-value ≤0.01

Table (4): Distribution of studied students according to their total mean score of basic life support practice at pre, immediate and 1-month post training program

practice items	Study sample (n=60)			X2 P
	Pretest Mean ± SD	Immediate post test Mean ± SD	1- months post test Mean ± SD	
Total mean shocking score	0.32 ± 0.56	4.73 ± 0.68	4.18 ± 1.14	105.94 0.001**
Total CPR mean score	0.13 ± 0.34	8.08 ± 1.30	7.73 ± .98	101.56 0.001**

**Highly significant, p-value ≤0.01

Table (5): Level of total practice score among studied students' regarding first aid and basic life support at pre, immediate and 1-month post training program.

Total practices score	Study sample (n=60)						X2 P
	Pre- program (I) (n=60)		Immediate post- program (II) (n=60)		1-monthes post- program (III) (n=60)		
	n	%	N	%	N	%	
Good	0	0	52	86.7	47	78.3	93.18 0.001**
Fair	0	0	8	13.3	13	21.7	
Poor	60	100.0	0	0	0	0	
Range	0-11		45-66		45-66		

Table (6): Correlation between total knowledge and total practice scores among studied students at pre, immediate and 1-month post training program.

Items of correlation	Preprogram total practical score	Immediate post program total practical score	1-month Post program total practical score
	r p	r p	r p
Preprogram total score of knowledge	0.505 0.000**	0.279 0.031*	0.362 0.004**
Immediate post program total score of knowledge	0.092 0.483	0.337 0.008**	0.059 0.655
1-month Post total score of knowledge	0.131 0.319	0.364 0.004**	0.141 0.281

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

VI.   Discussion

Injuries is a very important factors that affect school acheivement, it is considered the cause of disabilities and death among students [34]. Rapid administration of first aid and basic life support immediately after injury may minimize morbidity and mortality rate that resultes from it [35]. Therefore this study was conducted to assess the effect of training program on students' knowledge and practice regarding first aid and basic life support in industrial secondary schools.

At the beginning of the study, the pretest was applied for school students to analyze their sociodemographic data, knowledge and practice related to first aid and basic life support in order to develop specifically targeted program for them. In this context, the results of this study showed that before implementation of the training program among studied students, they had low scores of knowledge and poor practices. After implementation of the program there were significant improvement in their knowledge and practice scores regrading first aid and basic life support.

Regarding socio-demographic characteristics. The study results revealed that the two fifth of the students were in the age group (15- 16) years old. In relation to gender, the table shows that half of students were male and other half were female. In addition to about three quarter from the students have not any previous knowledge about first aid and basic life support. This results were in agreement with **Dasgupta A., etal. (2014)**[14] Who said that most of the students subjects were 14 years of age (58.09%) and most of them were females (56.2%) belonging to the general caste (68.6%). But (95.2%) of them had never been exposed to any sort of first aid training before this study was undertaken. And the remaining (4.8%) who had received training had done so mainly from parents and friends.

Regarding to knowledge about meaning, objectives, precautions and bag of first aid among school students from pre, immediate and 1-month post training program, the study resutls revealed that there were significant improvement in the level of knowledge among students post program. This result was in agreement with **Dasgupta A., etal. (2014)** [14] who said that only (15.2%) of the school students know about the correct definition of the term "first-aid" and the remaining don't know this, also most of them believed that first aid could only provide by doctors and health workers. In the same line **Joseph N., etal. (2014)**[36] mentioned that general knowledge about first aid among students in their study was poor in comparison with student's awareness level in other studies. In contrast to **Abd El -Ghany A., etal. (2014)**[37] who reported that in their study of the 102 students, 76.5% from them had already general information about first aid while 23.5% from them didn't have information about it.

The importance of knowledge in the health education must not be ignored because improvement in this knowledge is the first step toward proper practice and behavior modifications, so many studies must incorporoted knowledge in their training programs to reach to this goal [2]. Concerning level of knowledge about first aid and basic life support among studied students, the study results revealed that there were highly statistically significant improvement in the level of knowledge regarding first aid and basic life support from poor to good level post training program at P = 0.001. This may be attributed to school-age are more likely to accept first aid and cardiopulmonary resuscitation training than older people, also they are motivated to learn and do so quickly and easily.This results were in agreement with **Naqvi S., et al. (2011)**[38] who reported that there was a highly significant increase in the level of knowledge and skills of participant from students about basic life support after training program and it remained so for 3 months.

The results done by **Antas K.H., etal. (2005)**[39] revealed that, it was highly effective to teach students first aid and basic life saving skills as they can form effective peer first aid trainers for other students. In addition to **Muneeswari B. (2014)** [40] who said, the study revealed that the knowledge score regarding first aid

measures was highly significant after administration of training program. Also his findings showed that training program played an important role in improving the knowledge of school students regarding first aid. Also **Roppolo L.P. and Pepe E. (2009)**[41] reported that educating school children about basic life support is an excellent strategy to reach a broad public and increases the percentage of trained adults in a community. If students share the acquired knowledge with their families and non-trained friends, we indirectly introduce a larger part of the community to the topic of basic life support.

In the same line **Conolly M., etal. (2007)**[42] determined that in their study, conducted in Northern Ireland, that children instructed in CPR showed a highly significant increase in level of knowledge following the training session. While their level of knowledge decreased over a period of 6 months it remained significantly higher than that of a comparable group of children who had never been trained. In addition to **Campbell N. (2001)**[43] found in their research that the knowledge levels of the adolescents measured simply from their answers to the questions about what to do in emergencies situations are insufficient before training.

Concerning to the mean score of total knowledge regarding first aid and basic life support, the results revealed that there were significant improvement post training program at P=0.001. This was in agreement with **Aylaz R., et al. (2009)**[44] who revealed that there were improvement in mean knowledge score of the first aid among experimental group students was measured 29.32±11.04 before training and 59.12±19.72 after training at (p<0.05), This difference between experimental group regard to their mean knowledge score from pre to posttest was found to be statistically significant.

Also **Alanazi A.,etal. (2013)**[45] reported that in their study which carried out in high school students at Riyadh Saudi Arabia indicates that school students lacked CPR knowledge preprogram where only 45.5% of the students were aware about the right technique of foreign body removal from victim and the role of the recovery position during procedure. On the other hand **Khan F., etal. (2010)**[46] reported that the overall mean score of the students' knowledge about first aid was very low (40.3%). This lack of knowledge amongst the students is indicative of the fact that only a few students have first aid knowledge.

Concerning to mean score of total first aid practice among students as; fracture, bleeding, burn, fainting, epilepsy, poisoning, hypoglycemia and asthma, the study results revealed that there were highly statistically significant improvement in the mean score of total practice throughout the study at p = 0.001. This was in agreement with **Khan F. etal. (2010)**[46] who said that students having received formal first aid training scored better than those who had no first aid training but still the mean score itself is quite low emphasizing the need for refresher courses so as to keep one self-updated with latest improvements.

In addition **Ann K., etal. (2010)**[47] mentioned that there was an increase in mean scores of first aid practice following training, suggesting an increase in knowledge among the intervention group after training program. On the other hand **Aylaz R., et al. (2009)**[44] found that the experiment group students had at the lowest level of competency about first aid management of techniques for carrying the injured victims (14%) and first aid treatment for seizures (15%) respectively.

As regard to mean score of total basic life support practice among students; as chocking and cardiopulmonary resuscitation, the study results reported that, there were highly statistically significant improvement in the mean score of total practice post training program at p = 0.001. This was in agreement with **Mejia C.R., etal. (2011)**[48] Who reported that first aid done by students following accidental choking by a foreign body was good in only 13.2% cases as against 43.6% cases in the Karachi based study. Also, **Abbas A., etal. (2011)**[18] Reported that only 53.4% in the Peruvian study where students know of measures like stroking between shoulder blades or of Heimlich maneuver by hitting the chest. In addition **Joseph N., etal. (2014)**[36] reported that in their study, only 14.5% students know correctly the steps of cardio pulmonary resuscitation (CPR) as a part of first aid management in drowning cases.

Regarding to the total level of practice among studied students about first aid and basic life support. The study results revealed that there were highly statistically significant improvement in the level of total practice regarding first aid and basic life support throughout the study at P = 0.001. These results could be attributed to the good motivation for those students from the researcher and that those students were highly interesting to get benefits from the training program to use it throughout their life. This result was in agreement with **Bollig G., etal. (2009)**[49] who reported that training about first aid has led to positive changes in social responsibility and behavior among students in addition to acquiring first aid knowledge and skills. They also, showed that skill retention tested 6 months after the course was significantly better.

Also **Vega C. (2007)** [50] **and Jones I., etal. (2007)**[51] they revealed that training programme introduces chest compressions to school students at 11 years of age concluded that a majority of them showed good retention of skills and knowledge, provided chest compression at adequate depth, and could blow the air in the manikin's chest with power that made the chest rise. On the other hand **Alanazi A., etal., (2013)**[45] said that 68.4% of the students were not familiar with techniques of resuscitation when mouth-to-mouth ventilation started. Also 72.3% of them failed to select mouth-to-mouth and nose technique as the rescue breathing for victims.

Regarding correlation between total knowledge and total practice among studied students from pre, immediate and 1-month post training program. The study results revealed that there were statistically significant positive correlation between knowledge and practice throughout the study. This may be attributed to improve knowledge among students increase their understanding and motivation to carry out these procedure of first aid and basic life support correctly. This result was in the same line with **Kano M., etal. (2005)** [52] who reported that the first aid training which they administered to participant significantly increased the first aid level of knowledge as in their study. Also, **Elbas N., etal. (2003)** [53] Concluded that experiment group's knowledge scores are better and increased dramatically after training program and also increased demonstration of first aid training. In addition, **Muneeswari B. (2014)** [40] reported that there was statistically significant correlation between post-test knowledge of first aid with performance of the students.

Therefore continuous effort should be made to help students in industrial secondary schools to perform proper management to educational risk injuries to themselves and their colleges. This can be achieved through organization and implementation of first aid and basic life support programs within school. Rapid and proper management of school injuries may reduce morbidity and mortality rate among students.

VII. Conclusion

It can be concluded from this study that pre implementation of the program, the students in industrial secondary school had poor first aid and basic life support knowledge and practice. And after implementation of the program there were statistically significant improvement in these knowledge and practice of first aid and basic life support from pre to immediately and 1-month post training program. Also there were positive correlation between their total knowledge and total practice throughout the study at P = 0.004.

VIII. Recommendation

Based on results of the present study recommendation are suggested are;
- It is necessary that first aid and basic life support courses must be a part of the curricula in industrial secondary school.
-Each school should develop standard operating procedures for first aid and emergency care for students within industrial secondary school.
- First aid and basic life support training program should be integral part of high school study programs so as to ensure that young students could grasp enough knowledge and have capability to help the people in emergency situations and disasters.
-First aid and basic life support guidelines should be available to all students at school in order to decrease the early morbidity and mortality of accidents and emergencies
-Regular workshops are necessary for students in industrial secondary school to know the practical aspects of cardiopulmonary resuscitation on dummies and refresh their knowledge continuously.

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