



## The Efficacy of the First Aid Training Program for Apprenticeship Students

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**Objective:** This research was performed to assess the efficacy of training offered to students in the Apprenticeship and Vocational Training Center in Malatya, Turkey on their level of first aid knowledge.

**Methods:** This study was planned as an interventional research project pretest, posttest; control group design which offers a training program to the students of Apprenticeship and Vocational Training Center in Malatya. We included 200 students in our study, 100 as part of the experiment group and the other 100 in the control group. In the first part of the question form, students were asked questions about their socio-demographic characteristics and another questionnaire about their previous experiences with regard to first aid. They were then asked multiple-choice questions to measure their level of knowledge of first aid.

**Results:** Mean knowledge score of the experiment group students was measured as  $29.32 \pm 11.04$  before training and  $59.12 \pm 19.72$  after training ( $p < 0.05$ ), while mean knowledge score of the control group subjects was  $32.57 \pm 10.85$  in pretest and  $33.74 \pm 10.05$  in posttest ( $p > 0.05$ ). Utilizing paired-samples t-test analysis, the difference between experiment group regard to their mean knowledge score from posttest was found to be statistically significant.

**Conclusions:** It was found that interactive first aid training offered to students indeed enhanced the first aid knowledge of the experiment group. We, therefore, suggest that these training programs should be repeated at regular intervals in order to increase the knowledge levels.

**Key Words:** First Aid, Apprenticeship, Industrial Accidents, Injury Prevention, Training

### Çıraklık Eğitim Merkezi Öğrencileri İçin Verilen İlk Yardım Programının Etkisi

**Amaç:** Bu araştırma; Malatya Çıraklık ve Mesleki Eğitim merkezindeki öğrencilerin ilk yardım bilgi düzeylerini ölçmek ve verilen eğitimin etkililiğini değerlendirmek için uygulanmıştır.

**Method:** Bu çalışma Malatya Çıraklık ve Mesleki Eğitim Merkezi öğrencilerine programlı eğitim verilmesi ile deneysel çalışma ön test, son test; kontrol grup çalışması olarak planlanmıştır. Çalışmamız 100 deney ve 100 kontrol grubu olmak üzere 200 öğrenciden oluşmuştur. Soru formunda, ilk bölümde öğrencilere sosyo-demografik özellikleriyle ilgili sorular sorulmuştur, diğer sorular ise öğrencilerin ilk yardım ile ilgili önceki deneyimleriyle ilgilidir. Öğrencilere daha sonra ilk yardım bilgi düzeylerini ölçmek için çoktan seçmeli sorular sorulmuştur.

**Bulgular:** Deney grubu öğrencilerinin bilgi skoru ortalamaları, eğitim öncesi  $29.32 \pm 11.04$  ve eğitim sonrası  $59.12 \pm 19.72$  ( $p < 0.05$ ), kontrol grubu öğrencilerinin bilgi skoru ortalamaları ön test için  $32.57 \pm 10.85$  ve son test için  $33.74 \pm 10.05$  ( $p > 0.05$ ) olarak belirlenmiştir, paired-samples t test analizi kullanılarak, deney grubu arasındaki bilgi skoru ortalamaları arasındaki fark istatistiksel olarak anlamlı bulunmuştur.

**Sonuç:** Öğrencilere verilen interaktif ilk yardım eğitiminde deney grubunun ilk yardım bilgisinin arttığı saptanmıştır. Bu sonuca göre eğitim programlarında bilgi düzeylerini artırmak için düzenli aralarla tekrarların yapılmasını öneririz.

**Anahtar Kelimeler:** İlk Yardım, Çıraklık Eğitimi, Endüstriyel Kazalar, Kazayı Önleme, Eğitim

While the rapid social, economic, and technological developments of our time enhance our lives, they also cause an increase in the safety risk factors of the people's everyday lives. These risk factors can cause accidents and injuries in different places and times. Accidents are events that occur unexpectedly, causing injuries, diseases, and loss of life and property. Traffic

accidents constitute about 40% of all accidents around the world, followed by 25% domestic accidents, 20% industrial accidents and 15% consist other accidents.<sup>1-3</sup> According to the figures for the year 1995, accidents are the third leading cause of death after cardiovascular diseases and cancer in the USA and Europe.<sup>4</sup> While accidents rank fourth among causes of death for all age groups in developed countries, it is one of the leading causes of death among children from 1 to 4 years old

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and from 5 to 14 years old age groups.<sup>5</sup> Among children most accidents observed (especially in 1-4 years old age group) occur mainly due to parents' carelessness and ignorance of proper precautions, while in the five to fourteen year old age group, accidents usually occur due to children's carelessness and lack of knowledge of proper precautions.<sup>6,7</sup> Adolescents especially between the ages of 12 and 18 are in a phase of their lives in which their levels of attention decrease as a nature of their developmental course and are thus more inclined towards accidents.<sup>8-10</sup> Also, the State Institute of Statistics reported that about 3.8 million children in the six to fourteen years old age group work in Turkey. These children, especially those working in industry, constitute a high-risk group for industrial accidents due to the nature of their job.<sup>11-13</sup>

The International Labor Organization defines an industrial accident as an event which causes some certain damage or injury, is not planned beforehand and is unexpected. Previous research shows that 80-90% of industrial accidents and disease stem from human errors, while 10-20% of accidents occur due to environmental conditions. These results indicate that industrial accidents are preventable and the number of accidents can be decreased by training of workers to be more cognizant of possible dangers more conscious, and establishing safer working conditions.<sup>13,14</sup> According to estimates released by the World Health Organization, each year about 250 million industrial accidents occur in the world and 330 thousands of them result in death. In the world, especially in Turkey, industrial accidents of all kinds kill, injure, and disable more people than wars.<sup>15,16</sup> A previous research shows that 38.5 % of 266 adolescent workers had industrial accidents and 6 % of these accidents resulted in severed limbs, while 5.3 % resulted in other serious injuries, and 8.3 % resulted in electric shocks.<sup>5</sup> In Turkey, the first aiders are few in quantity and yet they are required in many settings. It is as important to handle the accidents that do occur with appropriate intervention as it is to prevent accidents in the workplace.<sup>9,12,17</sup>

Students attending this training center constitute a high-risk group for exposure to accidents due to both the nature of development nature of adolescence and due to their work conditions. It can be considered that adolescent apprentices, who have less manual skill and work experience than adults with similar background, are more likely be at a higher risk to have industrial accidents than adults.<sup>18</sup> Therefore it is important that this demographic group be considered before others for the first aid training programs.<sup>19</sup> Although this research aimed at determining the knowledge level, and the first aid competence are important in defining the problem, the real solution is to overcome these deficiencies about this issue by offering active training methods to those

groups needing the same.<sup>20,21</sup> Although there exist some descriptive studies assessing the first aid knowledge of adolescents and child workers, and the prevalence of industrial accidents in Turkey, thus far, there have been no studies assessing the efficacy of training offered to this group.<sup>3,22</sup> Thus, this research was undertaken to assess the efficacy of training offered to students in the Apprenticeship and Vocational Training Center in Malatya, Turkey on their level of the first aid knowledge.

## METHODS

### Design

This research utilized a pretest -posttest and control group and was designed to examine the level of the first aid knowledge level and to assess the efficacy of the training offered to the students. Requirements for admission to these training programs include documentation that the student is at least 15 years old, but not older than 18, and willingness to work as an apprentice. The coursework offered includes a workplace safety course which consists at least in part of the first aid training.

### Sample

Six hundred twenty students participated in the Apprenticeship and Vocational Training center in Malatya for the 2003-2004 educational year. We included 200 students in our study 100 as part of the experiment group and the other 100 in the control group.

### Instrument

The data was gathered using a questionnaire designed by the researchers. The questionnaire consisted of two parts, the first section asked 4 questions about their descriptive characteristics and another 10 questions about their previous experiences with regard to the first aid, and in the second part they were asked 35 multiple-choice questions to measure their level of knowledge about the first aid. Each question in the second part of the question form has only one correct answer, and in order to allow an assessment over 100 each of the questions except for the first one is worth %2.86 points. So, in order to have 100 in total, the first question was given a worth of 2.85 points. In order to assess the clarity of the questions, 10 students were subjected to a preliminary test. No changes deemed necessary after this preliminary test. Time limit for students to answer the question form is about 50 minutes.

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### Intervention

After pretests assessing the first aid knowledge levels of the students were administered students both in experiment and control groups, the experiment group was planned to the first aid training. The experiment group was divided into 10 sub-groups each involving 10 students; each group was trained one day per week through using interactive training techniques such as interactive information presentation, effective questioning, audio-visual materials, role-play/dramatization in small groups, case analysis, and demonstration on a model. After completion of training both groups were given posttests.

### Ethical principles

Prior to commencing research, this study received approval from the Directorate of Apprenticeship and Vocational Training center in Malatya. Informed consent was received from each of the student participants. Unpaired t test was used for comparison of variables between the pretest –posttest studied within

groups, pearson chi-square test was used for categorical and the paired-samples t-test. A value of  $p < 0.05$  was considered significant.

### RESULTS

**Statistical analysis:** Statistical analysis were performed using SPSS for windows version 11.0 program. Data were reported as means  $\pm$  (SD). Normality for continued variables groups was determined by the Shapiro wilk test. The variables showed normal distribution ( $p > 0.05$ ). seen in Table 1, the average age of the students involved in the research was calculated as  $18.08 \pm 1.86$  years old for the experiment group and  $18.23 \pm 1.28$  years old for the control group, thus no statistical difference was found between the groups. After examining the distribution of the students' level of education, it was found that the majority of both experiment group (72%) and 71% of the control group are secondary school graduates. Distributions of the students in both groups with respect to their level of education were found to be similar ( $\chi^2=0.204, p > 0.05$ ).

**Table 1.** Descriptive characteristics and first aid experiences of the students in experiment and control groups of Apprenticeship and Vocational Training Center in Malatya in Turkey during 2003-2004.

Descriptive characteristics and first aid experiences of the students (n=200)	Experiment group n %		Control group n %		Significance
Age (mean $\pm$ s.d.)	18.08 $\pm$ 1.86		18.23 $\pm$ 1.28		t:0.661 p>0.05
Level of education					
Primary	17	17.0		16.0	
Secondary	72	72.0		71.0	$\chi^2=0.204, p > 0.05$
High school	11	11.0	13	13.0	
Field of occupation					
Plumbing	12	12.0	6	6.0	
Carpentry and joinery	7	7.0	7	7.0	
Furniture making		12.0	0	0.0	
Automobile machinery		11.0	22	22.0	
Automobile body repair		11.0	31	31.0	
Barber	13	13.0	0	0.0	
Home repair	13	13.0	15	15.0	
Hairdressing		12.0	2	2.0	
Turnery	9	9.0	17	17.0	
First aid experience		25.0	26	26.0	$\chi^2=0.452, p > 0.05$
Having accident since they began working					
Type of accident					
Industrial accidents	19	76.0		46.2	
Home accidents	4	16.0		26.9	$\chi^2=1.117, p > 0.05$
Traffic accidents	2	8.0		7.7	
Given first aid treatment after involved in these accidents	13	13.0	16	16.0	$\chi^2=1.117, p > 0.05$
Witnessing any accidents since they began working	34	34.0	35	35.0	$\chi^2=0.088, p > 0.05$
First aid attempts by those witnessing the accident	16	16.0	17	17.0	$\chi^2=0.386, p > 0.05$

Table 1 shows the distribution of the students according to accidents that they have had during the time period that they've been working, the accidents they witnessed, and the number of the first aid treatments they attempted. While 25 % of the experiment group had an accident, 27 % of the control group had an accident during the period of time they've been working thus there is no statistical difference between the accident rates of both groups ( $\chi^2=0.452$ ,  $p>0.05$ ). In the experiment group 76.0 % of the accidents were industrial accidents, 16.0 % of them were home accidents, and 8.0 % of them were traffic accidents. On the other hand 46.2 % of the accidents the students in control group were industrial accidents, 26.9 % of them were home accidents, and 7.7 % of them were traffic accidents. The difference between the groups for the first aid treatment attempts was also found statistically insignificant ( $\chi^2=1.117$ ,  $p>0.05$ ). We found that 34 % of the students in the experiment group and 36 % of the students in the control group stated they have witnessed an accident; thus there was no statistically significant difference between the statistics of students in both groups with regard to "witnessing an accident" ( $\chi^2=0.088$ ,  $p>0.05$ ). Only 16 % of the students in the experiment group and 17 % of the students in the control group had ever attempted to give the first aid treatment, thus again there was no statistically significant difference between the statistics of the students in both groups in this regard. ( $\chi^2=0.386$ ,  $p>0.05$ ), (Table 1).

Table 2 shows that only 11 % of the students in the experiment group gave correct answers to the question about appropriate first aid for spinal injuries before the training program, while this increased to 50 % after the training program. Only two of the students in the control group, however, answered the question about appropriate first aid for spinal injuries correctly in both pretest and posttest. It was found that the question about appropriate technique for carrying an injured patient was answered correctly by 14 % of the experiment group students before the training program and by 40 % of this same group after training; the control group replied correctly in pretest 21 % of the time and in posttest 18 % of the time. The question about the first assessment of the injured patient was answered correctly by 17 % of the experiment group before training and by 53 % of them after training; control group results for this same question didn't differ significantly from pretest to posttest. In the posttest (after the first aid training program) the knowledge score difference between the groups was statistically significant ( $t=11.462$ ;  $p<0.05$ ). The average of the knowledge scores the students in control group had from pretest was measured as  $32.57\pm 10.85$ , their average knowledge score from posttest was measured as  $33.74 \pm 10.05$  ( $t=-0.963$ ;  $p>0.05$ ). From pretest to

posttest, experiment group knowledge scores showed a significant leap and as expected the control group did not show have significant positive change (Table 3).

## DISCUSSION

This research was intended to assess the efficacy of the training program offered to the students attending to the Apprenticeship and Vocational Training Center in Malatya on their level of first aid knowledge. During the course of time they have been working 25 % of the experiment group students and 27 % of the control group student in the research had an accident. Among these students with accident experience 76.0 % in the, experiment group and 46.2 % in the, control group had industrial accidents. In other studies, it was found that 38.5 % of apprentices in workshops manufacturing metal goods had industrial accidents and 32.7 % of them witnessed someone having an accident nearby.<sup>5,18</sup> Thus the frequency of students having industrial accidents is higher than other types of accidents, and is therefore an indicator of their need for first aid education. As for the statistics about the occasions in which students attempted to give some first aid to an accident they witnessed, it was found that only a small proportion of the experiment (16%) and control (17%) groups attempted to give some first aid. Therefore students' statistics with regard to first aid attempts at accidents are not at a satisfactory level, which we considered to be another indicator of their lack of relevant knowledge and competence in the area of the first aid (Table 1). It was found that the experiment group students questions answered at the lowest level of competency was about first aid treatment of spinal injuries (11%), techniques for carrying the injured (14%), and first aid treatment for seizures (15%) respectively.

Campbell and colleagues and Broslow et al. 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 are insufficient.<sup>20,23</sup> It was remarkable that the proportion of correct answers to the questions especially about appropriate first aid treatment for spinal injuries, partial respiratory tract congestions, and seizures increased after a training program. In both pretest and posttest, control group students answered the questions about chemical burns and shock position most proficiently, and the questions about spinal injuries and partial respiratory congestion with the least proficiency.

A general increase was observed in the correct answers to all questions by the experiment group after the training program (which was obviously a goal of the training program). It was found in the research by Kuepper et al. about "First aid knowledge of alpine

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**Table 2.** Distribution of the students involved in the research according to their correct answers to the first aid questions n: 200 (Experiment group n: 100, Control group n: 100) students of Apprenticeship and Vocational Training Center in Malatya in Turkey during 2003-2004.

Questions answered correctly about first aid treatment regarding:	Experiment group before training %	Experiment group after training %	Control group pretest %	Control group posttest %
Spinal injuries	11.0	50.0	2.0	2.0
Carrying techniques	14.0	40.0	21.0	18.0
Assessment of the injured	17.0	53.0	30.0	27.0
Respiratory tract congestion	0.0	41.0	12.0	13.0
Number of artificial respiration applications in a minute	30.0	57.0	29.0	28.0
Shock position	42.0	51.0	34.0	33.0
Internal bleeding	20.0	56.0	31.0	27.0
Seizures	15.0	70.0	13.0	14.0
Chemical burns	28.0	62.0	46.0	54.0
Inhalation poisoning	0.0	50.0	22.0	12.0

**Table 3.** Averages of the knowledge scores of the students in experiment and control groups from pretest and post test n: 200 students of Apprenticeship and Vocational Training Center in Malatya in Turkey during 2003-2004.

	Pretest		Posttest	
	Experiment	Control	Experiment	Control
	X ±SD	X±SD	X ±SD	X±SD
Score	29.32±11.04	32.57±10.85	59.12±19.72	33.74±10.05
Degree of significance	t =-1.452 p>0.05		t=11.462 p<0.05	
	Experiment Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
	X ±S.S	X±S.S	X ±S.S	X±S.S
Score	29.32±11.04	59.12±19.72	32.57±10.85 33	74±10.05
Degree of significance	t=-13.775 p<0.05		t=-0.963 p>0.05	

mountaineers” that at the end of the training best results were obtained for cardiac emergencies and hemorrhagic shock, and the worst results were obtained for hypothermia, vertebral/back injuries, pain treatment and management of alpine emergencies,<sup>24</sup> (Table 2).

As seen in Table 3, while the knowledge score average of the experiment group students increased dramatically after training, while there was no significant change in the scores for the control group, we can therefore conclude that experiment group’s knowledge scores are better after training and also that both groups need first aid training. Elbas and colleagues showed that, women in their study who were trained in first aid and an increase demonstrated in their levels of first aid knowledge after training.<sup>15</sup>

Kuepper et al. and Kano et al also reported that the first aid training they administered significantly increased the first aid knowledge level as in their study.<sup>24,25</sup> Although these research studies were carried out in groups with different characteristics, they correlate with the findings of this research, since they show that first aid training programs increase the first aid knowledge level too.

It was found that interactive first aid training offered to students did indeed enhance the first aid knowledge of the experiment group. In the light of these findings, we concluded that the students involved in the areas we studied had insufficient knowledge about first aid and their first aid knowledge (keeping first aid material in their workplaces) levels were increased significantly after participating interactive training method.

We therefore suggest that an interactive training program should be offered to all workers, especially adolescent workers who constitute a high-risk group with regard to industrial accidents, and that these training programs should be repeated at regular intervals in order to increase and maintain the knowledge levels

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