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FIRST AID AS AN IMPORTANT TRAFFIC SAFETY FACTOR

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1 INTRODUCTION

In the Czech Republic 25.459 people were injured and 583 people killed in 2013 (Sobotka, 2014). Worldwide every year 1.24 million people are killed and 50 millions are injured in road accidents. Road traffic injuries are the world leading cause of death among young people aged 15 to 29, and the second most common cause of death for those aged 5 to 14 (IFRC, 2010).

In case of an accident the immediate help of bystanders can save lives and reduce health damage. Providers of first aid can also significantly cut down the time before the professional medical assistance arrives by calling the professional help immediately. Therefore, a proper lay first aid constitutes one important aspect of road safety.

Table 1 shows us the percentage of deaths after the traffic accident before and after entering the hospital. In European countries, where the level of medical care is high, 50% of the fatalities happen before entering the hospital. The first minutes after the accident are critical and in many cases it is only the immediate action of lay bystanders that can save lives.

Table 1: Percentage of fatalities in the traffic accidents observed in various countries (WHO data)

	Kumasi (Ghana)	Monterrey (Mexico)	Seattle (United States)	Average values of the European countries
Stage of the development of the country	Low	Medium	High	Very high
Before entering the hospital	81	72	59	50
In the hospital	19	28	41	50

Source: Ferraz, C. et al, 2012, p. 34.

The International Federation of the Red Cross and Red Crescent Societies (IFRC) states that over 50 per cent of deaths from traffic accidents occur within the first few minutes after the crash (IFRC, 2009). In case of cardiac arrest, the brain starts to die within 4 minutes. Every single minute decreases the chances to survive by 10% (IFRC, 2010). In Europe it takes approximately 8 - 15 minutes before the emergency service comes (Pleskot, 2013). Many urgent conditions have to be treated much faster, so the help of bystanders is crucial.

Therefore IFRC as well as national Red Cross organizations call for the higher rate of population trained in first aid. However, the numbers of people trained in first aid vary a lot across the Europe. The IFRC survey from 2006 states that there are 80% of population trained

in first aid in Austria as well as in Germany. This is one of the highest rates in Europe, rates in other countries are (much) lower (figure °1).

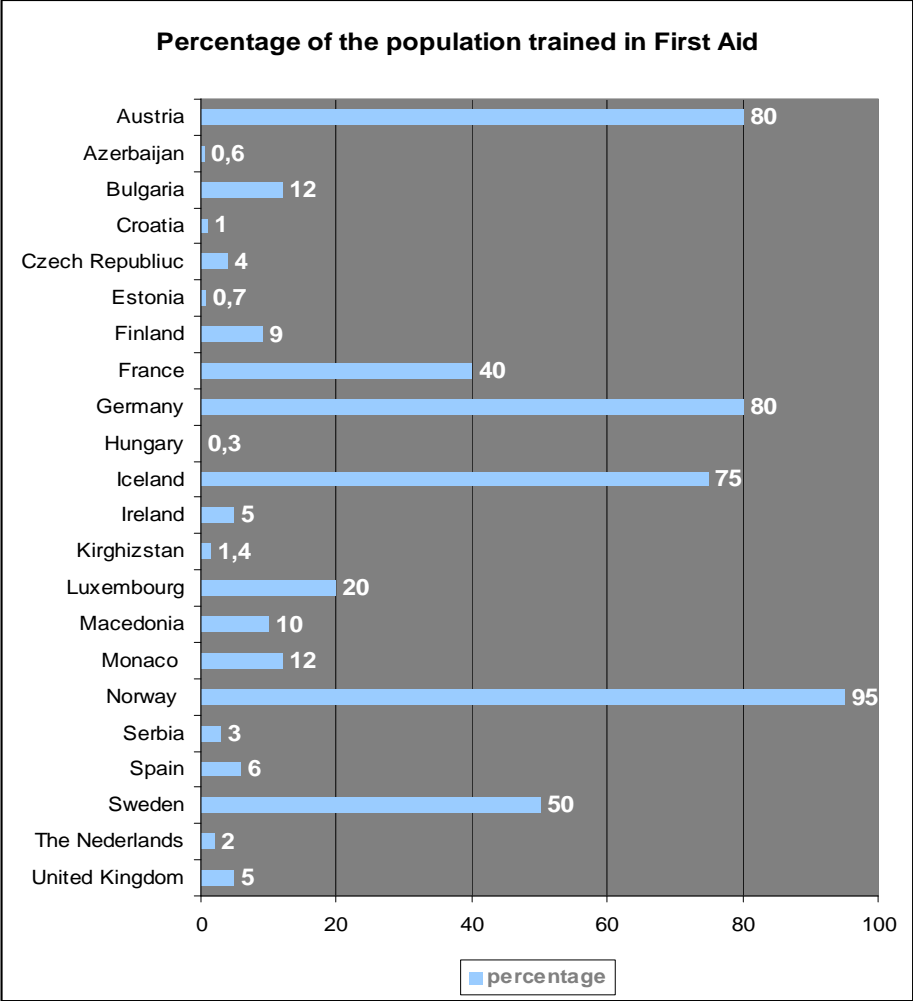


Figure 1. Percentage of the population trained in first aid

Source: IFRC health and care department, 2009, p. 3.

In the Czech Republic only 4% of the people are systematically trained in first aid (figure °1). However, the percentage of people that have gone through the first aid training does not necessarily indicate a high level of competencies, readiness to help properly and might have nothing to do with the actual performance of lay first aid providers. When compared to the Czech Republic, as well as to the rest of Europe, the percentage of the population trained in the first aid in Austria or Germany is very high. However the actual standard of first aid competencies in Germany and Austria is rather poor (Burghofer & Köhler, 2008; Müller, 2008). In Austria and Germany only 12.5 % of the people are really ready to help (Müller, 2008). The first aid training is usually too theoretical and has no connection to reality. Due to this many people are not able to act properly, although they formally have been trained.

A pilot research in the Czech Republic (Zamecnik, Kureckova & Bohmova, in preparation) showed that novice drivers that have recently passed through the compulsory 4 hour driving school first aid training mostly are satisfied with the training (71% of the respondents, n=88). Whereas 57% feel competent to give first aid, but knowledge tests showed that only 11% of them have even a basic necessary knowledge of the issue.

The effective methods of the first aid training must be developed and evaluated. Experts agree that the reduction of information is essential for successful first aid training (Breckwoldt, 2009; Pleskot, 2013). Only the basic knowledge is necessary. In many countries, as well as in the Czech Republic, the system of dispatcher-assisted resuscitation is well elaborated. After calling the emergency numbers operators are ready to provide help and advice. Therefore there are no high requirements to the special knowledge of the first aid providers.

Since many of the courses are rather theoretical, there is a lack of skills. From the didactical point of view, there are many methods for forwarding knowledge and providing skills training (e.g. Breslow et al, 1997; Pleskot, 2013; Müller, Breckwoldt & Comploi, 2014). However, there is one aspect that is much more complicated – the psychological setup of the lay first aid responders. Even if people know what they should do, their self-efficacy is too low to let them act fast and effectively. This determinates problems especially in the first phase of the first aid provision – people hesitate and start action too late. In many cases people who have both knowledge and skills fail due to psychological obstacles and lack of a psychological readiness for the first aid. This influences a lot both their self-efficacy and their feelings about the first aid giving process. Therefore not only the knowledge and skills but also the self-efficacy improvement must be a part of the effective first aid training

FIRST AID GIVING AS AN EMOTIONAL PROCESS

The psychological processes that are in progress during and after giving first aid are a serious theme. Numerous studies (e.g. Davies et al., 2008; Skora & Riegel, 2001) show that there are many thoughts and feelings that run in people's minds; doubts about their own abilities, uncertainty because of differences between training situation and reality; and various emotions such as joy, pride, hope, sadness, fear.

Riegel et al. (2006) state that most of the first aid providers did not experience a high level of stress. Meron et al. (1996) in their analysis of emergency line records stated that 77% of the first aid providers seemed to be completely calm. On the other hand Ranse & Burke (2012) consider stress to be a relevant problem. Axelsson, Herlitz & Fridlund (2000) reported that many of the interviewees in their research felt powerless, perceived the situation as uncertain and were worried if what they did was right. Hasík (2012) states that emotions and feeling of insufficiency are the key barriers of first aid giving.

Axelsson, Herlitz & Fridlund (2000) identified intuitive acting as one of the important factors

in the process of first aid giving. But the well-known concept of diffusion of responsibility (Darley & Latané, 1968) is also often mentioned in connection with first aid providing: The presence of other people reduces the initiative of the individual. People rely on the others and hope that they will help. The possible control by the bystanders also contributes to the inhibition of potential helpers. Very often people are worried about the potential harm they could cause to others.

OUR QUALITATIVE RESEARCH

In the Czech Republic we carried out a qualitative pilot study of the first-aid giving process. The results showed that there are various feelings during the first aid giving (blockade – temporary inability to do anything; limited ability to recall the relevant information learned earlier; decrease of performance even with simple tasks; time distortion – time seems to run slower than it really does; selective perception - many important pieces of information stay out of the interest; strong subjective stress; stress due to bystanders). Various feelings and processes occur not only during the first aid giving but also after it. There are doubts about one's acts and decisions, feelings of guilt and failure, feeling of disclosure (lay rescuers have no information about what happened to the rescued person(s) next), development of a relationship between rescuer and rescued person – even if they were strangers before, situational trauma – PTSD symptoms.

Stress and confusion were the dominate aspects of the experience. Most of the respondents perceived the situation as extremely stressful and reported a persisting trauma.

Our research was only a first pilot study of the issue. It is obvious that there are many cognitive and emotional aspects that have to be investigated more. The feelings, the decision making process, perception, priorities, communication and interaction between the first aid provider and the patient, bystanders, paramedics and emergency line dispatchers can also play an important role in the process. Understanding of the process can help us to establish the system of first aid training even more effectively.

2 TRAINING CONCEPTION

Based on the effective principles of the first aid training and current knowledge about the process of lay first aid giving we elaborated a new conception of the first aid training that can effectively train the participants to achieve desired competencies on all levels of preparedness – knowledge, skills as well as the psychological setup.

THE CONTENT OF TRAINING

The experience-based first aid training is designed as 16 hours programme and should be conducted in three basic steps: 1. **Check the situation** (safety, number of casualties, the whole scene, context); 2. **Act fast** (if there is anything that can endanger the life of the patient - unconsciousness, massive bleeding, lack of breath); 3. **Care** (if the person is conscious and not bleeding, monitor the situation and ask about everything that can be important) - think about life-threatening situations that might be difficult to notice.

Basic information people have to keep in their mind

What to do if the traffic accident happens

1. Watch out (care about safety of the rescuer as well as the safety of the victims, traffic accidents are usually very dangerous for any bystanders. It is therefore very important to keep all the safety rules.) Basic safety support actions also have to be done before the first aid – turn off the engine, warning triangle, check the airbags, flammable liquids, blood).
2. Act – when there is a situation that requires immediate help (no breathing, massive bleeding).
3. Think about other risks and life threatening states that might not be visible on the first sight (internal bleeding, spinal injuries).
4. Call the emergency line as soon as possible.

There are some basic skills that should always be trained - treating the unconscious person, CPR, handling the people during the traffic accident. We aim to develop necessary attitudes - willingness to help, awareness that it is important to save life, self – consciousness – people know that they are able to help, and acceptance of any emotions that can occur during and after the first aid process.

In table 2 you can see a detailed training schedule that should be kept to achieve the optimal efficacy.

Table 2: Detailed training schedule

Time schedule	Activity
Day 1	
9:00 – 9:15	Kick -off, lectors introduction, curriculum description, expectations of the participants
9:15 – 9:45	Opening simulation

	Unconscious patient treatment
9:45 – 9.55	Three steps – generally
10.00 – 10.15	First step – check out the situation, safety issues
10.15 – 10.40	The second step – (un) consciousness, how to treat unconscious patient
10.40 – 11.00	Drill of the unconscious patient treatment
11.00 – 11.15	Short break
11.15 – 11.30	Micro simulations (1 by 1 participants) – unconscious patient treatment
11.30 – 11.45	Resuscitation
11.45 – 12.00	Resuscitation drill
12.00 – 12.10	How to call 112
12.10 – 12.30	Spinal injuries
12.30 – 13.30	Lunch break
13.30 - 14.30	Roundabout simulations – spinal injury, unconscious patient treatment , safety
14.00 – 14.15	Internal injury.
14.15. – 14.30	Short break
14.30 – 14.40	Massive bleeding
14.40 – 15.20	Massive bleeding – training
15.20 – 15.50	Simulations – internal injury versus massive bleeding
15.50 – 16.15	Triage – priorities
16.15 – 16.30	Closing of the day – opinions, needs, feelings, requires...
Day 2	
9.00 – 9.10	Warm up
9.10 – 9.30	Micro simulation – unconscious patient treatment
9.30 – 10.00	Traffic accident – how to proceed, priorities
10.00 – 10.30	Roundabout simulations (unconscious patient, resuscitation, massive bleeding, safety)
10.30 – 10.45	Short break
10.45 – 11.15	Weak points – revision
11.15- 11.30	Head injuries
11:30 – 12.00	Resuscitation of infants, training
12:00 – 13:00	Lunch break
13:00 -14.00	Big outdoor car accident simulation
14.00 – 14.20	Analysis
14:20 – 15:20	Big outdoor simulation
15.20 – 15.40	Simulation analysis
15.40 – 16:30	Questions, other themes, ending

Number of participants

Material

Medical supplies (rubber gloves, compressive bandages...), masking utilities, cars, broken glass, resuscitation dummies, lecture notes for the participants are necessary.

Space, location

For the experience-based trainings at least two classrooms and back space for lecturers should be available. Also safe outdoor spaces where cars for the accident simulations can be placed are needed.

MAIN BENEFITS OF FIRST AID TRAINING (EXPERIENCE-BASED):

The first aid training based on experience principles has many benefits, when compared to the traditional frontal and mainly theoretical conception of training. It develops the capability to give first aid and react adequately in acute situation. It also develops a self-confidence of the participants. The effective training also reduces the stress during the first aid giving and also the stress and feelings of guilt and failure after the first aid giving. The participants are much more aware of the potential psychological consequences first aid giving may have.

KEY PRINCIPLES OF THE EXPERIENCE-BASED FIRST AID TRAINING

The experience based first aid training is based on basic principles that increase its efficacy. First is motivation – people should be willing to learn, then the reduction of theoretical information - as little information as possible, as much repeating as possible, as simple and understandable language as possible. The training is focused on skills and key skills drill. It develops self-confidence (during simulations people can experience that they really are capable to help, mistakes are presented as an opportunity to learn – “The mistake you did during the training you will never do again in real life.”). The training also continually works with emotions – explaining and talking not only about the situation people can experience, but also about emotions that can occur during or (even long) after the first aid.

LECTORS COMPETENCIES

According to the Czech legislation, the lecturers of the first aid at driving schools must get a “First aid member” certification. That means they have to pass about 120 hours of accredited training. For lecturers using an experience-based methods further education should be required. Degree in education science or psychology or psychotherapeutic background can be helpful too.

Trained and skilled figurants for simulations help to conduct the training more effectively, but due to the costs they usually act on volunteer basis only.

3 PILOT EVALUATION OF THE TRAINING

We made a pilot testing of the programs. The aim of the pilot testing was to see whether there are differences in efficacy between the standard 4 hours training that is currently a mandatory part of driving schools in the Czech Republic and experience-based 16 hours training that should be a new best practice in driving schools.

There were two groups of participants. The first one went through the 4 hour standard programme (frontal lecture, mainly theoretical) and the second one went through the 16 hours experience-based training (according to the principles and schedule mentioned above).

After the training the level of knowledge, skills and performance in simulated situations was assessed to see if there are differences between the two groups.

PARTICIPANTS

Our target group were the participants of driver improvement courses first aid trainings are part of. The group of 30 participants were randomly divided into two groups, each per 15 participants. The first group went through the standard training, the second group went through the experience-based training.

The participants in the group 1 (standard training) were aged between 19 and 52 years. The average age was 34 years. 13 of the participants were male, 2 of the participants were female. The participant in the group 2 /experience-based training) were aged between 20 and 52 years. The average age was 35 years. 14 of the participants were male, 1 of the participants was female.

None of the participants have gone through any other first aid training during last 2 years.

METHODS

The first group of participants went through the 4 hours standard training, the second group of participants went through the 16 hours experience-based training. After the training the competencies of participants were tested. There were three levels of competencies tested: 1. Knowledge; 2. Skills; 3. Performance in the simulated situation. The knowledge was tested by a short written test. There were six open questions, focused on the main topics of the first aid (the emergency line number, the proceedings on the traffic accident scene, internal injury issues, spinal injury issues, priorities, taking casualties outside of the car). The accuracy of the answers was then evaluated by the trained lector and marked on the scale 1 – 5 (1 the best, 5 the worst) to distinguish the accuracy and relevancy of the answers.

There were three main skills evaluated – check of the life functions (unconscious casualty treatment), CPR – artificial breathing and CPR – chest compressions. The performance was evaluated by the skilled observer and marked on the scale 1 – 5 (1 = the best, 5 = the worst).

Then the simulated situation was arranged – traffic accident scene with casualties whom the participants were to give the first aid. The performance in simulated situation was observed and evaluated by a trained observer. The same observer observed all participants in both groups. The video record was used for the prove check of the performance. There were four main aspects evaluated – the activity, the fastness of the reaction, accuracy of the action and the safety risks awareness. The results were marked on the scale 1 – 5 (1= the best, 5 = the worst performance).

RESULTS

The ratings that 16 hours experience based training leavers achieved were compared to the results of people that had gone through a standard 4 hour first aid course. Due to the number of participants only basic descriptive statistics were made.

Tab. 3 shows the differences in knowledge between longer and regular training leavers. In all of the questions there is a remarkable difference between the groups. The results for the 4 hour standard training leavers were rather poor, on the other hand the results of the 16 hours experience-based training were very good. In internal injury issues and spinal injury issues the differences were enormous, since such topics are not considered in most of the short 4 hour trainings, so no one of the participants of the 4 hours training knew the right answer. The knowledge was also affected by many myths and misunderstanding we could see with the standard 4 hour training leavers.

Table 3. Comparison of the level of knowledge (average ratings – 1= the best; 5 = the worst)

Type of training	Emergency line number	Desired proceedings on the scene of traffic accident	Internal injury issues	Spinal injury issues	Priority issues - massive bleeding or resuscitation	When do you take casualties outside of the car	Average knowledge rating	
Improved	Mean Std. Deviation	1,00 0,000	1,60 ,828	1,07 ,258	1,07 ,258	1,00 0,000	1,53 ,516	1,2111 ,23117
Standard	Mean Std. Deviation	2,33 1,447	4,00 1,000	5,00 0,000	5,00 0,000	2,33 1,952	3,93 ,961	3,7667 ,61978

Tab.°4 shows the comparison of the basic skills. Here a remarkable difference between the 16 hour experience-based training and the standard conception is clearly visible. The biggest difference is in the life functions check – unconscious casualty treatment where the performance of the standard training leavers was poor. The smallest difference was in the chest compression. It is probably due to the fact that the chest compression is one of the few practical activities that are trained during the 4 hours standard training. However the performance of the standard 4 hour training leavers was still worse and the participants also spontaneously mentioned more tension and stress during the activities.

Table 4. Comparison of the level of skills (average ratings; 1= the best; 5 = the worst)

Type of training	Life functions check - unconscious casualty treatment	CPR - artificial breathing	CPR - chest compression
Improved Mean	1,20	1,60	1,07
Std. Deviation	,414	,737	,258
Standard Mean	3,67	3,47	2,27
Std. Deviation	,724	1,187	,961

When the participants were asked to act in the simulated situation (traffic accident with casualties) some differences in activity and fastness of reaction became visible. However there was even bigger difference in the accuracy of performance and especially in the safety risks awareness. The leavers of the experience-based training where the risks for lay first aid providers is one of the crucial themes were much more aware of potential hazards than people that had not passed such training. Many of the standard course leavers also experienced a panic or enormous emotional reaction that influenced the performance. They spontaneously reported a strong tension and stress as well as the feeling of failure that persisted after the simulation.

Table 5. Comparison of the performance in simulated situations

Type of training	Reaction (active - passive)	Reaction (fast - slow)	Accuracy of performance	Safety risks awareness
Improved Mean	1,53	1,73	1,20	1,36
Std. Deviation	,743	,799	,414	,633
Standard Mean	2,73	2,53	3,47	4,60
Std. Deviation	1,624	1,552	1,060	,507

4 CONCLUSION

The effective lay first aid is a factor that reduces health damage and life loss in the traffic accidents. Therefore it is necessary to make the population ready and willing to give the effective first aid. In the Czech Republic there are 4 hour first aid trainings mandatory in the driving schools that do not provide appropriate level of competencies. Therefore we designed a new conception of the 16 hours experience-based first aid course that can provide better training for driving licence candidates as well as for licensed drivers. The training contains reduced information that is well-structured and understandable. Drill training of necessary skills is also part of the course. The most important part of the experience-based first aid training are the simulated situations and deep analysis of both the performance and efficacy and the emotional processes. All of these activities help the participants to manage the emergency situations effectively.

The pilot testing showed remarkable differences in knowledge, skills as well as the competency to act in the simulated situation between the people that had gone through the experience-based training and the people that had gone through the standard first aid course. Compared to the 4 hour standard trainings the 16 hours experience-based training leavers show more knowledge as well as better skills. They also perform better during the simulated emergency situations and declare better comfort and less inadequate emotional reactions.

Further testing and comparison of the experience-based approach for various target groups on bigger samples is necessary. It also seems useful to monitor the further performance of the participants in real situations and continue further elaboration of methods based on the evaluation.

The pilot testing proved that the experience-based first aid training focused on knowledge and skills as well as the psychological set-up is an effective part of the driver education. It can be useful for novice drivers as well as a part of the life-time driving training or driver improvement courses.

The experience-based first aid trainings for drivers can help to decrease the number of fatalities and serious health damages caused by traffic accidents and they should be considered as an important factor of the traffic safety.

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