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STUDENTS AND EMERGENCY MEDICINE: WHAT IS THE STANDARD LEVEL OF FIRST AID KNOWLEDGE?

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ABSTRACT

Background: First aid is a critical skill, and knowing how to perform it may ultimately save a person's life.

Aim of the study: The aim of the study was to assess the level of first aid knowledge among students from three backgrounds: medicine, science, and the humanities.

Material and methods: The authors surveyed a group of 180 fifth-year physiotherapy, geoinformatics, and psychology students, of which there were 60 from each discipline. The authors used an anonymous survey of their own design, composed of open- and closed-ended questions, which included 15 questions about first aid rules. The research was conducted in Wrocław, Poland.

Results: Only 60 students (30.33%) had previously had the opportunity to receive first aid training during the course of their studies. An additional 100 students (55.56%) claimed they were familiar with first aid rules. Of the physiotherapy students, 32 (53.3%) declared they would remain calm and composed in an emergency situation, with men claiming they would remain more composed than women. The difference in behaviour turned out to be statistically significant; the value of the chi-square test was 13.74. Students who had had prior first aid training at university were the most familiar with life-saving techniques and claimed they would remain the most composed in an emergency situation (32 students from physiotherapy; 53:3%). Prior to taking the first aid exam, the majority of students (100 respondents; 55.6% of the total) were confident that they would obtain the maximum number of points possible on the test. However, upon completion, they were found to have a medium level of knowledge at 889 points out of 1,500, or 59%.

Conclusions: The level of first aid knowledge among university students should be dramatically improved, so they are able to perform first aid with some level of expertise, should the need ever arise. To facilitate this, every university should include first aid classes in their curriculum. First aid techniques should be revised and refreshed every six months.

KEYWORDS: first aid, education, emergency medicine, universities, students

Background

The practice of first aid has existed since prehistoric times. Ancient hunters sometimes got hurt and to survive, needed to understand basic emergency techniques. Great advances in the science of first aid began about 120 years ago, based on the knowledge of military surgeons [1–3]. Today, intentional failure to provide first aid to someone in need constitutes a criminal offence in some countries, including Poland. The Code of Criminal Procedure lays down regulations regarding the pro-

vision of first aid. It states that if a person refuses to help a victim whose life or health is threatened, they could face potential imprisonment of up to 3 years, but only if they would have been able to provide such help without risking their own life or health. Other legal regulations regarding first aid are described in the Road Traffic Law; a driver is obliged to provide any necessary assistance to a victim of an accident, and must call the paramedics and police [1]. The principles of first aid education are based on the guidelines of the European Research Council (ERC). The use of these principles is not imposed in any way by the Council in the training programmes of private companies, nor is it mandated for university syllabuses. The studies described below show that universities often do not take them into account when constructing their syllabuses as many institutions do not teach first aid as a subject at all. In a survey conducted among 152 medical students in the South Indian city of Mangalore, Joseph et.al indicate that a high level of knowledge about first aid was observed in 13.8% of students, moderate knowledge in 68.4%, and poor knowledge in 17.8% [4]. According to the Alhejaili and Alsubhi study of health science students at Saudi Arabia's Taibah University in Al-Medina, 98.2% had information about first aid, however 79.1% thought their information was not sufficient and 83.7% thought they did not have the ability to perform first aid in emergency cases [5].

Aim of the study

The aim of the study was to assess the level of expertise in first aid among fifth-year students from three universities in Wrocław, Poland: the University School of Physical Education in Wrocław (UPE), the University of Science and Technology (UST), and the University of Wrocław (UW). The purpose of choosing three different universities was to ensure the diverse backgrounds of study participants. Participants have educational backgrounds in medicine, science, and the humanities.

Material and methods

The study was conducted at three universities and lasted for 3 months, from January to March 2016. The study included 180 second-year master's degree students. The participants were students from three faculties (60 each): physiotherapy (UPE), representing medicine; psychology (UW), representing the humanities; and geoinformatics (UST), representing the non-medical sciences. Among the chosen disciplines, the selection of these groups of students was random. Overall, 107 women and 73 men, aged 23 to 28 years, were surveyed. The study was conducted using an anonymous survey, which was designed by the authors of the study based on their professional experience as paramedics. The purpose of the study was to establish the participants' level of expertise in first aid techniques.

The questionnaire had 25 closed- and open-ended questions, including 15 questions related to knowledge of premedical first aid (PFA). The analysis of the survey results was carried out in two stages: the analysis of the remaining questions and the analysis of the theoretical part pertaining to PFA. The remaining questions referred to age, sex, education, prior first aid training, the need for first aid training, and behaviour during emergency situations. In the education section, additional questions covered topics such as the participant's current and previous course of study, any prior training in first aid techniques within the university setting, their total number of hours of first aid training, and by whom and in what form the PFA training was given. One question was about any prior PFA training that took place outside the university setting. For the study we asked the respondents the following questions: Do students remain calm in an emergency situation? Are men or women more composed? Does the inclusion of first aid training in the curriculum affect readiness to help a victim? Does confidence in one's own lifesaving skills translate to the results of the test contained in the survey?

The analysis of the theoretical part of the survey involved 100 students who declared that they knew the rules of first aid. Each student had the opportunity to earn a maximum of 15 points on the test. The number of points possible for any given group to earn corresponded adequately with its number: UPE, 48 students; UST, 21 students; and UW, 31 students.

The following statistical indicators and tools were used: minimum, maximum, standard deviation, mean, and chi-square test. Participants were ranked on the level of knowledge assessment based on the number of points they earned on the test. The high level included 100–66.67% of points, the medium level included 66.60–33.33% of points, and the low level included 33.26–0% of points. Differences between the groups of students were examined using the chi-square test. The null hypothesis at the critical level of significance $\alpha = 0.05$ was verified. Significance was found when the test probability was $p < 0.05$. The results were calculated using Excel. The study was approved by the bioethics committee of the Opole Medical School.

Results

Among the study group, only 60 respondents had PFA training during their studies. Physiotherapy students were the only ones with prior training because, out of the three universities, the University School of Physical Education was the only institution to provide it. More than 25% (49 students) participated in a PFA training outside the university setting. A total of 25 students had PFA training organised by an external company (about 8 hours, practise plus theory). The rest of the group (24 students) received training as part of their driver's licence course (about 1.5 hours, practise plus theory).

More than 50% (99) of respondents claimed they knew how to help a victim. Less than 10% (13) of students admitted they did not know any rules of PFA (Figure 1).

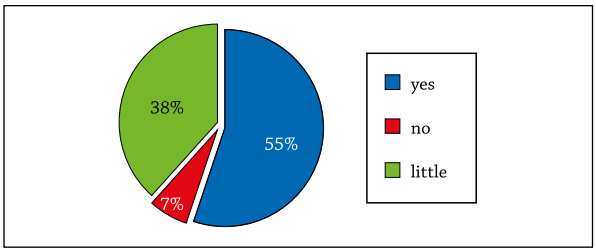

Figure 1. Self-identified familiarity with the basic principles of first aid.

The level of confidence regarding first aid rules was the highest amongst psychology students, followed by physiotherapy students, while the least amount confidence was expressed by geoinformatics students (Figure 2).

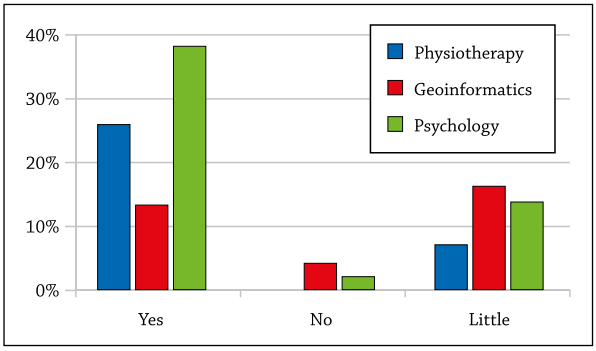

Figure 2. Declaration of first aid knowledge (acc. to the field of study)

In an emergency situation, 68 (37.8%) of respondents claimed they would remain composed. The largest group of people who thought they would remain composed were physiotherapy students (53.3%; 32 students). However, the majority of students (45%; 81 students) said they would probably feel uncertain. The largest group of people in this category were geoinformatics students (63.3%; 38 students) (Figure 3).

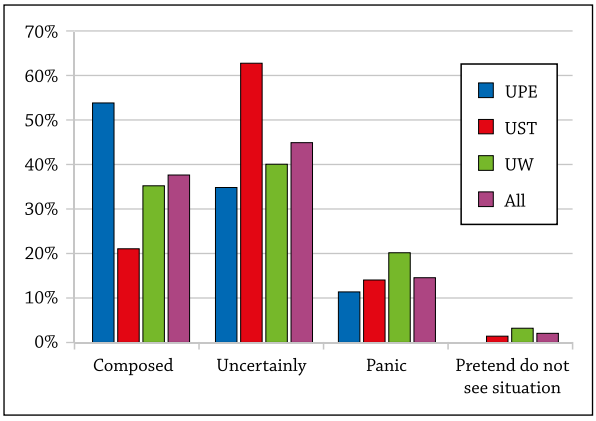

Figure 3. Statement of probable behaviour in an emergency situation among students from the three universities (UPE – The University School of Physical Education in Wrocław, UST – University of Science and Technology, UW – The University of Wroclaw, All – all students).

Of the total number of respondents, 27 (15%)—who had been in life-threatening situations themselves—provided help to a person in danger. Physiotherapy students had previously provided first aid to people in life-threatening situations significantly more often than students of other faculties (Chi^2 =12.81, df=2, $p < 0.005$).

Men claimed that, compared to women, they were more likely to remain calm. There are statistical differences between the sexes and their behaviour in emergency situations (Chi^2 =13.74, df=3, $p<0.05$) (Table 1).

Table 1. Behaviour in an emergency situation depending on gender.

Behaviour	Gender			
	Women		Man	
	[N]	%	[N]	%
Composed	35	32.71	32	43.84
Uncertain	60	56.07	22	30.14
Would panic	11	10.28	16	21.92
Pretend not to see the situation	1	0.93	3	4.11

Table 2 is a summary of the test part of the survey and includes only the scores of students whose answer to the question, "Do you think you are familiar with the basic principles of first aid?", was "yes" (N=100). Physiotherapy students obtained the highest score. Of 100 students who were confident about their skills, they gained 889 points out of 1500 (15 points for each student). These results show the students have achieved a medium level of knowledge (59%; 889 points) (Table 2).

Table 2. Distribution of parameters for results of the first aid test.

University	[N]	Measure of variability and appointed				Total score	
		Mean	Standard deviation	Minimum	Maximum	Amount	[%]
Physiotherapy	48	9.20	1.79	4	14	452/720	62.78
Geoinformatics	21	7.71	1.52	5	10	162/315	51.43
Psychology	31	9.17	2.10	6	14	275/465	59.14
All	100	8.98	1.95	4	14	889/1500	59.93

Among the 100 students (55.6% of respondents) who were confident about their skills, 74 (41.1%) students answered the question about the appropriate depth of chest compression incorrectly, 45 (25%) respondents gave an incorrect answer to the question about the number of chest compressions used for children, and 120 (66.7%) respondents stated that cooling a burnt area of the body is enough to manage a burn, which is not true. Only 13 (7.2%) respondents answered the question about choking correctly.

Discussion

In the last 10 years, many studies have shown that expertise in PFA is rapidly decreasing. In a randomized controlled trial, Chamberlain et al. [6] evaluated a person's level of expertise before a basic life support course and then 6–9 months after the course. The study enrolled 262 randomly selected volunteers. The study found that after 6–9 months, 68% of the respondents carried out effective breathing control, but only 33% remembered to provide a patent airway. However, 54% of the respondents properly performed chest compressions. Smith et al. [7] conducted a study among 133 nurses, which showed that it took less than 6–9 months to forget the skills acquired during the PFA training. The results indicated that the nurses retained their theoretical knowledge, but their practical skills significantly diminished. They found that the ability to perform advanced resuscitation procedures, or ALS (Advanced Life Support), degraded faster than the skill of providing basic life support (BLS). After 3 months of training, 63% of the respondents could pass the basic course exam, but after 6 months, this percentage dropped to 58%. After 12 months, the level of expertise of the study subjects was once again tested, and it turned out that only 14% could once again pass the exam. The above data suggests that the PFA training should be repeated twice a year.

Among the surveyed physiotherapy, geoinformatics, and psychology students, two-fifths agreed that PFA training should be repeated once a year, and about 25% of the students said PFA training should be refreshed every two years.

A study conducted in Poland in 2012 among 228 drivers showed that PFA training helped reduce the number of road accidents. The authors of the study found that PFA training significantly expanded and consolidated the knowledge [8].

People adapt to difficult situations in different ways. Some find it hard, others find it easier. There are people who always try to avoid difficult situations, while others are more willing and prepared to handle them [9]. For example, the behaviour of physiotherapy students might be tied to their individual ability to control stress. Obligatory first aid training was provided to these students only at the University School of Physical Education in Wrocław. Behaviour analysis showed that men (44%) were more controlled than women in emergency situations (33%), with more than 50% of women admitting to feeling insecure in an emergency situation [10].

A total of 15 questions were asked to establish the level of expertise in first aid techniques among students from three different faculties. The analysis of the results showed that only 50% of the respondents had expertise in first aid. This is an alarming result, and it might suggest that in many cases, victims will receive inadequate help. More than 50% of the students declared they were quite confident about their level of skills; however, this did not correlate with the results they obtained. On average, the number of correct answers was 8.9 (SD = 1.95) to 15. Physiotherapy students gave the most correct answers (63%), and geoinformatics students gave the fewest (51%). These are the results of the group of respondents who initially claimed they knew the rules of providing first aid, which should be synonymous with obtaining the maximum number of points. However, that was not the case. Seemingly, the most difficult question on the test was the one about the depth of chest compressions during cardiopulmonary resuscitation (CPR). In total, 25% of the respondents incorrectly marked 1-3 cm, which is not enough. High-quality and correctly performed CPR is essential to increase the likelihood of a victim's survival. According to one study, out of four recently performed by the European Resuscitation Council in 2015, the depth of chest compressions should be from 4.5–5.5 cm in adults. This depth increases the overall effectiveness of resuscitation and is more effective compared to shallower compressions during manual CPR [11]. In one of these studies, the authors found that a compression depth of 46 mm was linked to the highest survival rates. Therefore, the ERC recommends a chest compression depth of about 5 cm, but no more than 6 cm [12].

For non-healthcare professionals, the recommended chest compression-ventilation ratio in children is 30:2. The results of our survey showed that 74% of respondents answered this question incorrectly. In 2010, ERC introduced changes in how CPR should be conducted by non-healthcare professionals [13]. Many children do not receive resuscitation because potential first aid providers are afraid to harm the child. This fear to act may be due to a lack of ability to perform the procedure correctly.

In 2016, a study was conducted in German PFA training schools to evaluate the reduction of fear while performing first aid to victims by rescuers who had had prior training. It is better to for a lay person to learn how to perform first aid and be able to use BLS sequences for adult victims than to stand idly by and do nothing [14,15].

Those who are professionally responsible for children, for example teachers or school nurses, can learn a modified BLS. The modified sequence can be safely applied to children in the following way: give the first five rescue breaths before starting chest compressions, and then perform the BLS sequence for 1 minute before calling for help if no one else is around. Chest compressions should be at least one third of the depth. In children under 1 year of age, the chest is compressed with 2 fingers, and in children over 1 year of age, 1 or 2 hands should be used to achieve the appropriate depth [16–19].

In case of thermal burns, after the affected area has been cooled, it is important to cover it using a sterile dressing to avoid hypothermia. Currently, a wide range of wet and dry dressings are available that effectively protect burned skin. Plastic dressings are also available. Food film has the advantage of being widely available,

non-toxic, non-adherent, impermeable and transparent, which allows observation of the wound without the need to remove the dressing. There is no scientific evidence showing which types of dressings are the most effective [20–24]. Our analysis of the results showed that 70% of the surveyed students believed that cooling the affected area under running water was enough. The students did not know that after having cooled the burn, they should cover the damaged area using a sterile dressing in order to avoid hypothermia [25].

Studies conducted in San Diego (2007) of choking incidents among conscious adults and children over one year of age demonstrated that the most effective methods of first aid were blows to the back between the shoulder blades and abdominal thrusts. However, the studies were related to the treatment of acute obstruction [26]. A foreign body in the airway is a rare but possible cause of death. Often, an early and appropriately applied intervention can save a person's life [27].

One of the survey questions was about choking with an effective cough; an effective cough accompanies a light airway obstruction as a result of which the person can inhale before coughing, and can speak or breathe. Only 7% of students answered this question correctly. Back blows and epigastric abdominal compressions are performed when the injured person cannot breathe, cannot speak, silently attempts to cough, or has a whistling breath [28–30]. It is very important for bystanders to know how to perform first aid in these types of situations [31].

Limitations

The survey should be standardized. Because of the style and grammatical form, the questions could be considered leading; however, they do reflect the nature of the information the authors were seeking to collect, and clearly indicate the need to introduce first aid training in each university.

Conclusions

To conclude, the students who participated should ask themselves whether or not they rightly claimed that they knew the rules of PFA. Our research has shown that these students obtained test results with no more than 63% of correct answers, which indicates a medium level of first aid knowledge. That is why we believe mandatory PFA training should be introduced into all universities to improve this level.

Typically, men and women behave differently. The ability of men to remain calm may result from their psychology and ability to keep emotions at bay, so they are able to take action in a more controlled fashion, as compared to women. This is not a hard and fast rule, but it may be the case that the ability to correctly provide first aid is gender-related. Nevertheless, we believe that after a training session, even women who were not sure of their possible reactions or emotions beforehand, would then be able to control their behaviour. Based on our research, we believe that similar surveys evaluating students' expertise in PFA should be carried out in all universities across the country to help raise awareness among students regarding their desired behaviour in emergency situations and to help students acquire relevant skills that can save lives.

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