

Linek Jakub, Dudzińska Marta, Zwolak Agnieszka, Świrska Joanna, Smoleń Agata, Łuczyk Robert. The level of knowledge about first aid rules among high school students. *Journal of Education, Health and Sport*. 2018;8(9):438-448. eISSN 2391-8306. DOI <http://dx.doi.org/10.5281/zenodo.1403742>  
<http://ojs.ukw.edu.pl/index.php/johs/article/view/5865>

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part b item 1223 (26/01/2017).  
1223 Journal of Education, Health and Sport eISSN 2391-8306 7

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The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 02.08.2018. Revised: 18.08.2018. Accepted: 24.08.2018.

## **The level of knowledge about first aid rules among high school students**

**Jakub Linek<sup>1</sup>, Marta Dudzińska<sup>1</sup>, Agnieszka Zwolak<sup>1,2</sup>, Joanna Świrska<sup>1,2</sup>,  
Agata Smoleń<sup>3</sup>, Robert Łuczyk<sup>1</sup>**

**<sup>1</sup>Chair of Internal Medicine and Department of Internal Medicine in Nursing, Medical  
University of Lublin, Poland  
20-954 LUBLIN, ul. Jaczewskiego 8**

**<sup>2</sup>Department of Endocrinology, Medical University of Lublin, Poland  
20-954 LUBLIN, ul. Jaczewskiego 8**

**<sup>3</sup>Chair and Department of Epidemiology and Clinical Research Methodology  
University of Lublin, Poland  
20-093 Lublin, ul. Chodźki 1**

### **Corresponding author**

Marta Dudzińska

Chair of Internal Medicine and Department of Internal Medicine in Nursing, Medical  
University of Lublin, Poland

20-954 LUBLIN, ul. Jaczewskiego 8

Tel. (+48) 81 448-77-20, fax.(+48) 81-724-46-69

Email: [m.dudzinska1@o2.pl](mailto:m.dudzinska1@o2.pl)

## **Wiedza w zakresie zasad udzielania pierwszej pomocy wśród uczniów szkół średnich**

### **Streszczenie**

Pierwsza pomoc to zespół czynności podejmowanych w celu ratowania osoby w stanie nagłego zagrożenia zdrowotnego wykonywanych przez osobę znajdującą się w miejscu zdarzenia. W toku edukacji zasady te są omawiane w ramach przedmiotu Edukacja dla Bezpieczeństwa, realizowanych w szkole średniej, a uprzednio także w gimnazjum.

Celem pracy jest sprawdzenie poziomu wiedzy uczniów szkół średnich w zakresie zasad udzielania pierwszej pomocy przedmedycznej.

Materiał i metody: W badaniu wzięło udział 304 uczniów (K-60,2%, n=183, M-39,8%, n=121) I, II i III Liceum Ogólnokształcącym w Zamościu. W badaniu zastosowano technikę badawczą sondażu diagnostycznego, w ramach, którego narzędziem był autorski kwestionariusz ankiety.

Wyniki: 94,4% ankietowanych znało zasady prowadzenia reanimacji, co stanowiło 97,2% (n=174) osób mieszkających na wsi oraz 90,4% (n=113) osób mieszkających w mieście (p=0,01). Mieszkańcy wsi także częściej potrafili wskazać właściwy tok postępowania przy obecności ciała obcego w ranie (92,1%, n=163 vs 81,6%, n=102, p=0,01) jak też postępowania w sytuacji zranienia (73,7%, n=132 vs 60,8%, n=76, p=0,01). Mniej niż połowa badanych potrafiło wskazać właściwy tok postępowania w sytuacji omdlenia w miejscu publicznym (29,9%) oraz postępowania w sytuacji oparzenia I stopnia (49,3%). 46,7% badanych dokonało właściwego różnicowania krwotoku żylnego i tętniczego, przy czym częściej prawidłowego wskazania dokonali mężczyźni (58,7% n=71) w porównaniu do kobiet (39,2% n=71, p<0,001).

Wnioski: Ankietowani w znacznej mierze znają zasady udzielania pierwszej pomocy, przy czym w zakresie postępowania w przypadku omdlenia, różnicowania krwotoków oraz postępowania w sytuacji oparzeń wiedza ta wymaga pogłębienia. Należy propagować wśród młodzieży wiedzę z zakresu udzielania pierwszej pomocy, w tym w postaci zajęć praktycznych, realizowanych w każdym roku szkolnym w celu ugruntowania wiedzy oraz umiejętności.

**Słowa kluczowe: pierwsza pomoc, omdlenie, krwotok, oparzenie**

## **The level of knowledge about first aid rules among high school students**

### **Abstract**

First aid is defined as a group of activities directed at a person in a sudden health or life threatening state which is performed by somebody who is present at the site of the incident. First aid skills are taught in high school during the Education for Safety and it is an extension of the subject introduced in junior high school.

The aim of the study is to evaluate the level of knowledge of high school students on first aid rules.

Material and methods: The studying group consisted of 304 students of I, II and III High School in Zamość (F-60,2%, n=183, M-39,8%, n=121). The survey used self-reported proprietary questionnaire.

Results: 94,4% (n=287) of the respondents knew correct chest compression to breathing ratio in cardio-pulmonary resuscitation (CPR). This answer was given significantly more commonly by the students from rural areas than the teenagers living in town (97,2%, n=174 vs 90,4%, n=113 respectively, p=0,01). Respondents living in rural areas also more often were able to describe correct procedure both in case of foreign body embedded in the wound (92,1%, n=163 vs 81,6%, n=102, p=0,01) as well as how to dress the wound (73,7%, n=132 vs 60,8%, n=76, p=0,01). Less than a half of studying group knew appropriate management in case of collapse (29,9%) and in case of first grade burn (49,3%). 46,7% of the respondents knew how to differentiate venous from arterial hemorrhage, and in that area male students were giving the correct answer more often than women (58,7%, n=71 vs 39,2%, n=71 respectively, p<0,001).

Conclusions: In general, high school students know first aid rules, however the subjects that in particular demand knowledge improvement include management in case of fainting and in case of burns as well as hemorrhages differentiation. First aid skills and theory knowledge should be popularized among teenagers and repeated in every school year in order to consolidate the knowledge

**Key word: first aid, collapse, hemorrhage, burn**

## **The level of knowledge about first aid rules among high school students**

First aid is defined as a group of activities directed to a person in a sudden health or life threatening state which is performed by somebody who is present at the site of the incident. First aid comprises also usage of over-the-counter drugs and medical articles authorized in Poland [1].

Loss of conscious and lack of respiration leads to sudden cardiac arrest (SCA). Within three to four minutes after the cardiac arrest, irreversible changes in central nervous system develop. Thus, in case of SCA, only immediate cardio-pulmonary resuscitation (CPR) gives a chance to avoid heart and brain damage. CPR includes clearing the airways, chest compressions and rescue breathing. Stopping hemorrhage can be also a life-saving activity [2,3].

Life-threatening incidents can happen in every situation and at any time. Therefore, the ability to perform first aid activities should be obligatory for everybody and is not reserved exclusively for healthcare professionals. First aid skills should be trained from an early age and school should play a significant role in this education.

Until recently, first aid skills were taught in secondary schools during the Civil Defense training lessons. From September 2012, Civil Defense training is named Education for Safety and it is an extension of the subject introduced in middle schools in 2009. The major role of the former Civil Defense training lessons was to present defense structures and to teach how to behave particularly in case of external dangers including e.g. bomb attack. Only few hours were devoted to learn first aid skills. At present, during Education for Safety lessons, much time is devoted to learn how to prepare the site of first aid action, how to evaluate basic vital signs and how to carry on cardio-pulmonary resuscitation. The students also learn how to proceed in case of bleedings, hemorrhages, thermal or chemical burns and how to behave in case of airway obstruction due to foreign body aspiration [4-6]. The Education for Safety lessons comprise not only learning theory information; in fact it is mainly based on scenario training when students learn first aid practical skills. Therefore, the classrooms where Education for Safety is taught must be equipped with phantoms in order to practice CPR. Bandages, sanitizers, bag valve masks, blankets, foam mattresses, emergency

foil thermal survival blankets, latex gloves and fully equipped first aid kit are necessary there, too. Apart from scenario training, the students are taught bandaging [4-6].

### **Aim of the study**

The aim of the study is to evaluate the level of knowledge of high school students on first aid rules.

### **Material and methods**

The study was conducted in I, II and III High School in Zamość. The survey used self-reported proprietary questionnaire. Filling the questionnaire was voluntary and anonymous. The research questionnaire comprised 4 questions concerning demographic data and 23 questions verifying the knowledge on first aid rules; of these 22 were closed-ended questions and in 1 question the responder had to place the procedures in the correct order. The studying group consisted of 304 students and included first, second and third class students (F-60,2%, n=183, M-39,8%, n=121). Of total, 17,4% (n=53) were first class students and 59,5% (n=181) and 23% (n=70) accounted for the second and third class students respectively. Sixteen years old students comprised 17,8% (n=54), there were 57,9% (n=176) seventeen year old students and 24,3% (n=74) eighteen year old students. 41,4% of respondents lived in town whereas 58,8% (n=179) lived in rural areas.

The results of the study were analysed statistically. The values of the considered parameters were measured in the nominal scale, characterised by means of multiplicity and proportion. In order to identify any differences or relationships a  $\chi$ -square test was conducted. A 5% inference error and a significance level of  $p < 0.05$  were assumed, indicating the existence of statistically significant differences or relationships. The results obtained are presented in tables. The statistical analysis was done using STATISTICA v. 10.0 software (StatSoft, Poland).

### **Results**

Respondents had to point correct chest compression to breathing ratio in CPR. Correct answer (30:2) was marked by 94,4% (n=287) of the students. This answer was given significantly more commonly by the students from rural areas (97,2%, n=174 for the students from rural areas vs 90,4%, n=113 for the teenagers living in town,  $p=0,01$ ). No significant differences were stated in terms of other demographic data.

The students had to point the article which should not be present in first aid kit. The correct answer is hydrogen peroxide and this answer was given by 63,8% of the respondents (n=194). Significantly more often correct answer was given by the students from rural areas than town citizens (72,6%, n=127 vs 54,5%, n=67 respectively, p=0,001). No significant differences for other demographic data was observed.

Respondents were asked how to differentiate venous from arterial hemorrhage. The correct answer was given only by 46,7% (n=142) of them. Male students were giving the correct answer significantly more often than women (58,7%, n=71 men vs 39,2%, n=71 women, p<0,001). No significant differences were found for other demographic characteristics.

The students had to point the telephone numbers that should be dialed to call medical emergency. The health emergency numbers in Poland are 999 and 112, and 94,4% (n=187) of students knew it. Significantly more often correct answer was given by third class students (100%, n=69 for third class students vs 92,8%, n=167 for second class students, p=0,05, at the limit of statistical significance) and by eighteen year old students (100%, n=73 for eighteen-year-old students vs 92,6%, n=162 for seventeen year-old students, p=0,04).

The students were asked what is the procedure in case of foreign body embedded in the wound. The correct action is to stabilize the foreign body with two same length bandages placed on two sides of the foreign body and to paste them together so that the foreign body cannot neither move nor fall out. 87,2% (n=265) of students knew it. Significantly more often correct answer was given by students from rural areas (92,1%, n=163 students from rural areas vs 81,6%, n=102 students living in town, p=0,01). No significant differences were found in terms of other demographic data.

In the next question, the students had to answer how to properly dress the wound. First step, if possible, is to wash the wound with soap and water, then place a sterile gauze directly on the wound and wrap it with sterile bandage. If there are no bandages on the site of the injury, the clothing of the affected person can be used to dress the wound. The correct answer knew 68,4% (n=208) of students. The detailed analysis revealed that good answer was given more commonly by students from rural areas (73,7%, n=132 for students from rural areas vs 60,8%, n=76 for students living in town, p=0,01). No significant differences were found in terms of other demographic data.

The students were asked how to behave in case of a person in hypothermia. According to the recommendations, warm and sweet beverages should be given first. 57,9% (n=176) of

students knew it. Women knew the answer significantly more commonly than men (65,7%, n=117 vs 48,8%, n=59 respectively, p<0,001).

The responders had to answer how to behave in case of electric shock suspicion. First step is to disconnect the power source. 72,4% (n=220) of students knew it. Men knew correct answer more commonly than women (81,0%, n= 98 vs 67,4%, n =122, respectively, p=0,03). Furthermore, second class students pointed correct answer more often than third class students (78,8%, n=141 vs 58,6%, n=41 reseptively, p=0,01). Similarly, seventeen-year- old students gave correct answer significantly more often in comparison to the remaining students (78,7% n=137 for seventeen- year -old students vs 72,2, n=40 for sixteen-year-old students vs 59,5% n=44 for eighteen- year- old students, p=0,02).

The students were asked when they do not have to continue CPR. Correct answer was pointed by 71,1% (n=216) of students. Men were giving correct answer significantly more often than women (79,2% n=95 for men vs 66,9% n=121 for women, p=0,005).

All questions and the percentage of correct answers given by the students is listed in tab.1. In case of questions mentioned in the research questionnaire, no significant differences were found in answers distribution in terms of demographic data, unless it was mentioned in the above text.

**Table 1. List of questions asked to respondents and the percentage of students who gave correct answer to the question**

Question	Percentage of respondents who gave correct answer to the question [%]
1. Point correct chest compression to breathing ratio in CPR	94,4
2. How will you place a person in recovery position in first aid management?	97,7
3. What <b>should not</b> be present in first aid kit?	63,8
4. Imagine, you are at the bus stop waiting for a bus. Suddenly, in front of your eyes, an elderly man collapses on the floor. Put in the correct order (from 1 to 7) procedures that you should perform as a witness of the accident.	29,9
5. What is AED?	82,6
6. What you should do in case of nasal hemorrhage?	89,1

7. How will you differentiate venous from arterial hemorrhage?	46,7
8. What serves as a protection for a person providing first aid?	80,9
9. Imagine that you do cardiopulmonary resuscitation (CPR) in an elderly person who fainted at the bus stop. After ten minutes, emergency medical service arrives and takes care of the patient. Unfortunately, when you were performing chest compressions, ribs fractures occurred. Can you be held liable for this?	89,5
10. What is telephone number that should be dialed from the mobile phone to call medical emergency?	94,4
11. What will you do in case of foreign body in the wound?	87,2
12. What is the appropriate management in case of first grade burn?	49,3
13. How will you dress the wound properly?	68,4
14. Point the correct management in case of hypothermia?	57,9
15. When body dehydration can occur?	75,3
16. Point correct management in case of epilepsy attack	57,2
17. What will you do first in case of electric shock suspicion?	72,4
18. How to secure site of the car accident before emergency services arrival?	95,1
19. How check for breathing properly?	59,2
20. When can you stop resuscitation?	71,1
21. How will you use emergency foil blanket in order to protect from hypothermia?	73,7
22. How will you use emergency foil blanket in order to protect from hyperthermia	74,0
23. What is the correct management in case of choking?	66,5

## Discussion

The aim of this study was to determine the state of knowledge of high school students on first aid rules. The students who participated in the study were aged varied. Some of them had undergone Education for Safety classes in high school (in first class) and everybody has



had already this subject in middle school. During these lessons, the students should be taught, among the others, preparation to emergency actions [7].

Correct chest compression to breathing ratio in CPR, which is basic first aid information, knew almost 95% of the responders. In the different study, this percentage equaled almost 100 [8]. However, in the study by Chemperek et al., nearly 1/3 of the examined students did not know how to perform CPR properly [9]. If we compare teenagers to adults, the percentage of adult responders who knew proper management was lower and varied from 37% to 72% [10-14]. It confirms the importance of continuous education of first aid activities also aside from school.

Performing defibrillation within 3-5 minutes from the moment of loss of conscious, can lead to 50-70% survival rate. Early defibrillation performed by a witness of the incidence is possible if AED is available [15]. Its availability is raising, especially in public place and in areas of increased people movements. In this study, 82,6% of the responders knew what AED abbreviation means. However, it remains unclear how many of them know general principle of its usage and whether they would use it properly when necessary.

In this study, the most problematic for the responders was to put in the correct order the procedures in case of somebody's loss of conscious in public place, which, by the way, can happen anytime and anywhere. The questions where the ratio of correct answers did not exceed 60%, included differentiation of venous from arterial hemorrhage or the manner by which respiration should be evaluated. In another study, similarly to this evaluation, it was underlined that the knowledge on the bleeding management among the students who graduated from secondary school was insufficient as 50% of them did not know it [8]. This is one of the basic first aid skills and thus low ratio of correct answers in this matter seems to reflect low effectiveness of first aid education in this age group.

It was also problematic for the students to point proper management in case of a burn as a correct answer was given by only 49% of them. Also in the study by Jurczak et al., every seven student of above middle school, did not know it [8].

Students from rural areas were giving significantly more often correct answers in terms of chest compressions to breathings ratio, knowledge on what articles should not be found in first aid kit, management with foreign body in the wound or proper wound dressing. However, it can be a random result secondary to the small group examined or be due to the fact that these students have personal experience in this matter gained during every day work at family farm where they have to know how to avoid life threatening situations or, if they happen, how to manage them.

The limitation of this study is that it was narrowed to only three schools of one city. In order to better evaluate the state of knowledge and the effectiveness of the education, the study should be extended and this is the task for the authors in future.

## **Conclusion**

1. In general, high school students know first aid rules.
2. The problems that demand in particular knowledge improvement include management in case of fainting and in case of burns and hemorrhages differentiation.
3. Students from rural areas when compared to the students from the city, were giving significantly more often correct answers when asked about chest compressions to respirations ratio, foreign body in the wound management or proper wound dressing.
4. Men, in comparison to women, knew significantly better how to differentiate hemorrhages and how to behave in case of electric shock.
5. First aid skills and theory knowledge should be popularized among teenagers and repeated in every school year in order to consolidate the knowledge

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