Students’ Awareness of Human Security in Emergencies at the Faculty of Health Sciences, Palacký University Olomouc

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ABSTRACT

Background: The risk of an emergency cannot be underestimated and it is necessary to be prepared for emergency management. Knowledge and preparation enhance assessment of the situation and correct decision-making, thus making it possible to provide help to one self as well as other people.

Aim: To ascertain the knowledge level about human security during an emergency in a healthcare institution among students of Faculty of Health Sciences, Palacký University Olomouc.

Methodology: The sample comprises of 298 students in full-time and part-time study programmes. The knowledge level amongst students was investigated using a quantitative research design and a questionnaire. The research was conducted in the academic year 2017/2018. The results are presented in absolute (n) and relative (%) values. When comparing the responses of students in full-time and part-time programmes, the Student t-test was used. The tests were done on a 5% significance level using TIBCO STATISTICA version 13.3.

Results: Student’s knowledge level is insufficient in areas of warning signals for population and appropriate reaction, protection in a radiation emergency, iodine prophylaxis and in selecting the correct fire extinguisher to control a fire. Good knowledge was found in emergency phone numbers. There was no significant difference in knowledge level between full-time and part-time students. A total of 80.87% consider human security during emergency important and would like this subject to be incorporated into study programmes.

Conclusion: It is necessary to provide good quality methodology, improve knowledge and practical skills amongst students of non-medical healthcare professions by including human security in emergency and crisis management into current educational programmes.

KEY WORDS
emergencies, human security, students, knowledge, security in emergency and crisis management, educational programmes

BACKGROUND

In recent decades, these have been significant geopolitical changes in term of international security. The end of the Cold War between the political and military organisations of NATO and the Warsaw Pact, which had caused fear of a devastating war, had a substantial impact (1).

After the easing of tensions, it has become apparent that humankind – apart from war conflicts – is still facing an entire range of other threats brought about by scientific and technical development (such as industrial accidents, fires, nuclear incidents), terrorist attacks and natural disasters (floods, earthquakes, landslides, weather disasters). The danger behind these incidents lie in the fact that they start very quickly, they are unexpected, may be underestimated and the consequences may be far-reaching. In view of these new potential risks, which may cause harm to life, health and property, the human security has been re-evaluated worldwide (2).

The above mentioned facts that the risk of an open global warfare has lowered and at the same time, new potential dangers have appeared caused a substantial change in dealing with non-military crisis and hu-
Human protection in developed countries, including the Czech Republic.

The Czech Republic adopted concrete measures to comply with the European concept of civil protection by passing a decree No. 710 in 1997 regarding the tasks of civil protection.

The bill No. 239/2000 Coll. (3) defines a major emergency as follows: “Harmful action of forces and phenomena cause by human activity, natural forces, as well as accidents which put life, health, property or the environment to danger and require the execution of rescue and elimination actions.” At the same time, the bill defines that “civil protections means the accomplishment of tasks for civil protection, namely waring, evacuation, taking shelter and emergency survival of population and other measures taken to protect life, health and property”. Linhart et al. (4) add that “civil protection includes a set of legal, organisational, material and other measures aimed to protect people and their property”.

The risk of a major emergency cannot be underestimated and it is necessary to systematically prepare to handle and overcome the associated fear and panic. Foreknowledge and preparation of people will enhance the correct assessment of the situation and will facilitate provision of help not only to one self, but also to others (5).

The development of a major emergency depends on the presence of threat or danger which can lie in an event, activity or a person with a negative effect of security (6). According to the source of danger, major emergencies may be divided into natural and anthropogenic.

The education about human protection in major emergencies witnessed a substantial change in 1989 in relation to the new political situation (2). In 1991, the Bill on Civil Defence Education No. 73/1973 was abolished and at the same time, the education on civil defence was abandoned at all school levels. By cancelling the civil defence as a school subject in elementary and secondary schools, the education of young people in civil protection in major emergencies was interrupted.

In 1991, the State Defence Council adopted the Concept of Civil Protection of the Czech and Slovak Federative Republic. The aim was to formulate the focus on providing civil protection in major emergencies. This was the step to define the purpose of civil protection in peacetime for the first time.

In July 1997, the most devastating floods in the 20th century occurred in the Czech Republic. 34 counties were affected with massive damage to infrastructure and property and losses of human lives. This tragic event revealed a serious lack of legal means to deal with similar situation in a complex manner. An entire set of bills was passed in order to facilitate help in these situations (3, 7, 8).

In 1999, the Ministry of Education, Youth and Sport issued a decree (9) in which elementary and secondary schools were instructed to implement the topic of civil protection in major emergencies into the curricula.

In 2003, a year after another major emergency caused by massive floods, a new approach was set (10). The Ministry of Education, Youth and Sport in cooperation with the Ministry of the Interior updated the decree and issued an addendum to educational materials for a compulsory topic “Civil protection during major emergencies”, which became part of the curricula (11, 12).

Human protection during major emergencies is a topical issue in healthcare facilities and involves the healthcare staff at all levels, so that a person can react accordingly to a major emergency and protect own health, health of colleagues and patients. This is a requirement stipulated by law, in Bill on Integrated Rescue Services from 28 July 2000, 239/2000 Coll. (3). In § 8, section 3, the bill says “The Ministry of Health is responsible within its competence for the selection and methodological guidance of the healthcare staff and for collecting means for international rescue operations and the provision of humanitarian aid in foreign countries”.

The healthcare staff should posses sufficient theoretical knowledge and practical skills in the area of human protection during major emergencies according to the new content in educational materials used in elementary, secondary, higher vocational and specialised schools. Increasing the competence of future healthcare professionals should continue also in tertiary healthcare education, both medical and non-medical.

On 28 March 2007, the Ministry of Health issued a Conception of Crisis Preparedness in Czech Healthcare (13), in which it concludes that the state does posses all the means necessary to secure the tasks required during a major emergency, however, the system as such does not work effectively and the individual elements are not interconnected. A great threat is seen in the absence of or ineffective legal and methodological environment and insufficient training of special activities which a major emergency in healthcare necessitates.

**AIM**

The aim of the research was to ascertain the knowledge level of theory and practical skills amongst students in
full-time and part-time study programmes at the Faculty of Health Sciences, Palacký University Olomouc in selected areas of human protection during a major emergency in a healthcare facility.

**METHODODOLOGY**
The sample comprised of 298 students in full-time and part-time study programmes at the Faculty of Health Sciences, Palacký University Olomouc (hereinafter referred to as FHS UP). A questionnaire survey took place between 1 October 2017 and 11 March 2018. The return rate was 100%. Table 1 shows the sample characteristics in terms of gender and full-time and part-time programmes. The average age of full-time students was 20.98 let (±2.11 SD) and 31.82 let (±8.09 SD) in part-time programmes.

### Table 1 Sample characteristics (n=298)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Full-time programme</th>
<th></th>
<th>Part-time programme</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
<td>91.43</td>
<td>3</td>
<td>8.57</td>
<td>35</td>
<td>11.74</td>
</tr>
<tr>
<td>Female</td>
<td>207</td>
<td>78.71</td>
<td>56</td>
<td>21.29</td>
<td>263</td>
<td>88.26</td>
</tr>
</tbody>
</table>

Notes: n – absolute frequency, % – relative frequency

The sample included students in Bachelor’s programmes of Nursing, Midwifery, Radiology Assistant and Paramedicine and a Master’s programme Intensive care in Midwifery. In total, 49.58 % (n=239) students in full-time and 35.54 % (n=59) part-time programmes completed the questionnaire (Table 1), i.e. 45.99 % out of 648 students enrolled at the FHS UP in the academic year 2017/2018.

Out of the total of 298 students, 61.28 % (n=182) had completed grammar school, 26.60 % (n =79) secondary medical school, 7.74 % (n=23) Bachelor’s programme, 3.03 % (n=9) tertiary professional school and 1.35 % (n = 4) had completed a Master’s programme.

In terms of regional representation, the respondents were mostly from the Olomouc region (50.67 %), Moravian-Silesian region (17.45 %), 27.18 % respondents from other 8 regions of the Czech Republic and 14 students (4.70 %) from Slovakia.

The knowledge level amongst students about selected areas of human protection was investigated using a quantitative questionnaire survey. The survey was anonymous and students were given the questionnaire by the authors themselves upon verbal consent from each participant.

The questionnaire comprised of 23 questions, participant’s demographic data (age, gender, education level, type of study programme, study programme, the region where they studied). For the purpose of this survey, the questions focused on knowing the emergency phone numbers, knowledge and reaction to warning signals, human protection during radiation accidents, the proper use of different types of fire extinguishers and questions about student’s opinions on introducing human protection during emergencies into study programmes at secondary and tertiary level.

Closed questions were used, multiple-choice questions and semi-closed questions. Free space for comments was given with some of the questions.

The survey results are presented in absolute (n) and relative frequencies (%). When comparing the responses of students from full-time and part-time programmes, the Student t-test was used (14). The tests were carried out on 5 % significance level (α = 0.05). The data were processed using the TIBCO STATISTICA programme, version 13.3.

### RESULTS
Knowing the emergency numbers is one of the key elements in handling a major emergency, as the calls activate the integrated rescue services. The results show that 98 % of the students would call the right emergency number: 150 – Fire Rescue Service, 155 – EMS, 158 – Police. A separate question focused on the situation when to use the European Emergency Number – 112. Respondents were asked when they can call the 112 emergency number:

a) Without SIM card, without phone credit, empty battery and O2 mobile operator.

b) Without SIM card, with credit and if there is a phone signal of at least one mobile operator.

c) Without SIM card, without credit and if there is a phone signal of at least one mobile operator.

The correct answer c) “Without SIM card, without credit and if there is a phone signal of at least one mobile operator” was selected by 93.31 % full-time students and 86.44 % part-time students. Wrting answer was selected in 8.05 % (n=24) students.
In case of major emergencies, the state is responsible for all the areas of civil protection, namely for the following: warning, evacuation, taking shelter, emergency survival and other measures taken to protect lives, health and property (e.g. informing citizens and preparing them for self-protection, providing mutual help, providing humanitarian aid).

The respondents were presented with graphic siren signals, which may be used locally in endangered areas or, if necessary, all over the country. Their task was to match the signals with their names and mark the signal used for general population warning. The results are given in Table 2.

<table>
<thead>
<tr>
<th>Signal</th>
<th>Full-time programme</th>
<th>Part-time programme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right n</td>
<td>%</td>
</tr>
<tr>
<td>Fire alert</td>
<td>19</td>
<td>7.95</td>
</tr>
<tr>
<td>Test of sirens</td>
<td>66</td>
<td>27.62</td>
</tr>
<tr>
<td>General alarm</td>
<td>18</td>
<td>7.53</td>
</tr>
<tr>
<td>Population warning</td>
<td>77</td>
<td>32.22</td>
</tr>
</tbody>
</table>

Notes: n – absolute frequency, % – relative frequency, **p<0.01

In the Czech Republic, there is one warning signal “General alarm”. Besides the “General alarm”, there are two signals for rescue professionals, not intended for the general public. These are “Fire alert” and “Test of sirens”.

The results clearly indicate that students do not know the signals correctly. 92.05% do not know the name and the graphic representation of the “Fire alert”. “Test of sirens” was mismatched by 72.38% and the “General alarm” by 92.47% of the respondents. The signal used as “Population warning” was identified correctly by only 32.22% of full-time and 20.34% part-time students (Table 2).

The differences between correct and wrong answers in both groups of students are statistically significant. Both groups of students do not have the necessary knowledge about siren signals. In full-time students (32.22%) and part-time students (20.34%) there was no statistically significant difference in relative frequency of the correct answer about the signal Population warning (Table 2).

In question “When the General alarm sounds, it is your duty to”, we tried to investigate how the students would react to the above mentioned signal. These were the options:

a) Move to their homes quickly, turn on radio or television for more information.

b) Seek the closes concrete building or places beneath the terrain, seek shelter, close the doors and window and turn on radio or television for more information.

c) Seek shelter in the closest building quickly, close the doors and window and turn on radio or television for more information.

The correct action taken when the General alarm sounds is in c), i.e. seek shelter in the closest building quickly, close the doors and window and turn on radio or television for more information.

Table 3 Students’ reaction to the signal General alarm

<table>
<thead>
<tr>
<th>General alarm</th>
<th>Full-time programme</th>
<th>Part-time programme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right n</td>
<td>%</td>
</tr>
<tr>
<td>Move to their homes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Building under terrain</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Move to the closest building</td>
<td>167</td>
<td>69.87</td>
</tr>
<tr>
<td>Total</td>
<td>167</td>
<td>69.87</td>
</tr>
</tbody>
</table>

Notes: n – absolute frequency, % – relative frequency, **p<0.01
Table 3 shows that 69.87 % full-time and 55.93 % part-time students would react correctly to the General alarm. Considering that out of 298 students, 32.88 % (n=98) would react incorrectly, they would put their patients and colleagues in a healthcare facility at risk. It is interesting that there is a significantly higher frequency of correct answer among full-time students. Among part-time students, there was no statistically significant difference between in relative frequency between the correct and wrong answers. The knowledge level of full-time and part-time students was similar (Table 3).

Table 4 shows that only 13.81 % full-time and 3.39 % part-time students answered correctly, i.e. they will organise the escort and transfer of patients to the reception. It was a surprising fact to find out that 88.25 % (n=263) of the students would chose the wrong action and thus would put their life and the lives and health of patients in the healthcare facility at risk. It is also striking that only 3.39 % of part-time students answered correctly. In this group, we could assume that those students already working in a healthcare facility have the knowledge about how to behave in an emergency according to the Emergency Evacuation Plan of the facility. The above listed differences in relative frequencies of corrects and wrong answers are statistically highly significant and indicate insufficient knowledge of how to react to the General alarm amongst students of both full-time and part-time programmes.

An unplanned radioactive or ionizing radiation leak into the environment that does not put population at risk is called a radiation incident. If the leak is so vast that it puts the health of nearby population at risk it is called a radiation accident. In case of radiation accident, health-preventive emergency measures are taken.

The above mentioned results correspond with the following question: “How would you – as healthcare professionals – react to the warning signal ‘General alarm’ in a healthcare facility with patients sitting in the waiting room?” These were the options:

a) Ask the patients to leave the premises immediately.
b) Find out what has happened and then inform the patients about emergency.
c) Take patients to the reception and return to the department.
d) Leave the premises as quickly as possible and go home.

Currenty, there are two nuclear plants in the Czech Republic (Temelín, Dukovany). There are very strict rules for their operation because of the risk of radiation accident, yet the risk is very low. For this reason, internal emergency plans have been developed to deal with radiation accidents and very detailed external emergency plans to handle a radiation accident. If there is an emergency situation, a quick evacuation of people is essential as well as the provision of health care.

The respondents were asked the following question: “How would you react to a radiation accident announced with the General alarm and what are the necessary measures?” There were three options:

a) Seek central section of a building or basement and wait for further instructions.
b) Monitor the situation, any preventive measures are useless as the radiation penetrates through all materials.
c) Move to higher floors of the building where the effect of the radiation is lowest and wait for further instructions.

The answers of full-time students show that 76.99 % would handle the situation properly and would move to a safer zone. Among part-time students, there were 79.66 % correct answers. (Table 5).
Table 5  Respondents’ reaction to a radiation accident.

<table>
<thead>
<tr>
<th>Radiation accident</th>
<th>Full-time programme</th>
<th>Part-time programme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
<td>wrong</td>
</tr>
<tr>
<td>Seek central section</td>
<td>184</td>
<td>76.99</td>
</tr>
<tr>
<td>Monitor the situation</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Move to higher floors</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>76.99</td>
</tr>
</tbody>
</table>

Notes: n – absolute frequency, % – relative frequency, **p<0.01

The prevailing frequency of correct answers is statistically significant. There was no significant difference between full-time and part-time students in relative frequencies, which means that the knowledge level about the reaction to a radiation accident is the same for both groups (Table 5).

In the moment of a radiation accident, alarms are raised and people in the affected area are obliged to seek shelter and take further protective steps due to the release of radioactive iodine.

The respondents were asked: “What is an iodine prophylaxis used when a radiation accident occurs and what are the preventive measures taken to prevent inhaling the radioactive iodine, which can cause cancer?” These were the options:

a) Take three tablets of potassium iodine. These will be distributed into pharmacies across the Czech Republic for people to buy after the radiation accident.

b) Take tablets of potassium iodine. The dosage will be announced in the media to people living in the affected area where the tablets are regularly distributed and exchanged.

c) Breathe through a wet handkerchief, towel of a protective filter which lowers the concentration of inhaled iodine and lowers the risk of radioiodine uptake by the thyroid gland.

Table 6  Iodine prophylaxis

<table>
<thead>
<tr>
<th>Radioactive iodine</th>
<th>Full-time programme</th>
<th>Part-time programme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
<td>wrong</td>
</tr>
<tr>
<td>Take 3 tablet of iodine</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Take tablets</td>
<td>38</td>
<td>15.90</td>
</tr>
<tr>
<td>Breathe through a handkerchief</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>15.90</td>
</tr>
</tbody>
</table>

Notes: n – absolute frequency, % – relative frequency, **p<0.01

The answers show (Table 6) that only 15.9 % of full-time students and 13.56 % of part-time students were able to select the correct answer b), which means to take potassium iodine tablets as soon as possible after the radiation accidents, ideally within an hour. If taken later than 6 hours after the exposure, iodine prophylaxis is ineffective and the use of potassium iodine tablets is useless. There is a significant number of wrong answers which shows that both groups have poor knowledge of iodine prophylaxis. There was no significant difference between full-time and part-time students, their knowledge is similarly poor (Table 6).

One of the important elements of emergency preparedness is the fire emergency evacuation plan. A fire breaking out in a healthcare facility is real, possible emergency and the preventive measures are listed in Bill No. 133/1998 Coll., Bill on Fire Prevention (15). Among other measures, the bill describes the required location and visibility of available fire extinguishers and their classification. In general, fire extinguishers are intended to be used in early stages of a fire as the primary fire action. Portable fire extinguishers are classified according to the agent used to extinguish a fire. There are foam, water, dry powder, and carbon dioxide and halon types. In case of a fire, the healthcare staff must know how to use the fire extinguisher and what type of fire is to be extinguished. If the wrong type of extinguisher is used, the person can sustain
harm or put his life at risk (e.g. using water extinguisher for electrical devices).

The respondents were asked for which types of fire a foam extinguisher can be used:

- a) Flammable liquids not mixable with water (petrol, diesel fuel, mineral oils, and fats).
- b) Wired electrical devices and their vicinity.
- c) Flammable metals (magnesium and aluminium alloys).

<table>
<thead>
<tr>
<th>Fire extinguisher</th>
<th>Full-time programme</th>
<th>Part-time programme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>right</td>
<td>wrong</td>
</tr>
<tr>
<td>Flammable liquids</td>
<td>129</td>
<td>53.97</td>
</tr>
<tr>
<td>Electrical devices</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Flammable metals</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td>53.97</td>
</tr>
</tbody>
</table>

Note: n – absolute frequency, % – relative frequency.

The correct answer – a), foam fire extinguisher can be used to extinguish flammable liquids – was recorded in 53.97 % full-time and 55.93 % part-time students. (Table 7). Using the Student’s t-test, a statistically significant difference was found between the correct and wrong answers in both groups and at the same time, no significant difference was found between full-time and part-time students.

The above mentioned results of a survey carried out among students of non-medical healthcare professions clearly indicate that except for the emergency phone numbers their knowledge of emergency procedures is poor. It is very likely that in case of an emergency, they would not be able to react correctly and would put their life, health and the lives and health of their colleagues and patients at risk.

It was proved that the knowledge of human protection during major emergencies are at the same level in both groups of full-time and part-time students. This is despite the fact that part-time students are generally older, have work experience from a healthcare facility and 12 % had completed tertiary education and most of them worked in a healthcare facility at the time of the survey. The results suggest that there is a strong and substantiated need for a life-long education of healthcare staff in human protection.

At the end of the survey, respondents were asked if they consider human protection during emergencies an important matter and whether it should be part of primary, secondary and tertiary education. A total of 98.99 % (n=295) thinks that it is necessary to include human protection in the curricula in elementary and secondary schools. 80.87 % respondents think that human protection during major emergencies should be included in study programmes at universities.

**DISCUSSION**

Handling of an emergency situation depends on several factors, including emergency calls which activate the Integrated Rescue Services. Emergency numbers are toll-free, in the Czech Republic the following numbers are used: 112 European Emergency Number, 150 for fire Rescue, 155 emergency medical services, and 150 for Police. The operation of emergency numbers is defined in Bill No. 127/2005 Coll., on electronic communication, as amended (16). The results show that only 2 % of students included in the survey do not know the emergency number, or would call the number 156 for Municipal police. However, this number does not belong among emergency numbers.

There is a certain lack of knowledge about the use of the European emergency number 112. The question was whether or not one can call without a SIM card or zero credit, the correct answer was recorded in 93.31 % full-time students and 86.44 % of part-time students. It is surprising that despite a massive media campaign more than 10 % of the students do not know the emergency number 112.

We can compare our data with the results of the Centre for a safe state (17). In 2012, there was a survey among university students in the Czech Republic (n=962) who were asked in which countries the emergency number 112 can be used – only 51 % answered correctly. This lack of knowledge may be fatal during a major emergency when a quick response is necessary in case the witnesses are not able to deal with the situation themselves.
In human protection during emergency it is important to know the siren signals and the proper reaction. The survey results show that only 14.36% of full-time and 14.68% part-time students are able to tell the different signals apart. It is a startling fact that only 26.28% think that the “General alarm” is used to warn the population. A similar result was reported among students of University České Budějovice (18) where only 29% of the students identified the “General alarm” signal correctly. Poor knowledge was also found among 210 students from the Faculty of Education at Charles University in Prague (19). There, only 15% of students know the meaning of siren signals. Lack of knowledge was also confirmed in a study carried out in 2016 (20) conducted in healthcare institutions in the South Bohemian Region. Only 20% of healthcare professionals were able to identify the “General alarm” signal.

The reaction to the “General alarm” signal is also important. The research among students in České Budějovice (18) indicates that only 36% would react correctly, as would 52% of students from the Faculty of Education at Charles University in Prague (19). A questionnaire survey in healthcare facilities in the South Bohemia Region in 2016 (20), only 28% of the healthcare staff would respond correctly and 55% would seek information about the situation. Our research shows that 62.90% of the respondents would react adequately.

A radiation accident or emergency associated with radiation leakage requires immediate measures for human safety and environmental protection (21). A research carried out amongst people living in the danger zone near the Dukovany nuclear plant (22) revealed that 54% of the population would assess an emergency situation correctly and would react adequately. Another study conducted in the danger zone but in a different place shows even better awareness about emergency actions amongst the population (23). The results suggest (23) that in the moment of a radiation accident, 85% of the population would react correctly. It is clear that even though the educational materials are prepared consistently for the people living in the danger zone and are widely available for everyone, the awareness varies amongst municipalities. Marádová (19) states that 80% of students of the Faculty of Education at Charles University Prague would react correctly to a radiation emergency. Our research shows the correct reaction of students in 78.35%.

A necessary precaution during a radiation emergency is the so-called iodine prophylaxis (21). The Decree No. 359/2016 Coll., on detailed handling of a radiation accidents, as amended, stipulates in § 15 precise rules for the distribution of antidotes amongst population for iodine prophylaxis in the nuclear plants danger zones. This decree is linked to the § 220 Par. 2 of the Nuclear Bill (21).

Our research shows only 14.73% of the respondents know what iodine prophylaxis is. A similar lack of knowledge during a radiation emergency was also discovered amongst students of the Faculty of Education at Charles University Prague (19), where only 18% would use antidotes for human protection.

A higher level of awareness about iodine prophylaxis was ascertained in population in the nuclear danger zones (22): 65% knows when and how many tablets of potassium iodine to take. The results show that the population living in the danger zones have a better awareness of iodine prophylaxis than university students.

In case of contamination by radioiodine $^{131}$I, the radioactive substance is absorbed by the thyroid gland where it accumulates in high concentration, unless it is blocked by a stable potassium iodine. In consequence, the function of the thyroid gland may be inhibited, or could lead to the development of benign nodes or cancer growth (24).

It is necessary to stress that students of non-medical professions should know the issue in order to provide an immediate prophylaxis, i.e. to supply potassium iodine tablets within an hour after the radiation accident to ensure effectiveness (21).

Fires may have tragic consequences and can cause vast damage on property. It is usually negligence, carelessness or underestimation of the situation that leads to fire breaking out (25). Anyone can witness a fire or may provide immediate medical assistance. The law on fire protection (15) requires that every citizen must act to prevent fire breaking out and that citizen should know which fire extinguisher to use with respect to the type of fire.

In our survey amongst university students, only 54.95% knew the right answer. It is a surprising finding since a survey carried out amongst students of secondary schools suggested that 79% were convinced they know how to use a fire extinguisher and but only 69% knew where to find one (26). 64% of the students in secondary and vocational school would choose the correct type of fire extinguisher. Better awareness of students from secondary schools may be explained by the fact that they have a regular training in fire protection in their study programmes, however, this is missing in university education completely. It is clear that unless this type of emergency education...
is done repeatedly at all school levels, the acquired knowledge and skills may be forgotten.

The conclusion of the entire study is highly disturbing as the author uncovered a serious lack of knowledge not only among students, but also among teachers who are dealing with this issues in secondary schools (26).

Poor knowledge among the healthcare staff was also pointed out in a survey (20) including 317 questionnaires from selected healthcare facilities. The results show that awareness of fire protection among the healthcare staff does not reach the required 80 % as the respondents only reached 74.37 % of correct answers. Yet the survey concludes that a regular training for increases knowledge and if trained in proper areas and at regular intervals as required by law, the results reached are significantly higher.

The results of our and other surveys suggest that there is a need for a life-long education of the general public – in all professional and adjusted to age groups – about human protection during emergencies and crisis. At the same time, the education should be tailored for different professions.

CONCLUSION

The survey results among students of non-medical professions in full-time and part-time study programmes at the Faculty of Health Sciences, Palacký University Olomouc show poor knowledge of selected areas of human protection during major emergencies. There is inadequate knowledge of siren warning signals, reaction to the signals, poor knowledge of behaviour following a radiation accident, iodine prophylaxis, and the correct use of a fire extinguisher. It is clear that both students and working healthcare professionals and not aware of the emergency measures, lack the theoretical knowledge and practical skills to protect themselves, their co-workers or the patients in a healthcare facility during a major emergency. The results show the need to re-implement this issue into current study programmes at university level. Based on the above mentioned results and the need to increase the competence of future healthcare professionals, a new optional course Human Protection during Emergencies will be offered in the academic year 2018/2019 for students at the Faculty of Health Sciences, Palacký University Olomouc. The faculty academic staff will try to follow the Conception of Crisis Preparedness in Healthcare adopted by the Ministry of Health in the Czech Republic with the aim to provide a quality methodological environment, knowledge and training in special skills in healthcare and healthcare facilities during major emergencies and to practice the handling of an emergency situation.

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