

Evaluating the Effectiveness of a First Aid Training Programme for Individuals Without a Background in Medical Education

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Objective: People without a medical education background who have the skills and knowledge to provide emergency care can be useful in emergencies, disasters, earthquakes, and pandemics to save or support the life of an injured person until hospitalization or the arrival of an emergency medical team. The purpose of the study is to assess the knowledge and skills of first aid in individuals without a medical education background within a year after training.

Materials and Methods: The study sample included 643 people without a medical education background. The study participants attended basic first aid training, the sessions that lasted for 18 hours. Participants answered a 10-question skills test before and after completing the course, as well as 6 months and 1 year after training. SPSS version 20.0 (IBM Ireland Product Distribution Limited, Ireland) was used for the statistical assessment of data, employing Cochran's Q test. Pairwise comparisons were made between different periods using the Wilcoxon test with Bonferroni correction.

Results: The mean age of the participants was 36 for males, and 42 for females. In the sample, males accounted for 70% ($n = 441$) and females for 30% ($n = 202$). The first aid training provided to persons without a medical education background significantly increased their level of knowledge. After 6 and 12 months, their knowledge and abilities remained significantly higher than before the training. However, these results were lower than they had been immediately after training.

Conclusion: The study demonstrated that first aid training significantly increased the knowledge level of non-medical individuals immediately after training and remained elevated after 6 and 12 months. However, there was a decline in the level of knowledge and skills over time, indicating the need for refresher training.

Keywords: first aid training, effectiveness, non-medical people, emergency situation, Kazakhstan

Introduction

Possession of the skills to provide first emergency medical aid by a non-medical person is essential in an emergency, a disaster, an earthquake, or a pandemic. Up until the victim is admitted to a hospital or an emergency medical team arrives with trained individuals are able to preserve or sustain their life.¹

The National Register of Paramedics (Emergency Register of Emergency Medical Technicians) USA, established four levels for qualification characteristics for paramedic education: the first level characterizes a basic or general course education; the second and third levels correspond to intermediate training; the fourth level corresponds to full paramedic training. In others countries, in addition to these stages, there is also a zero level of minimum pre-medical assistance, mandatory for police officers, firefighters and other employees of law enforcement agencies, related to emergencies. They are often the first to arrive at the scene of a disaster. Employees at this level receive a first aid certificate (Certified first responder—CFR).² The zero level involves learning skills of stopping bleeding, fixation of limbs for various fractures, transporting injured patients to the hospital, providing minimal care for uncomplicated burns, childbirth, cerebrovascular accidents, etc. Specialists at this level do not have the right to independently diagnose or apply medicines, but are able to

evaluate the patient's emergency severity, control respiratory and cardiac failure, as well as critical conditions with traumatic injuries. Anyone can undergo this training on a voluntary basis.³ Considering the short duration of training, a superficial level of knowledge, and a small set of skills, specialists at the zero and first levels of training are designated as emergency medical technicians or first responders.

In different countries, the competencies of first responders include cardiopulmonary resuscitation; automatic external defibrillation; immobilization of the limbs and pelvis; stopping bleeding; oxygen therapy; registration and interpretation of ECG in myocardial infarction.^{4,5} Medical technicians are also licensed to use certain medications for shock, myocardial infarction, hypoglycemia, or drug poisoning. Their minimum course duration is from 40 to 84 hours, depending on the number of skills acquired.^{6,7} In Canada, the course for Medical First Responder lasts 5 days, for Emergency Medical Responder duration of course is 10 days; in the USA, the duration of education for Emergency medical responder (EMR) and Emergency medical technician (EMT) can vary from 40 to 60 hours; in France, the duration of such course is 35 hours.

In the Republic of Kazakhstan, persons without medical education background who have undergone appropriate training in first aid standards can provide emergency medical care.⁸ The following groups of people are required to take first aid courses: police officers, military personnel, firefighters, emergency rescue workers, employees of air, water, and railway transport, bus drivers, employees of security organizations, employees of educational institutions, workers of hazardous production facilities, and non-medical staff members of healthcare organizations.⁸ After completion of training, they receive certificates, which need to be updated every three years.⁸

In Kazakhstan, the training program lasts 18 hours; it is significantly less compared to developed countries. The training program includes algorithms for providing primary medical care for the following emergency conditions: loss of consciousness, cessation of breathing and blood circulation, external bleeding, foreign bodies of the upper respiratory tract, injuries, burns, consequences of exposure to high temperatures, frostbite, and other consequences of exposure to low temperatures, poisoning, convulsions, and bites. However, it does not include the use of medications for myocardial infarction, anaphylaxis, or shock. The training is carried out face-to-face, in the form of theoretical and practical classes using simulation equipment (stretcher; neck brace; hemostatic tourniquets; mannequin for simulating a foreign body in the upper respiratory tract; Ambu mask with a check valve for artificial ventilation; hypothermic first aid kits).⁸ Training is carried out once every 3 years.

The purpose of the study is to assess the knowledge and skills of first aid in persons without a medical education background within a year after training.

Materials and Methods

Characteristics of Studied Persons

Participants for the study were selected by quota sampling from certain professional groups defined by the Order of the Minister of Health. Recruiting of the participants was mandatory.

The study group included 643 people without medical education who, due to the nature of their work, were faced with the need to provide emergency medical care in emergency situations: representatives of the Ministry of Emergency Situations, firefighters, and the National Guard ($n=280$); sports school trainers ($n=6$); security guards ($n=20$), and other employees of medical institutions without medical education background ($n=337$). Males comprised 70% ($n=441$), and females comprised 30% ($n=202$) of the sample. The average age in the male group was 36 years, while in the female group it was 42 years. Among the participants, 90% ($n=579$) had diplomas in special education according to their profession (not medical diplomas). None of the participants had a previous medical education. 37.3% of participants had higher education, and 52.7% had secondary specialized education. Most of them (31.5%) had short experience in their professional area (from 1 to 3 years), 17.3% of participants had work experience of 3–5 years, 26.8% had worked in their profession for 5 to 10 years, and 19.7% had worked for over 20 years.

After 6 months, 430 responders agreed to take part in the survey, and after a one year, their number decreased up to 232 people. The study had a cross-sectional design.

Characteristics of Survey

To conduct the survey, the staff of the Department of Emergency Medicine developed 10 skill tests (Table 1). The basis for creating the questionnaire was the CPR Practice Quiz Questions for nurses. Considering that we taught people without medical education, we adjusted the questionnaire so that it would be as clear and understandable as possible for our students. To create the MCQs, we used the Angoff method, which is a common standard approach in test development. We asked four experts to estimate the percentage of tests that students could answer correctly. Then we checked the spread of such estimates, discussed controversial issues, and came to a common decision.

Table 1 First Aid Questionnaire for People Without Medical Education. Comparison Between Pre-Test and Post-Test Performance

1. What is the fastest and easiest diagnostic method for cardiac arrest?	a) Check the pulse on the carotid arteries (carotid in adults, children, and brachial/femoral arteries in infants.
	b) Auscultation of heart sounds.
	c) Checking the pulse on the radial arteries.
	d) Assessment of skin color
	e) ECG interpretation
2. How quickly should CPR be started?	a) After a 4–5 minute pause to reliably confirm the case of death
	b) Only after relatives and other persons have left the scene of the incident.
	c) Only after a complete information about the patient has been collected to determine the true cause of death.
	d) It starts immediately after cardiac and respiratory arrest.
	e) Immediately after the ambulance crew arrived.
3. What is the correct ratio of chest compressions and breaths during CPR?	a) 10: 2.
	b) 30: 2.
	c) 15: 1.
	d) Independent compressions and breaths
	e) 5:1
4. What position should be given to the patient before starting CPR?	a) Horizontal, on the back with a raised leg end
	b) On the back with the raised head end
	c) On the back with the head end down
	d) In the supine position with the head turned towards the resuscitator
	e) The position of the patient does not matter
5. What actions are used to restore airway patency?	a) Head tilting back, advancement of the lower jaw, and sanitation of the oral cavity (removal of foreign bodies by visual identification)
	b) No action taken
	c) Giving the patient a position with an elevated head end
	d) Place the patient in a head-down position

(Continued)

Table 1 (Continued).

6. Where should the base of the palm be placed when performing cardiac massage in adults?	a) In the 4–6th intercostal space on the left side along the midclavicular line
	b) In the epigastric region
	c) 2 centimeters below the jugular notch of the sternum
	d) In the center of the chest (intersection of the nipple line and the longitudinal midline of the body)
	e) The position of the hands does not matter
7. What methods for determining consciousness do you know?	a) survey of the patient's relatives
	b) calling the patient, patting him on the shoulder, pricking him with a sharp object
	c) survey witnesses
	d) survey the patient
	e) palm clenching
8. How long after cardiac arrest does brain death develop?	a) 10 minutes
	b) 3–5 minutes
	c) 5–7 minutes
	d) 7–10 minutes
	e) 10–15 minutes
9. What is the minimum sufficient time during which CRP should be conducted?	a) 10 minutes
	b) 20 minutes
	c) 30 minutes
	d) 40 minutes
	e) 45 minutes
10. What frequency of compressions per minute is correct when performing CRP?	a) 60–80
	b) 100–120
	c) 70–90
	d) 110–130
	e) 50–70
11. Have there been situations during your life/career when you provided emergency care?	A) yes
	B) no
12. Do you consider whether it is appropriate to provide basic first aid training to persons without medical education?	A) yes
	B) no

The survey was conducted in two languages – Russian and Kazakh, depending on the preferences of the respondents. We solved the problem of adapting questionnaires in the Kazakh language, taking into account ethno-linguistic features, in the following sequence: translation into Kazakh was followed by back translation into Russian; translation examination; improving the translation with semantic adjustments.

The translation of the questionnaires was carried out in parallel by two native Kazakh language translators with higher medical education. We aimed to convey the meaning of the questions as accurately as possible, avoiding literal

translation and using the simplest and most understandable sentences. Then the translated questionnaires were assessed by an expert - A native Kazakh speaker with a higher medical education, who was not previously familiar with these questionnaires and did not take part in their initial translation. The next stage of questionnaire validation was back translation from Kazakh into Russian; it was carried out by two persons with higher medical education, fluent in both Kazakh and Russian, who did not take part in the previous stages of adaptation, followed by comparison with the original versions of the questionnaires. The final decision was made to ensure that the final versions of the questionnaires were equivalent to the original ones.

Subsequently, testing of the Kazakh versions of the questionnaires was carried out on a group of 20 people twice to avoid inaccuracies and distortions in understanding.

The Training Sequence

The medical teachers of the Department of Emergency Medicine conducted theoretical training for the participants in providing first aid (lectures, video lectures, step-by-step algorithms for emergency care), followed by practical skills on mannequins. The training took place on-site at the Department of Emergency Medicine of Semey Medical University and lasted 3 days for 6 hours (18 hours). The thematic plan of the preparatory courses for emergency medical care included the following conditions: lack of consciousness, respiratory and circulatory arrest, external bleeding, foreign bodies in the upper respiratory tract, injuries to various areas of the body, burns, effects of high temperatures, thermal exposure, frostbite, poisoning, convulsions, and bites. The list of practical skills included: Basic Life Support (BLS), applying a tourniquet for bleeding, Heimlich maneuver for foreign body asphyxia, immobilization of limbs, and primary wound treatment.

All study participants were initially surveyed on their knowledge, skills, and abilities to provide emergency medical care in emergencies before the start of the study. The assessment of the output level of training results was carried out immediately after completing the course, 6 months, and 1 year after the training. Before the start of training and immediately after training, the students were surveyed offline; after 6 months and after one year; they were surveyed online via Google form, with the link sent out via instant messengers.

Statistical Analysis

Statistical data analysis was carried out using SPSS version 20.0 (IBM Ireland Product Distribution Limited, Ireland). During the study, descriptive statistics were carried out for each period with the calculation of absolute and relative indicators. We used Cochran's Q test to assess the statistical significance of differences in learning outcomes at the following stages: pre-training and immediately after the training, pre-training and 6 months after the training, pre-training and 12 months after the training, immediately after the training and 6 months after the training, immediately after the training and 12 months after the training. For a more detailed analysis, pairwise comparisons were made between different periods using the Wilcoxon test with Bonferroni correction. A p-value <0.05 was considered statistically significant.

Results

Employees of the Department of Emergency Medicine who conducted the training analyzed the answers to the questionnaire before, immediately after training, after 6 months, and after one year. [Figure 1](#) shows the answers to the first five questions. To the first question: "Which diagnostic method is the fastest and easiest for cardiac arrest?" Most students (93.8%) immediately after training chose the correct answer that the pulse is checked on the carotid arteries, whereas before training only 76.7% were able to answer this question correctly ($p < 0.001$). About 14% of respondents before the start of training answered that the pulse check should be carried out on the radial arteries. Statistically significant differences in responses persisted for one year after training compared to results before training.

To the second question: "How quickly should CPR be started?" Before training, 72.1% answered correctly, whereas after training this rate was 99.2% ($p < 0.001$). Statistically significant differences in responses persisted for one year after training compared to results before training. It is interesting that before the training, 9.3% of respondents answered this question "After a 4–5 minute pause to reliably confirm the case of death", and 16.3% answered, "Only after it is possible

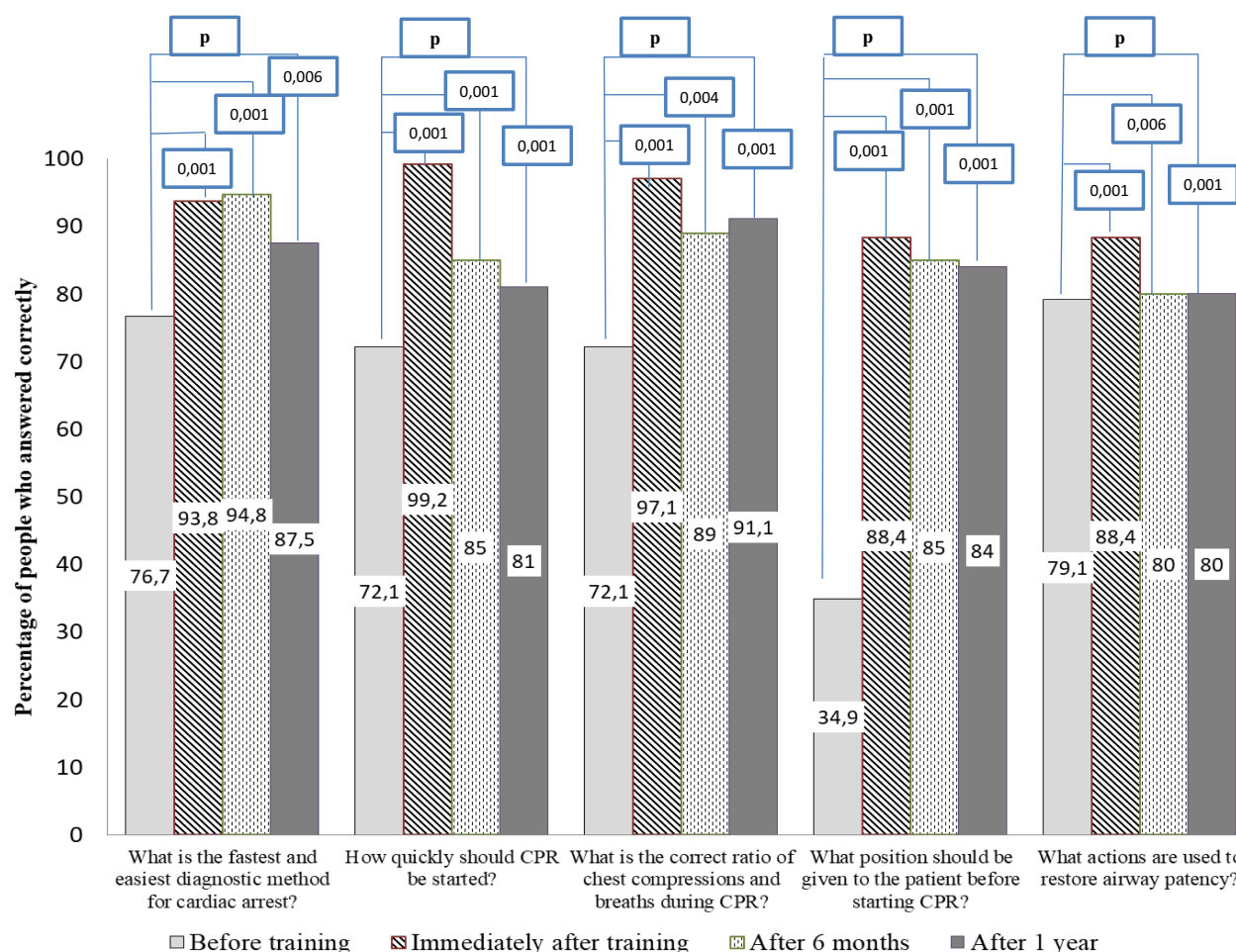


Figure 1 Describes the percentage of correct answers to 1–5 questions about CPR performing before training, immediately after training, six months and one year after training. The figure shows statistically significant differences between respondents' answers before training, immediately after training, 6 months and one year after training ($p < 0.05$).

to remove from the place of the incident the relatives and others". These answers indicate an almost complete lack of knowledge on this issue among a quarter of studied people. First aid training can be a valuable resource for people without medical education, giving them the knowledge and skills needed to provide immediate assistance in emergencies.

To the third question: "What is the correct ratio of chest compressions and breaths during CPR?" Before training, only 72.1% answered correctly (30:2), while immediately after training this figure increased to 97.1% ($p < 0.001$), after six months this figure decreased slightly, reaching 89%, and after a year, it remained at the same level - 91%. However, the differences remained statistically significant for one year after training.

To the fourth question: "What position should be given to the patient before starting CPR?" Only 34.9% answered correctly before training. The remaining answers were distributed as follows: "On the back with the head end raised" - 20.9%; "On the back with the head end down" - 25.6%; "In the supine position with the head turned towards the resuscitator" - 4.7%; "The position of the patient does not matter" - 14%. This distribution of responses indicated that, apparently, this issue is not covered in the mass media accessible to the population. Immediately after training, 88.4% answered this question correctly ($p < 0.001$). Statistically significant differences in responses persisted for one year after training compared to results before training.

To the question: "What actions are used to restore airway patency?" 79.1% of students gave the correct answer before the start of training: "Head tilting back, advancement of the lower jaw and sanitation of the oral cavity", while immediately after training, the percentage of people who answered correctly was 88.4% ($p = 0.001$). After 6 months,

this rate dropped to 80%; it remained at this level for up to one year, but the differences compared with the results before training remained statistically significant.

Figure 2 shows the answers to questions 6–10. To the question “Where should the base of the palm be placed when performing cardiac massage in adults?” Before the start of training, 58.1% of students answered correctly: “In the center of the chest (intersection of the nipple line and the longitudinal midline of the body)”. The remaining answers were distributed as follows: “In the 4–6th intercostal space on the left side along the midclavicular line” - 32.6%, “2 centimeters below the jugular notch of the sternum” - 7%, “The position of the hands does not matter” - 2.3%. Immediately after training, the percentage of those who answered correctly increased significantly and reached 92.6% ($p < 0.001$); after 6 months it was at the same level - 93.5%; after one year the rate decreased to 87.5%, however, it remained significantly higher compared with the initial result ($p = 0.001$).

To the question, “What methods for determining consciousness do you know?” Only 55.8% chose the correct answer before the start of training: “Calling the patient, patting him on the shoulder, pricking him with a sharp object”. Immediately after training, 92.6% of respondents gave the correct answer ($p < 0.001$). Statistically significant differences in responses persisted for one year after training compared to results before training.

To the next question: “How long after cardiac arrest does brain death occur?” Before the start of training, only 18.6% gave the correct answer (3–5 minutes). The other answers were distributed as follows: 10 minutes – 20.9%; 5–7 minutes – 25.6%; 7–10 minutes – 7%; 10–15 minutes – 27.9%. Both immediately after training and throughout

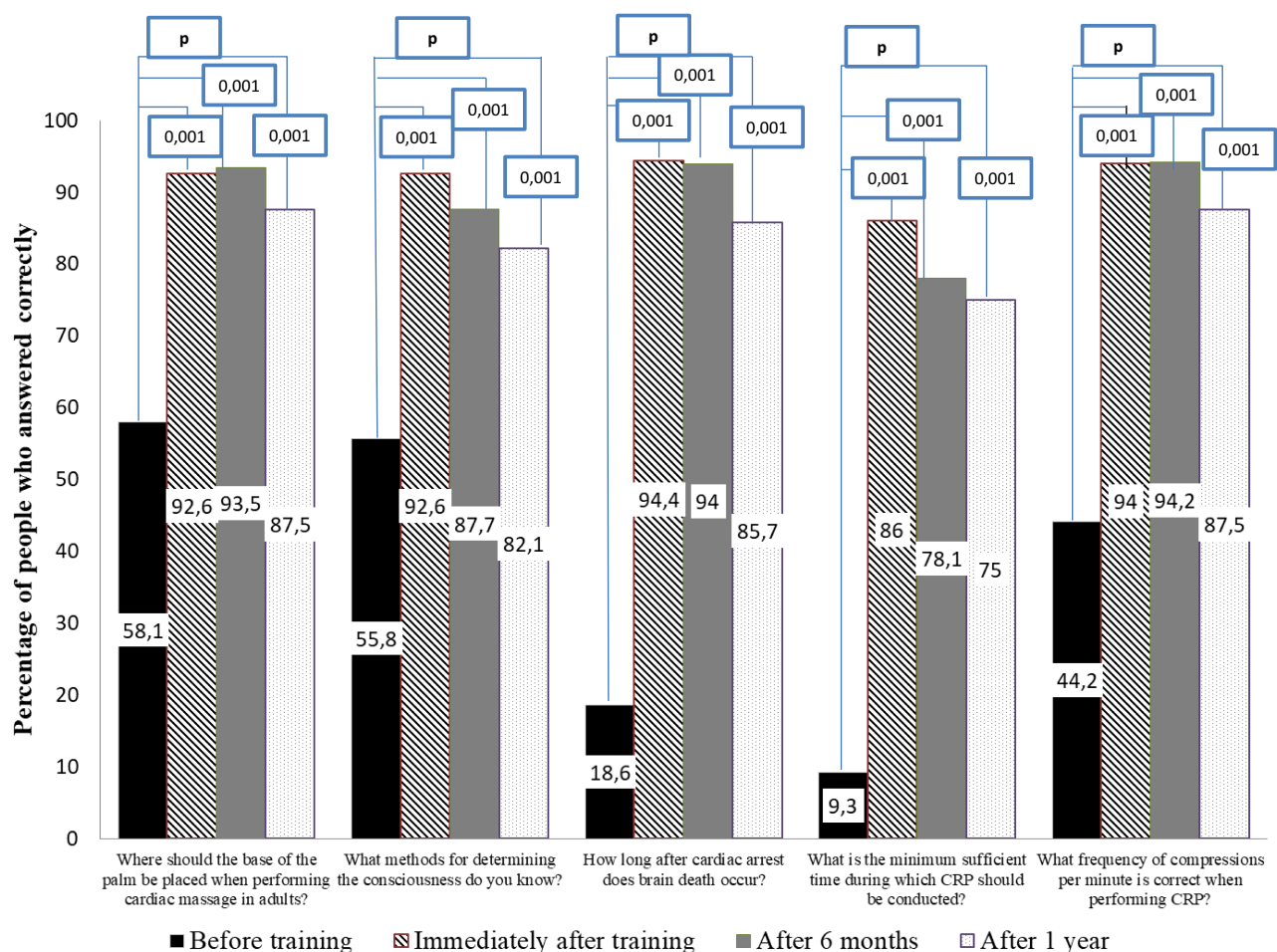


Figure 2 Describes the percentage of correct answers to 6–10 questions about CPR performing before training, immediately after training, six months and one year after training. The figure shows statistically significant differences between respondents' answers before training, immediately after training, 6 months and one year after training ($p < 0.05$).

the year after training, the survey results had statistically significant differences with the indicators before training ($p < 0.001$).

Before the start of the training, only 9.3% of the respondents knew that the minimum sufficient time for CPR is 30 minutes, whereas after the training, 80% gave the correct answer ($p < 0.001$). Statistically significant differences in responses persisted for all periods of the study compared to results before training.

To the question: “What frequency of compressions per minute is correct when performing CRP?” Forty-four percent of students knew the correct answer before the start of training (100–120 per minute). After completing the course, this rate more than doubled and rose to 94% ($p < 0.001$). The majority of respondents gave correct answers throughout the year after training; these results remained statistically significant in comparison with the rates before training.

Forty-four percent of the students had moments in their lives when they needed to provide emergency first aid to an injured person. After completing a course in emergency first aid, 98% of respondents considered it necessary to conduct such courses for people without medical education.

Discussion

Many people in need of medical care in emergency situations die due to delayed first aid.⁹ Considering that brain death occurs in the first 3–5 minutes after cardiac arrest, emergency care provided by first responders (persons without medical education) before the arrival of emergency crew is necessary to save lives. Some researchers have assessed the effectiveness of first aid training among schoolchildren,¹⁰ students,¹¹ teachers,¹² drivers and security personnel,¹³ non-professionals,¹⁴ and university academic and administrative staff.¹⁵

In many countries, the minimum skills for pre-medical assistance are mandatory for police officers, firefighters, and other representatives of law enforcement agencies related to emergencies by type of their activities, and often the first arriving at the scene of the disaster. Specialists at this level do not have the right to independently diagnose or apply medicines, but are able to evaluate the severity of the patient's emergency condition, control respiratory and cardiac failure, as well as critical traumatic injuries.¹⁶

In our study assessing the effectiveness of first aid training for non-medical individuals, we have found a significant increase in post-test knowledge. The results of our study suggest that such type of training can be effective in improving the knowledge, skills, and confidence of people without medical education. Our data are consistent with numerous previous studies.^{15,17,18} Thus, Mert-Boga assessed the effectiveness of CPR training in the university academic and administrative staff using questions on the depth of chest compressions, the number of compressions per one minute, checking the consciousness, and measures taken during respiratory arrest. He concluded that after training the knowledge of the students significantly improved. The authors concluded that there was a significant increase in the level of knowledge of study participants after training, mainly in the BLS skill; women had better results compared to men; participants with higher levels of education had significantly higher scores; the level of knowledge was inversely proportional to age.¹⁵ In another study, the percentage of correct answers given to CPR questions was also significantly higher among students after first aid training (post-test) in comparison with pre-test (34.8% to 60.5%); however, the result was not statistically significant ($p > 0.05$).¹² When examining the impact of such education on medical students, it was found that trained students' knowledge such as frequency of cardiopulmonary resuscitation and hand position during CPR were significantly higher than those of the untrained ($p < 0.05$).¹⁹

Karaca A. et al assessed the knowledge level of 747 people without medical education who completed a non-medical first aid training program 3 years ago. The responders showed a high level of knowledge compared with the pre-test level for all periods of the study. Their knowledge level was found to be related to the number of first aid trainings and the number of performed interventions ($P < 0.05$, $P < 0.001$, respectively).¹⁴ In our study, 44% of people undergoing training (mainly representatives of the Ministry of Emergency Situations and firefighters) indicated that they had attempted first aid before training. However, most of these attempts in cases of cardiac arrest were unsuccessful. According to our data, knowledge in the field of emergency care 6 months after training remained at the same level as immediately after training (Figures 1 and 2) and decreased slightly 1 year after training (question 6) (Figure 2), which indicates the need to periodically update knowledge of first aid. However, it should be noted that the level of knowledge remained quite high compared to the level before training after 6 and 12 months.

When assessing pre- and post-test results based on the age of the participants, different studies have shown conflicting results. Some authors have shown that younger employees had more positive outcomes compared to older employees.^{15,20} In contrast to these studies, Ganfure et al, assessing the level of knowledge of kindergarten teachers, reported that teachers over 35 years of age had 4 times more first aid knowledge than people under 25 years old.¹⁴ Numerous studies have shown that women have a higher level of first aid knowledge than men before and after training.^{15,20} In our study, the average age of men was 36 years, for women 42 years; only 30% of the subjects were female. Their level of education was lower than of men, so we did not compare the results of our training in the gender groups due to this fact.

The results of our study of the effectiveness of education for people who do not have a medical education, but who faced with emergency situations due to their professional duties showed a very low level of knowledge in this area before the start of training, even among representatives of the Ministry of Emergency Situations and hospital employees. This disheartening fact demonstrates the lack of prior training in the necessary knowledge and skills in the practice of these professionals, as well as the lack of information in the media. Considering that in Kazakhstan today the emergency medicine service is represented mainly by paramedics, an acute question arises of the need to train people without medical education in the skills of providing emergency care in critical situations.

Further research is needed to examine the long-term impact of first aid training on people's ability to respond effectively to emergencies. Organizations and institutions should continue to prioritize first aid training for non-medical professionals to ensure they are prepared to act quickly and decisively in emergencies.²¹

Conclusion

The results of the study showed that first aid training provided to non-medical people significantly increased their level of knowledge and skills immediately after training, after 6 and 12 months compared with pre-test results. Given the decline in knowledge at 12 months after completing the course, we could recommend repeating the training periodically to improve the effective response in emergencies.

Ethics Approval and Informed Consent

The study received approval from the Local Ethics Commission of the Semey Medical University on March 16, 2022. All participants signed an informed consent form.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflicts of interest in this work.

References

1. Leggio WJ, Varner L, Wire K. Patient safety organizations and emergency medical services. *J Allied Health*. 2016;45(4):274–277.
2. Salzman SM, Clemente Fuentes RW. EMS national incident management system. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2024.

3. National Association of State EMS Officials. August). National EMS scope of practice model 2019: including change notices 1.0 and 2.0 (Report No. DOT HS 813 151). National Highway Traffic Safety Administration; 2021.
4. Clark WR. Emergency medical services education and licensure--a road map for the future. *J La State Med Soc.* 2009;161(5):290–292.
5. Missel AL, Dowker SR, Dzierwa D et al. Factors Impacting Treatment of Out-of-Hospital Cardiac Arrest: A Qualitative Study of Emergency Responders. *J Am Heart Assoc.* 2023;12(10):e027756. doi:10.1161/JAHA.122.027756
6. Aras A, Dogan MS. Evaluating the levels of knowledge and attitudes of emergency medical technicians and paramedics toward traumatic dental injuries. *Niger J Clin Pract.* 2020;23(1):54–58. doi:10.4103/njcp.njcp_257_19
7. National EMS Education Standards. Washington, DC: National Highway Traffic Safety Administration; 2021:72.
8. Order of the Minister of Health of the Republic of Kazakhstan. Registered with the Ministry of Justice of the Republic of Kazakhstan on December 20, 2020 No. 21814. On approval of the Rules for the provision of first aid by persons without medical education, including those who have undergone appropriate training and the First Aid Standard; 2020.
9. Bjørshol CA, Søreide E. Improving Survival after Cardiac Arrest. *Semin Neurol.* 2017;37(1):25–32. doi:10.1055/s-0036-1593890
10. Tse E, Plakitsi K, Voulgaris S, Alexiou GA. The Role of a First Aid Training Program for Young Children: a Systematic Review. *Children.* 2023;10(3):431. doi:10.3390/children10030431
11. Tuna A. Cardiopulmonary resuscitation education and knowledge and skill levels of students in health school: results of six months. *J Humanit Social Sci Res.* 2017;6(3):1842–1848.
12. Ganfure G, Ameya G, Tamirat A, Lencha B, Bikila D. First aid knowledge, attitude, practice, and associated factors among kindergarten teachers of Lideta sub-city Addis Ababa, Ethiopia. *PLoS One.* 2018;13(3):e0194263. doi:10.1371/journal.pone.0194263
13. Andsoy I. The efficiency evaluation to first aid training given to security personnel in a state university. *J Contemp Med.* 2014;4(2):84–90.
14. Karaca A, Kose S. The effect of knowledge levels of individuals receiving basic first aid training in Turkey on the applications of first aid. *Niger J Clin Pract.* 2020;23(10):1449–1455. doi:10.4103/njcp.njcp_686_19
15. Mert-Boga S, Arsal-Yildirim S, Baydemir C, Kulcu N. Assessment on efficacy of basic first aid training provided to academic and administrative staff of a state university. *Int J Med Res Heal Sci.* 2018;7:93–102.
16. EMS Special Operations. Town of Colonie EMS; 2008:44.
17. Banfai B, Pek E, Pandur A, Csonka H, Betlehem J. ‘The year of first aid’: effectiveness of a 3-day first aid programme for 7–14-year-old primary school children. *Emerg Med J.* 2017;34(8):526–532. doi:10.1136/emermed-2016-206284
18. Bánfai B, Pandur A, Schiszler B, et al. ‘The (second) year of first aid’: a 15-month follow-up after a 3-day first aid programme. *Emerg Med J.* 2019;36(11):666–669. doi:10.1136/emermed-2018-208110
19. Abbas F, Sawaf B, Hanafi I, et al. Peers versus professional training of basic life support in Syria: a randomized controlled trial. *BMC Med Educ.* 2018;18(1):142. doi:10.1186/s12909-018-1241-z
20. Serinken M, Türkçüer I, Karcioğlu Ö, Akkaya S, Uyanık E. Kadınların başına gelen ev kazaları ve ilk yardım bilgi düzeyleri [Domestic accidents involving women and first aid knowledge]. *Ulus Travma Acil Cerrahi Derg.* 2011;17(5):445–449. doi:10.5505/tjtes.2011.55649
21. Alanazi A, Algethami S, Alnafisah M, et al. Assessment of the Knowledge Level of First Aid among Medical Students in Work Environment. *J Environ Public Health.* 2022;2022(1):8381819. doi:10.1155/2022/8381819

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