

**Nadiia Kotsur***

Doctor of Historical Sciences, Professor, Head of Department
Hryhorii Skovoroda University in Pereiaslav
08401, 30 Sukhomlynskyi Str., Pereiaslav, Ukraine
<https://orcid.org/0009-0003-3072-1706>

Lidiia Tovkun

PhD in Historical Sciences, Assistant Professor
Hryhorii Skovoroda University in Pereiaslav
08401, 30 Sukhomlynskyi Str., Pereiaslav, Ukraine
<https://orcid.org/0000-0002-4091-1322>

Professional training of future teachers in the provision pre-medical aid with basics of tactical medicine in educational institutions

Abstract. The research is relevant due to life, health and safety threats to children and adolescents during the Russian-Ukrainian war. It led an increase in the number of injuries requiring urgent medical care. First aid knowledge in tactical conditions is essential for teachers working in combat zones, occupied territories and territories under fire. Teachers are responsible for children's safety at any time, in peace or war. The research was aimed at studying the theoretical and methodological aspects of training future teachers to provide pre-hospital medical care to children in educational institutions. Research methods: scientific medical and biological literature analysis showed a lack of foreign publications on the teacher training in providing pre-hospital care to children in educational institutions; scientific modelling helped to create models for training future teachers to apply knowledge and to process quantitative and qualitative empirical data analysis; questionnaires, pedagogical experiment and methods of mathematical statistics helped to determine the level of knowledge and practical skills in providing pre-hospital medical care among pedagogical specialties students of Hryhorii Skovoroda University in Pereiaslav. The discipline structure and content of "Pre-hospital medical training with the basics of tactical medicine" for pedagogical specialties is revealed. The discipline introduction has increased interest in its study and the expediency of mastering practical skills. Research among Hryhorii Skovoroda University in Pereiaslav students has shown the training effectiveness of future teachers in this area. The future teachers professional training in the martial law conditions in Ukraine requires knowledge and practical skills of providing pre-medical care to children in educational institutions. The discipline studying "Pre-hospital medical training with the basics of tactical medicine" develops competences in the tactical medicine basics, ability to diagnose and provide pre-hospital care. This will contribute that future teachers will work effectively and be ready to help children if necessary

Keywords: war; trauma; emergencies; training; students; pre-school education; school education

INTRODUCTION

Children's and adolescents' safety and health in emergencies is one of the most pressing issues of modern days. In this regard, there is a need to develop competencies in

health protection and safe behaviour as a prerequisite for a stable and fulfilling life. In that context, the study focused on fill the gap in children's awareness of emergency

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*Corresponding author



behaviour and lack of knowledge and practical skills in providing pre-hospital care. In the period of the large-scale Russian-Ukrainian war, these issues are particularly important for all participants in the educational process. An important step in this direction were the changes in the future teachers' professional training in providing pre-hospital medical care to children in educational institutions. A special emphasis is placed on tactical medicine.

Not only military personnel, but also other professionals who are in combat zones, occupied territories and territories that are exposed to artillery and rocket attacks need to be provided with the specifics of pre-hospital care in tactical conditions. According to medical research, the absence of pre-hospital medical care for victims within the first hour after injury increases the likelihood of death by 30%, within 3 hours – by 60%, and within 6 hours – by 90% (Gudzevych & Prokopenko, 2021). That is why, in the present martial law conditions, every Ukrainian citizen should know the basic rules of pre-hospital medical care. At the same time, timely and properly provided pre-hospital medical care not only saves the victim's life, but also contributes to further successful treatment and prevents the serious complications development, reduces the risk of injury and disability. Pre-hospital medical care and the basics of tactical medicine knowledge is essential for a future teacher who bears moral and legal responsibility for the safety, children and adolescents' life and health preservation. In this regard, in professional teacher training process, there is a necessity to study the following disciplines: "Fundamentals of Medical Knowledge", "Pre-hospital Medical Care", "Pre-hospital Medical Aid with the Basics of Tactical Medicine".

One of the main tasks for the New Ukrainian School is to create a safe educational environment in educational institutions. This is also stated in the Law of Ukraine No. 2925 (2023) and the Law of Ukraine No. 2849-IX (2022). The expediency of future teachers' knowledge formation on the basics of providing pre-hospital medical care in emergencies is also evidenced by a number of legal documents. In particular, Article 1 of the Law of Ukraine No. 2581-IX (2022) states that premedical care is provided by persons who do not have a medical education, but in accordance with their professional duties must have knowledge and practical skills to provide such care in emergency conditions in order to save human life (We know, we act, 2022). Accordingly, the timely provision of pre-hospital medical care to all participants in the educational process in order to preserve their lives and health requires appropriate knowledge and practical skills of teachers and the ability to apply them if necessary. In this regard, the study purpose was to examine the theoretical and methodological aspects of training future teachers to provide pre-hospital medical care to children in educational institutions.

According to the research purpose, the following tasks were formulated: to analyse the state of future teachers' training in pre-hospital medical care and the tactical medicine basics in domestic and foreign literature; to reveal

the structure of the educational component "Pre-hospital medical care with the basics of tactical medicine" and its content; to find out the content and essence of the "tactical medicine" concept in the training process of future teachers in higher pedagogical educational institution; to determine the level of future teachers' training to provide pre-hospital medical care to children and adolescents in the educational process. The scientific novelty of the results obtained is that the knowledge level and practical skills of pedagogical specialties' higher education students in the study process of the EC "Pre-hospital care with the basics of tactical medicine" and its significant importance and effectiveness during martial law in Ukraine are determined.

MATERIALS AND METHODS

The study was carried out within the framework of the research topic of the Hryhorii Skovoroda University in Pereiaslav on the Health and Life Safety Department "Health Saving Competence Formation in Children, Pupils and Students in the Continuing Education System: Medical, Biological, Psychological and Pedagogical Aspects". Research methods used: theoretical (review and analysis of Ukrainian and foreign scientists' medical and biological literature on the problem under study, scientific modelling method to create a model of training future teachers to apply pre-hospital medical care knowledge and skills to students in educational institutions; empirical: (questionnaires, observations, pedagogical experiment among higher education students of Hryhorii Skovoroda University); mathematical statistics methods to process quantitative and qualitative empirical analysis data. The study was conducted during the academic years 2022-2023 and 2023-2024 among 462 students of 1-4 years full-time and part-time studying in pedagogical specialties: "012 Preschool Education", "013 Primary Education", "014 Secondary Education (Ukrainian Language and Literature)", "014 Secondary Education (Language and Literature (English))", "014 Secondary Education (Biology and Human Health)", "014 Secondary Education (Geography)", "014 Secondary Education (Natural Sciences)", "014 Secondary Education (Physical Education)", "014 Secondary Education (Mathematics)", "015 Vocational Education (Occupational Health and Safety)", "015 Vocational Education (Digital Technologies)". All study participants were informed about the survey results use and that all the provisions of the Declaration of Helsinki (2013) were followed during the survey. An anonymous survey was conducted to determine the future teachers desire to acquire knowledge of providing pre-hospital medical care to children and adolescents in educational institutions and tactical medicine basics. The author's questionnaire consisted of ten questions and four answers to them:

1. Do you think it is important to know pre-hospital care and tactical medicine basics: a) yes, very important; b) yes, but not necessarily; c) not sure; d) no, not important.
2. Are you interested in providing pre-hospital medical care with the basics of tactical medicine in extreme

situations: a) yes, very interested; b) yes, a little; c) not very interested; d) no, not interested.

3. Are you ready to attend additional classes on pre-hospital medical care with tactical medicine basics: a) yes, I am ready; b) yes, if I have time; c) not sure; d) no, I am not ready.

4. How often do you think about the possibility of providing pre-hospital medical care with tactical medicine basics in an emergency case: a) very often; b) sometimes; c) rarely; d) never.

5. Do you think that the pre-hospital medical care knowledge with tactical medicine basics can be useful in your future profession: a) yes, definitely; b) maybe; c) not sure; d) no.

6. Are you ready to devote your personal time to studying pre-hospital medical care with tactical medicine basics: a) yes, I am ready; b) yes, but not much; c) not sure; d) no, I am not ready.

7. Which learning format would be more convenient for you to master pre-hospital medical care knowledge with tactical medicine basics: a) lectures and practical classes; b) online courses; c) materials self-study; d) not interested.

8. Are you ready to participate in practical trainings on pre-hospital medical care providing with the basics of tactical medicine: a) yes, definitely; b) yes, maybe; c) not sure; d) no, not ready.

9. Do you think that tactical medicine knowledge can increase your confidence in crisis situations: a) yes, of course; b) maybe; c) not sure; d) no.

10. How would you rate your current awareness of pre-hospital and tactical medical care: a) very high; b) medium; c) low; d) not aware at all.

The survey results were analysed and presented in the table below.

RESULTS AND DISCUSSION

In martial law conditions in Ukraine, the educational process is endangering children's and adolescents' lives and health. It is associated with air raid warning signals, rocket and artillery attacks, hostilities and the presence of a significant number of children in the occupied territories. All this requires readiness to provide emergency pre-hospital medical care to children in case of various injuries. These issues are constantly on doctors' and teachers' minds. Future teachers' professional training in providing pre-hospital medical care to children in educational institutions is addressed in a number of educational and methodological manuals and work programmes published by Ukrainian scholars in recent years. For example, in the textbook "Pre-hospital care with the basics of tactical medicine", which is recommended for pedagogical specialties of higher education institutions, the authors N.I. Kotsur *et al.* (2023) highlight the basic rules for providing pre-hospital care to victims both in peacetime and in military field conditions for various injuries and traumas. The authors focus on providing pre-hospital care for bleeding, open and closed injuries, transport immobilisation methods, first aid

for injuries of various locations, head, chest, abdomen, artificial lung ventilation and indirect heart massage, emergency medical care for acute poisoning and exposure to high and low temperatures. Pre-hospital medical care provision to victims in peacetime is described by N.I. Kotsur & L.P. Tovkun (2021), also in the textbook "Medical Knowledge Fundamentals". Similar manuals for non-medical specialties applicants were published by R.V. Burdeniuk & S.P. Gvozdiy (2021), T.L. Bilous (2020), A.M. Lyashevych *et al.* (2021) and others.

Theoretical and practical foundations of medical knowledge, presented at the modern level are disclosed in the textbook "Pre-hospital care in emergency conditions" by I.O. Kalynyuchenko *et al.* (2023). Based on updated methodological approaches, the authors present a modern algorithm for providing pre-hospital medical care to injured persons in emergency conditions. Authors' particular attention is paid to the preparation of higher education students for practical classes and situational tasks during distance learning. Pre-hospital medical care provided to victims of emergencies issue is highlighted in a number of educational and methodological manuals. For higher medical education students, it is recommended to use manuals that provide more thorough coverage of first aid for various traumatic injuries in the combat zone and describe methods of transporting victims to medical facilities. In particular, the textbook "First Emergency and Tactical Medical Care at the Pre-Hospital Stage" edited by V.S. Tarasiuk *et al.* (2021) analyses the methods of providing emergency medical care in emergencies. The authors recommend certain aspects of pre-hospital medical care for non-medical specialists to master their practical skills. Similar information is covered in the textbook "Emergency and Urgent Medicine. First Aid and Medical Care" by G.I. Slobodanyk (2021). This manual is recommended both for military medics in providing emergency medical care in the combat zone and for civilian doctors to provide such care in emergencies.

The practical manual "Premedical Training at the Incident Site" by P.B. Volyansky *et al.* (2020) covers the algorithms for providing premedical care at the incident site by rescuers of the State Emergency Service (SES). The manual content is adapted to "The First on the Spot" educational and training programme. According to the authors, the manual is also useful for teaching non-medical higher education students and heads of executive authorities, various institutions and organisations. Teachers' professional training issues in providing pre-hospital care to children in pre-school and school education institutions are covered in the working curricula of higher education institutions, which are published on their websites. In particular, Hryhorii Skovoroda University website has published a working curriculum for the educational component "Pre-medical training with tactical medicine basics", which is recommended by the Academic Council for all pedagogical specialties (Working curriculum..., 2023); the work programme of the discipline "Pre-medical aid in emergency conditions" is recommended for the speciality 227 "Physical therapy,

occupational therapy” at the Petro Mohyla Black Sea National University (Mykolaiv) (Work programme of the discipline “Pre-medical aid in emergency conditions”, 2022); the work programme of the discipline “Pre-medical aid” for the specialty 227 “Physical therapy, occupational therapy” at Uzhhorod National University (Work programme of the discipline “Pre-medical aid”, 2022), and others. Future teachers can get acquainted with the practical course “First medical aid in war conditions” on the Prometheus educational platform, where they can learn the MARCHE algorithm (massive haemorrhage, airway, respiration, circulation, head injury/hypothermia, everything else), the general chronology of first aid for victims, signs of bleeding and how to stop it, the external cardiac massage basics, etc. The mentioned course is aimed at improving academic and pedagogical staff’s competencies in first aid basic skills in war conditions (First medical aid in war conditions, 2022).

The training programme for pre-hospital medical care provision “We Know and Act”, published on Ukrainian Medical Centre for Road Safety and Information Technology portal website, is designed for non-medical workers whose professional duties are related to pre-hospital medical care provision in accordance with the Order of the Ministry of Health of Ukraine No. 1627 (2022) and Order of the Ministry of Health of Ukraine No. 441 (2022), Order of the Ministry of Education and Science of Ukraine No. 64 (2022). The training and professional development programme for pedagogical staff includes theoretical and practical training and includes the following 3 premedical training courses: premedical care in case of sudden cardiac arrest in adults; premedical care in case of sudden cardiac arrest in children; premedical care in case of massive bleeding. It should be emphasised that the “We Know and Act” programme meets the standards set out in international requirements, in particular the BLS (Basic Life Support) programme, which focuses on life support basics and mastering practical techniques for providing emergency medical care in case of respiratory distress or respiratory arrest, cardiovascular disorders (We know, we act, 2022).

The theoretical and methodological aspects of training higher education students to provide pre-hospital medical care in emergency conditions and situations are covered in a number of publications by Ukrainian scientists. Particularly significant and valuable on this issue are the studies of T.S. Vaida (2019) and L.S. Gudzevych & Y.S. Prokopenko (2021). The authors conducted a medical and social substantiation of teaching students and adolescents premedical care practices, listed the practical premedical care skills that should be formed in Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University students, analysed teaching forms and methods. The study also reveals the stimulation technologies effectiveness in mastering practical premedical aid skills. The author highlights certain topics related to pre-hospital medical care provision, in particular, the importance of studying basic cardiopulmonary resuscitation by non-medical higher education students (Gudzevych, n.d.). The scientific work by V.M. Zyuz et

al. (2021) highlights the relevance of teaching higher education students of all non-medical specialities the first aid basics, and the consequences of untimely first aid. The authors recommend the introduction of modern evidence-based data on injury prevention in the educational process, and in order to improve first aid effectiveness, they propose a knowledge and skills manual developed in accordance with the course curriculum “Medical Knowledge Fundamentals” and “Medical Training Course for Rescuers”, which is approved by the Medical Department of the Ministry of Emergency Situations of Ukraine.

Innovative approaches to the teaching methodology of the discipline “Pre-hospital medical care” in the training process of future bachelors are revealed in the study by M. Demianchuk (2022). Some aspects of teaching higher education students the basics of pre-hospital care on the basis of 5 subject-subject interaction are disclosed in the monograph by S.P. Hvozdiy et al. (2021). In O.V. Kornilova’s studies (2020; 2021), medical care is considered as a social security type. The author analyses the regulatory and legal support for medical care provision in emergencies and the main features of medical care. In line with modern scientific developments, it is worth noting the study conducted by M. Matvienko & V. Didkovsky (2023). The authors examine medical care basics as a knowledge area and an academic discipline for Ukrainian higher education institutions. The article points to the knowledge formation process on pre-medical training basics and its theoretical substantiation and methodological improvement as an academic discipline for students, cadets, and trainees.

Over the last few years, the scientific space has seen the foreign scholars publications on certain aspects of this issue. These are mainly publications that address general issues of first aid and pre-hospital care in emergency conditions and situations, which medical and non-medical students should master. In particular, the knowledge and practical first aid skills developed by medical and non-medical students are described in the study by S.O. Bashtan et al. (2019) and S. Basuhail et al. (2022). The study was conducted to determine the knowledge level and skills of first aid in case of emergencies among students of Kuwait Al-Hamis. The study results showed that the knowledge level of first aid in emergencies among medical students was significantly higher than among philology students. The knowledge and practical skills formation in first aid among non-medical undergraduate of Karachi University students and their attitude to the study of this issue is revealed in the scientific work by Z. Ahmer et al. (2020). The authors’ research results indicate a low knowledge level of bachelor’s students on providing first aid to victims in emergencies. In this regard, the authors proposed a first aid training programme recommended for school, college and university students and the general public. Similar studies were conducted by R. Riaz et al. (2020). By surveying medical and non-medical students from different universities in Karachi (Pakistan) on first aid provision for burns, it was found that most students had an insufficient level of knowledge

on this topic. This demanded the need to integrate this topic into the curriculum and to improve knowledge through multimedia and formal training courses as a mandatory way to improve knowledge.

The awareness level analysis of premedical care among multidisciplinary university students (Pakistan) conducted by Z. Hussain *et al.* (2021) also shows a low training level. The authors note that medical students are not sufficiently taught the theoretical aspects and practical first aid skills at the pre-hospital stage, and non-medical students are not taught this issue at all. As a result, many people in Pakistan die in road accidents or other emergencies due to first aid inaccessibility at the incident scene. In a publication by T. Huabbangyang *et al.* (2023) conducted a quasi-experimental study on the effectiveness of developing the operational pre-hospital emergency skills medical personnel in Thailand in hazardous areas. The researchers analysed hazardous sources related to terrorism or war, which lead to public health risks in developed and developing countries around the world. Using pre-test, post-test and questionnaire surveys on knowledge and confidence in cardiopulmonary resuscitation skills, the researchers evaluated the training programme effectiveness, which included three courses: the Emergency Medicine in Chemical, Biological, Radiation and Nuclear Hazards course (EM-CBRN); the Thai Tactical Emergency Medical Services course (TTEMS); and the Cooperation and Preparedness for Disasters course (CPD).

According to foreign sources analysis, there are few publications on this issue, which is connected with the absence of the extreme threats to human life and health that Ukraine is facing in 2014-2024. Despite the fact that children, adolescents, pupils and students are trained in knowledge and practical skills in foreign educational institutions, it has not been the subject of a separate study on the state of future teachers' training in providing pre-hospital medical care to children in recent years. At the same time, the publications of foreign scientists published in 2020-2024 are dominated by studies aimed at training medical students and military personnel in tactical medicine. M. Lv *et al.* (2022) on the successful and effective use of portable simulators to teach medical students first aid skills during combat; R. Cole *et al.* (2023) on the impact of high-fidelity simulation on medical students' readiness to provide care to the wounded in combat. F.K. Butler (2021) describes the developed course on tactical medicine for SEAL mission commanders. The authors K. Conyers *et al.* (2023) pointed out the importance of using tactical combat training guidelines by NATO's international partner military forces to provide medical care to the wounded.

The importance of studying the educational component (EC) "Pre-hospital medical care with the basics of tactical medicine" for future teachers is evidenced by the following facts: 1) the full-scale Russian-Ukrainian war, which causes a high injury rate among the civilian population, and especially among children and adolescents as a result of rocket and artillery shelling. All this requires a

competent approach to the provision of pre-hospital care and appropriate training of specialists in higher education institutions, as well as qualified graduates training in tactical medicine; 2) insufficient medical care level for pre-school and school-age children. The absence of medical staff in a number of educational institutions and, in this regard, the need to train teachers to provide pre-hospital care to children; 3) state regulatory documents implementation, in particular: Decree of the President of Ukraine No. 195/2020 (2020); Decree of the President of Ukraine No. 210/2020 (2020); Decree of the President of Ukraine No. 894 (2019); Concept for the implementation of state policy in the field of reforming general secondary education "New Ukrainian School" for the period up to 2029, approved by the Cabinet of Ministers of Ukraine (Order of the Cabinet of Ministers of Ukraine No. 988..., 2016); Concept for the development of mental health care in Ukraine for the period up to 2030; The National Programme of Mental Health and Psychosocial Support (National programme of..., 2022); 4) the absence of healthy and safe lifestyle habits among the vast majority of children and students, insufficient safe behaviour and non-violent, conflict-free communication skills development, etc; 5) psychological well-being disorders among children and adolescents, manifested by depression, increased anxiety and aggression, suicide attempts; 6) insufficient education effectiveness that provides safety, social and health education components, media and digital literacy of students, which can contribute to safe living, health maintenance and promotion, healthy lifestyle, and secure communication.

Developing a responsible attitude to life, health and safety in children and adolescents is an integrated process that should involve not only healthcare professionals, but also teachers and parents. It is only through joint efforts that we can ensure a healthy and safe educational environment to preserve children's lives and health, promote their somatic and mental health, and raise an educated, healthy and harmonious personality. A key part in this process is the future teachers professional training to develop their knowledge and practical skills in providing pre-hospital medical care to children in urgent conditions and emergencies. In this regard, the inclusion of the discipline "Pre-hospital medical care with the basics of tactical medicine" in the educational professional programmes (EPP) for all pedagogical specialities contributes to solving this problem, especially in the context of martial law in Ukraine.

Purpose of teaching the discipline is to teach higher education students to provide pre-hospital medical care at the scene, in emergency situations or dangerous circumstances, in war, active combat zones, areas of shelling. *The main tasks* solved in the teaching process of the EC "Pre-hospital medical care with the basics of tactical medicine" are: to master the basic principles of tactical medicine and their application in real situations; mastering the correct assessment skills of the victim's condition and rapid life threats detection; learning effective pre-hospital care methods for injuries, traumas or diseases; communication and

leadership skills development for cooperation with other team members and pre-hospital care organisation in emergency situations. In studying the EC “Pre-hospital medical care with the basics of tactical medicine”, future teachers should develop both general and special (professional) competences. General competences include the ability to make informed decisions about the personal and public health preservation, pre-hospital medical care provision at the scene, in emergency or dangerous circumstances, in war, active combat zone, shelling areas; the ability to learn and master modern knowledge about health preservation and provision of necessary pre-hospital medical care and tactical medicine under certain conditions. Special (professional) competencies include the ability to master basic concepts and ideas about tactical medicine basics, special equipment knowledge for rescuing the wounded during hostilities; ability to timely diagnose the scope of pre-hospital medical care; methodological rules for providing first aid to victims and rules for evacuating the wounded to hospitals.

The study subject of the EC “Pre-hospital medical care with the basics of tactical medicine” is the scientific and methodological foundations of pre-hospital medical care organisation with tactical medicine basics, which are aimed at the effective formation of future teachers’ motivations, skills and abilities, useful vital competences of human health care in the life process. A special place in the discipline study is given to familiarising future teachers with pre-hospital medical care providing and tactical medicine techniques for bleeding, open and closed injuries, acute poisoning, exposure to high and low temperatures, transport immobilisation, pre-hospital medical care for head, chest, abdominal injuries, artificial lung ventilation and indirect heart massage. As a studying result and mastering the main provisions of the EC “Pre-hospital medical care with the basics of tactical medicine” the higher education student should know clinical and biological death signs; resuscitation basics; pre-hospital medical care basics for some pathological conditions (burns, frostbite, electric shock, prolonged compression syndrome, poisoning, fractures, bleeding, traumatic shock, wounds, etc.) and sudden illnesses in normal conditions and in extreme situations; pre-hospital diagnostics basics, sudden illnesses (including epidemic processes) and pathological conditions classification; pre-hospital medical care techniques in different conditions aimed at preventing complications and rescuing the victim; medical care basics during military operations.

The theoretical and practical training of future teachers in the EC “Pre-hospital medical care with the basics of tactical medicine” according to the working curriculum approved by the Academic Council of Hryhorii Skovoroda University in Pereiaslav in 2023 involves the following topics study:

1. Medical care and tactical medicine general concepts;
2. Bleeding. Open injuries (wounds). Pre-hospital medical care in stopping bleeding and open injuries;
3. Closed injuries. Pre-hospital medical care;
4. Pre-hospital medical care for head, chest and abdominal injuries;

5. Pre-hospital medical care in emergency conditions;
6. Restoration of airway patency for the wounded in military field conditions;
7. Providing pre-hospital medical care to children in emergency conditions;
8. Pre-hospital medical care in case of exposure to high and low temperatures, electric current, poisoning, poisonous snake, insect and animal bites.

While studying the topic “Medical care and tactical medicine general concepts”, higher education students get acquainted with medical care types, tactical medicine general concepts, determining the scope of pre-hospital care at the scene, pre-hospital medical care stages for the wounded in military field conditions, using first aid means. As noted above, it is important for a teacher to have knowledge and practical skills in providing pre-hospital medical care, which includes a set of basic urgent (operational) measures aimed at providing medical care to children in case of emergency critical conditions that may arise in the educational environment, during man-made accidents, disasters, acute therapeutic, neurological, terminal conditions in order to preserve their life and health, reduce the severity of the injury or disease, and prevent complications.

Under martial law, teachers should have knowledge of tactical medicine. It is important to distinguish between the concepts of “first aid” and “tactical medicine”. First aid includes emergency medical measures that are carried out urgently at the accident scene. As a rule, it is provided by non-medical workers directly at the accident scene. By analysing the literature, the essence of “tactical medicine” concept was clarified. The vast majority of scholars interpret this concept as pre-hospital medical care provision in the combat zone. A similar definition is given in online sources. According to researchers, medical care provision in tactical conditions is significantly different from the provision of such care in hospitals, ambulances, etc. (Tactical medical aid: self-help and life-saving skills for the wounded, 2022).

It should be emphasised that tactical medicine emerged as an independent medicine field after the emergence of the TCCS, TEMS (National Association of Emergency Medical Technicians (NAEMT) guidelines and similar algorithms and training programmes. These associations belong to the professional union of emergency medical service (EMS) workers in the United States of America, which represents all emergency medical technicians (EMT) and paramedics. In recent years, NAEMT has become an international organisation. In Ukraine, this medical care area began to spread in 2014 during the Anti-Terrorist Operation in eastern Ukraine to provide pre-hospital medical care in combat zones according to NATO (North Atlantic Treaty Organisation) standards. According to researchers, the introduction of this course in the armies of NATO countries has led to a significant reduction in the number of deaths from injuries (Tarasiuk *et al.*, 2021). Given its high effectiveness, TCCS is now recommended for all military personnel and medics involved in combat operations.

The algorithm for assessing the victim's condition is particularly important in tactical conditions. For various terminal conditions, standard pre-hospital care measures have been established, approved by the Order of the Ministry of Health of Ukraine No. 398 (2014). The document substantiates the victim's assessment timeframe and the sequential examination rule according to the "ABCC" scheme: A – airway patency examination; B – respiratory assessment; C – blood circulation; C – if a spinal injury is suspected, cervical spine observation and cervical collar application. These are the measures that should be followed when providing pre-hospital medical care to victims of war (Kotsur *et al.*, 2023).

Given the combat injuries, pre-hospital medical care effectiveness depends primarily on special equipment for rescuing the wounded during hostilities. For this purpose, tactical individual first aid kits (IFAKs) are used, which must be provided to all military personnel. When providing pre-hospital medical care, a modern tactical first aid kit should be equipped with all the means in accordance with the rules of care (C-A-B-C). During the practical classes, future teachers get acquainted with individual first aid kits (IFAK – Individual First Aid Kit) means such as haemostatic agents, airway aids, respiratory aids, and master practical skills in their use. When considering the topic "*Bleeding. Open injuries (wounds). Pre-hospital medical care in stopping bleeding and open injuries*", higher education students learn about bleeding and wound types, bleeding features to stop in tactical conditions. During the practical training, students learn the points of pressure on the arterial trunks and master the technique of temporary bleeding control using this method; applying a pressure bandage; tight wound tamponade; maximum limb flexion in the joint; and the rules for applying a tourniquet and tourniquet twist.

Mastering the technique and skills of tourniquet application is of great importance for a future teacher. The most common bleeding stops methods in military field conditions include: 1) applying an Israeli compression bandage; 2) Esmarch's tourniquet, SVAT (Self-Adjusting Venous Arterial Tourniquet); 3) C.A.T. tourniquet (Combat Application Tourniquet). Particular attention is paid to the correctness and timeliness of tourniquet application. In this regard, higher education students make several attempts. As noted in the study by L.S. Gudzevych (n.d.), the experiment participants learned to apply tourniquets correctly under normal conditions on average after 14 attempts (Esmarch tourniquet), 12 attempts (SVAT), and 12 attempts (CAT). The tourniquet application time was 10 seconds.

Studying the topic "*Closed injuries. Pre-hospital medical care*", students' special attention is focused on closed injuries types and pre-hospital care for them. During the class, higher education students get acquainted with transport splints; master transport immobilisation techniques for fractures of the spine, collarbone, ribs, upper extremities, pelvic and lower extremities; learn the behavioural rules for injured victims; methods of transferring victims. The practical skills development of immobilisation

(creating immobility (rest) in various injuries in case of various diseases) is carried out through the various splints usage (fixation and distraction). An example of a fixation splint is a ladder splint (Kramer), and a distraction splint is a Dieterichs splint. In addition, higher education students master the technique of applying improvised (from improvised materials) splints to various injured parts of the human body. In the practical lesson on "*Pre-hospital medical care for head, chest and abdominal injuries*", students learn the pre-hospital medical care sequence for skull and brain injuries; closed and open chest injuries; injuries to the eyes, ears and nose; closed and open chest injuries; abdominal injuries and acute abdominal diseases. Particular attention is paid to the following issues such as the main symptoms of closed head injuries (concussion, bruise, brain compression); penetrating head injuries symptoms; main symptoms of closed chest and thoracic injuries; the pneumothorax and haemothorax concept; closed abdominal injuries, main symptoms; main symptoms of acute abdominal diseases.

A prominent place in studying the discipline is occupied by the topic "*Pre-hospital medical care in emergency conditions*". Higher education students master the concepts of resuscitation and terminal conditions, study the factors that contribute to terminal conditions onset, clinical and biological death symptoms. During the class, higher education students learn about the indications for resuscitation and the victim's preparation for it; master the methods for performing mouth-to-mouth, mouth-to-nose, mouth-to-mouth and nose artificial lung ventilation for children and the Kalistov method, external (indirect) heart massage for adults and children. The topic study focusses on the effectiveness of pre-hospital medical care in terminal conditions. When defining biological death, special attention is paid to its relative and obvious signs. Future teachers also learn the algorithm for providing pre-hospital medical care to unconscious victims by non-medical professionals. In military field conditions and during artillery and rocket attacks as for respiratory damage and heart failure as a result of injuries, the victim's life will depend on pre-hospital medical care timeliness. In this regard, the topic studying "*Restoration of airway patency for the wounded in military field conditions*" is particularly important. During the class, higher education students learn about restoring airway patency methods to the wounded in military field conditions; master such breathing recovery methods as tilting the head back and lifting the chin, "look – listen – feel", the use of a nasopharyngeal airway and medical equipment to open the airway and support the wounded breathing, including an Ambu bag, an I-Gel supraglottic airway, and an intubation kit for unconscious wounded. The class uses tables and thematic stands, presentations, and appropriate equipment for opening the airway and maintaining the wounded's breathing.

It is known that during the war, the number of wounded children increases, both in the educational environment and outside it, which requires immediate pre-hospital

medical care. That is why it is important for a teacher to have knowledge of the topic *“Peculiarities of providing pre-hospital medical care in case of emergency and terminal conditions to children”*. It should be emphasised that pre-hospital medical care provision for children is different from that for adults. This is primarily due to the anatomical and physiological characteristics of their body. When studying the topic, higher education students learn the rules for providing pre-hospital medical care for the following emergency conditions in children such as sudden respiratory and cardiac arrest, first aid; fainting; burns, degrees of severity, frostbite, drowning; ingestion of foreign bodies into the nose, trachea, bronchi; bruises, dislocations, fractures: causes, manifestations; sunstroke and heatstroke; acute food poisoning, its prevention; non-bacterial poisoning, its causes, manifestations; poisonous snakes, animals, insects bites and pre-hospital medical care.

In studying the topic *“Pre-hospital medical care in case of high and low temperatures, electric current”*, higher education students learn the rules and techniques of providing first aid due to various burns types, hypothermia, frostbite, electrical injuries, and lightning strikes. The practical course *“Pre-hospital medical care with the basics of tactical medicine”* is aimed at consolidating theoretical material and developing skills in providing pre-hospital medical care to children. In the practical training process, future teachers acquire diagnostic skills, classification of sudden illnesses and pathological conditions (ability to measure body temperature, blood pressure, determine and assess pulse, breathing, etc); techniques for providing pre-hospital medical care and tactical medicine for bleeding, open and closed injuries, acute poisoning, exposure to high and low temperatures, transport immobilisation,

pre-hospital medical care for head, chest, abdominal injuries, artificial lung ventilation and indirect heart massage; use the acquired knowledge not only in everyday life and daily professional activities in peacetime, but also during martial law in Ukraine.

Checking the preparedness level of future teachers to provide pre-hospital medical care to children in preschool and secondary education institutions is carried out through current control. The current control objects are systematic and active work of higher education students in practical classes; independent tasks performed by higher education students. In order to test students' knowledge, each lesson includes control questions, situational tasks, test tasks and tasks for independent work, which is carried out on specific topics in accordance with the work curriculum. Solving situational tasks enables higher education students to improve their theoretical knowledge and practical skills. Upon studying the EC *“Pre-hospital medical care with the basics of tactical medicine”*, future teachers should be able to analyse and assess risks, problems in professional activities and choose effective ways to solve them in the case of providing pre-hospital medical care and tactical medical care; be responsible for decision-making within their competence, adhere to professional ethics standards; apply national and international standards and practices in professional activities to provide pre-hospital medical care in educational institutions. In this regard, during the academic year 2022-2023, an empirical study was conducted to determine students' desire to gain pre-hospital medical care knowledge with tactical medicine basics. Based on anonymous questionnaire responses from 1-4 year students of full-time and part-time forms of study at Hryhorii Skovoroda University in Pereiaslav, the results are presented in Table 1:

Table 1. Results of the questionnaire, %

1. Do you think it is important to know pre-hospital care and tactical medicine basics:							
a) yes, very important		b) yes, but not necessarily		c) not sure		d) no, not important	
number of students	%	number of students	%	number of students	%	number of students	%
337	72.9	83	17.9	32	6.9	10	2.2
2. Are you interested in providing pre-hospital medical care with the basics of tactical medicine in extreme situations:							
a) yes, very interesting		b) yes, a little		c) not very interesting		d) no, not interested	
number of students	%	number of students	%	number of students	%	number of students	%
296	64.1	88	19.04	41	8.8	37	8.0
3. Are you ready to attend additional classes on pre-hospital medical care with tactical medicine basics:							
a) yes, I am ready		b) yes, if I have time		c) not sure		d) no, I am not ready	
number of students	%	number of students	%	number of students	%	number of students	%
263	56.9	83	17.9	69	14.9	47	10.17
4. How often do you think about the possibility of providing pre-hospital medical care with tactical medicine basics in an emergency case:							
a) very often		b) sometimes		c) rarely		d) never	
number of students	%	number of students	%	number of students	%	number of students	%
281	60.8	143	30.9	36	7.8	2	0.43

Table 1. Continued

5. Do you think that the pre-hospital medical care knowledge with tactical medicine basics can be useful in your future profession:							
a) yes, definitely		b) maybe		c) not sure		d) no	
number of students	%	number of students	%	number of students	%	number of students	%
228	49.4	97	20.9	69	14.9	68	14.72
6. Are you ready to devote your personal time to studying pre-hospital medical care with tactical medicine basics:							
a) yes, I am ready		b) yes, but not much		c) not sure		d) no, I am not ready	
number of students	%	number of students	%	number of students	%	number of students	%
185	40.04	106	22.9	87	18.8	84	18.18
7. Which learning format would be more convenient for you to master pre-hospital medical care knowledge with tactical medicine basics:							
a) lectures and practical classes		b) online courses		c) materials self-study		d) not interested	
number of students	%	number of students	%	number of students	%	number of students	%
251	54.3	124	26.8	60	12.9	27	5.84
8. Are you ready to participate in practical trainings on pre-hospital medical care providing with the basics of tactical medicine:							
a) yes, definitely		b) yes, maybe		c) not sure		d) no, not ready	
number of students	%	number of students	%	number of students	%	number of students	%
297	64.3	87	18.8	50	10.8	28	6.06
9. Do you think that tactical medicine knowledge can increase your confidence in crisis situations:							
a) yes, of course		b) maybe		c) not sure		d) no	
number of students	%	number of students	%	number of students	%	number of students	%
241	52.2	170	36.7	36	7.8	15	3.24
10. How would you rate your current awareness of pre-hospital and tactical medical care:							
a) very high		b) medium		c) low		d) not aware at all	
number of students	%	number of students	%	number of students	%	number of students	%
-	-	-	-	217	46.9	245	53.03

Source: developed by the authors

Consequently, the respondents majority (72.9%) considered knowledge of pre-hospital care and tactical medicine to be very important, while only a small proportion (2.2%) considered it not important. The overwhelming majority of respondents (64.1%) showed a strong interest in the topic, while only 8% were not interested in the topic at all. More than half of the respondents (56.9%) are ready to attend additional classes, which indicates a high motivation to learn. A significant proportion of respondents (60.8%) often thought about providing first aid, which indicated their awareness and readiness to act in crisis situations. Almost half of the respondents (49.4%) considered this knowledge to be definitely useful for their future teacher profession, which underlined its importance in the professional context. 40.04% of respondents are ready to devote personal time to studying pre-hospital care and tactical medicine basics, which demonstrates their high motivation to learn. Lectures and practical classes (54.3%) were considered the most convenient learning format by respondents majority, which underlined the importance of a combined approach to learning. The respondents majority (64.3%) indicated their willingness to participate in practical training, which indicates a high interest in practical skills. More than half of the respondents (52.2%)

believed that tactical medicine knowledge could increase their confidence in crisis situations. The respondents majority (53.03%) considered their awareness of pre-hospital care and tactical medicine to be low or not aware at all, which highlighted the need to increase the knowledge level in this area. Overall, the survey showed that the respondents majority were aware of that knowledge was important for pre-hospital care and tactical medicine, showed a strong interest in this topic and were ready to devote time to study and practical training. At the same time, a significant number of respondents considered their current awareness to be low, which underlined the need to introduce the educational component "Pre-hospital medical care with the basics of tactical medicine" into professional education programmes. Following the preparatory work, the Academic Council of the Hryhorii Skovoroda University in Pereiaslav recommended in June 2023 that the EC "Pre-Hospital Medical Care with Tactical Medicine Basics" to be introduced as a mandatory educational professional programme component for all specialities. During the 2023-2024 academic year, according to the working curricula of pedagogical specialities, students mastered theoretical knowledge and practical skills in providing pre-hospital medical care with the basics of tactical

medicine. Based on the examination data of the final test control in this discipline for the first and second semes-

ters, students received the following results on the ECTS scale (Table 2):

Table 2. The assessment of the final test control results of students' knowledge of 1-4 courses in the EC "Pre-hospital medical care with the basics of tactical medicine" for the first and second semesters of the academic year 2023-2024

Points	ECTS score	National score	Number of students	%
90-100	A	excellent	47	10.17
82-89	B	good	133	28.78
74-81	C	good	175	37.87
64-73	D	satisfactorily	48	10.39
60-63	E	satisfactorily	36	7.79
35-59	FX	unsatisfactory with the possibility of retaking	23	4.98
0-34	F	unsatisfactory with mandatory re-study of the discipline	-	-

Source: developed by the authors

Consequently, only 10.17% of students received the highest grade of "excellent" according to the ECTS (European Credit Transfer and Accumulation System), which indicates the high complexity of the discipline. More than half of the students (66.65%) received a grade of "good", which indicates a generally high level of knowledge. 18.18% of students passed the test with a satisfactory grade. This indicates that some students need additional attention or support in learning the material. 4.98% of students failed to pass the test the first time, but passed it successfully the second time. This is a relatively small proportion, which indicates some difficulties in learning the material. No student received the lowest grade, which required repeating the course. This is a positive indicator that shows that all students have achieved the minimum required knowledge level.

In summary, the assessments showed that the students' majority had a sufficient or high knowledge level of pre-hospital medical care with tactical medicine basics. More than 66% of students received a "good" grade, and only a small proportion (less than 5%) needed to repeat the course, which indicated that students generally mastered the material successfully. Comparing the study results with similar foreign studies, it should be noted that the level of students' knowledge of pre-hospital medical care depends on the feasibility and importance of studying this issue, the structure of the curriculum and its content. For instance, in the above-analysed studies by foreign scientists S. Basuhail *et al.* (2022), Z. Ahmer *et al.* (2020) found that medical students had a high level of readiness to provide medical care in emergencies. At the same time, non-medical students had a low level of such knowledge, which indicates that they were not adequately trained in this area at higher education institutions. The high and sufficient knowledge of pre-hospital medical care among pedagogical specialties students, as shown in this study, indicates the need and importance of studying this problem, especially during martial law, as well as in the emergencies event and situations in peacetime.

CONCLUSIONS

The current training state of future teachers in pre-hospital medical training and the basics of tactical medicine in

pedagogical higher education institutions shows the expediency and importance of including the EC "Pre-hospital medical training with the basics of tactical medicine" in the EPP of all specialties; its structure and content are aimed at the effective formation of future teachers' motivations, skills and abilities, useful vital competences aimed at preserving the life, safety and health of children in educational institutions; knowledge of tactical medicine is necessary in the context of martial law in Ukraine, as teachers are legally and morally responsible for the safety and life of children. The analysed structure and content indicate the formation of a competence-based approach to pre-hospital care provision with tactical medicine basics for children in educational institutions, which contributes to the provision of safety, social and health components of education.

The theoretical and methodological aspects of preparing teachers to provide pre-hospital medical care to children in educational institutions have been the subject of scholarly research. At the same time, the lack of publications on this issue in the sources indicates the absence of the challenges and threats to human life and health that are typical during wars, in particular the large-scale Russian-Ukrainian war. The effectiveness of future teachers' professional training in providing pre-hospital medical care to children in preschool and school education is evidenced by the sufficient and high knowledge level of the studied problem among applicants (bachelors) for higher pedagogical education. The conducted research has shown the desirability of higher education of pedagogical specialties in acquiring knowledge and practical skills in providing pre-hospital medical care in emergency conditions and situations. Prospects for further research are to compare the knowledge and practical skills of providing pre-hospital care in emergency conditions and situations among higher education students of non-medical specialties.

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CONFLICT OF INTEREST

None.

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Надія Коцур

Доктор історичних наук, професор, завідувач кафедри
Університет Григорія Сковороди в Переяславі
08401, вул. Сухомлинського, 30, м. Переяслав, Україна
<https://orcid.org/0009-0003-3072-1706>

Лідія Товкун

Кандидат історичних наук, доцент
Університет Григорія Сковороди в Переяславі
08401, вул. Сухомлинського, 30, м. Переяслав, Україна
<https://orcid.org/0000-0002-4091-1322>

Професійна підготовка майбутніх педагогів із надання долікарської медичної допомоги з основами тактичної медицини у закладах освіти

Анотація. Актуальність дослідження зумовлена загрозами для життя, здоров'я та безпеки дітей і підлітків під час російсько-української війни. Вона спричинила зростання кількості травм, які потребують термінової медичної допомоги. Знання долікарської допомоги в тактичних умовах необхідні педагогам, які працюють у зонах бойових дій, на окупованих територіях і територіях, які обстрілюються. Педагоги відповідають за безпеку дітей у будь-який час, мирний чи воєнний. Метою дослідження стало вивчення теоретичних і методологічних аспектів підготовки майбутніх педагогів до надання долікарської медичної допомоги дітям у закладах освіти. Методи дослідження: аналіз наукової медико-біологічної літератури засвідчив про нестачу зарубіжних публікацій щодо підготовки педагогів із надання долікарської допомоги дітям у закладах освіти; наукове моделювання допомогло створити моделі підготовки майбутніх педагогів до застосування знань і для обробки кількісного і якісного аналізу емпіричних даних; анкетування, педагогічний експеримент і методи математичної статистики дали змогу з'ясувати рівень знань і практичних навичок із надання долікарської медичної допомоги серед студентів педагогічних спеціальностей Університету Григорія Сковороди в Переяславі. Розкрито структуру і зміст дисципліни «Долікарська медична підготовка з основами тактичної медицини» для педагогічних спеціальностей. Впровадження цієї дисципліни підвищив інтерес до її вивчення і доцільність оволодіння практичними навичками. Дослідження серед студентів Університету Григорія Сковороди в Переяславі показали ефективність підготовки майбутніх педагогів із цієї проблеми. Професійна підготовка майбутніх педагогів в умовах воєнного стану в Україні вимагає знань і практичних навичок надання долікарської допомоги дітям у закладах освіти. Вивчення дисципліни «Долікарська медична підготовка з основами тактичної медицини» формує компетентності щодо основ тактичної медицини, вміння діагностувати і надавати долікарську допомогу. Це сприятиме ефективній роботі майбутніх педагогів та їх готовності надавати допомогу дітям у разі необхідності

Ключові слова: війна; травми; невідкладні стани; підготовка; студенти; дошкільна освіта; шкільна освіта