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Preparing Future Medical Professionals for Service in Wartime Conditions

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Abstract: *The article aims to explore the specifics of training doctors during wartime. It seeks to define the role of universal skills in today's system of military medical education in Ukraine. The article also analyses the historical experience of training reserve officers at military faculties of medical universities and examines current approaches to teaching military and emergency medicine. It investigates the development of professional and legal skills, including battlefield traumatology, the evacuation of the wounded, the organisation of medical support, and the advancement of legal aspects in medical education. The findings show that the system of military medical education helps to form a set of universal skills that prepare future specialists for work in extreme conditions. Emphasis is placed on the importance of legal education for doctors in clarifying the boundaries of their legal responsibility. The article also highlights the prospects for public-private partnership as an innovative model for organising medical care in wartime.*

Keywords: *implementation; military medical education, tools; interaction; adaptation; development; extreme conditions.*

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1. Introduction

Ukrainian medical education, having undergone reforms to align with European Union standards, has consistently been at the forefront of professional advancements. Nevertheless, the outbreak of a full-scale war has placed the entire education sector in a challenging position, necessitating adaptation. Through a thorough literature review, the authors of this article have attempted to identify potential ways of improving medical education under wartime conditions in Ukraine and globally.

The fundamental challenge lies in the practical aspects of providing medical education by means of distance learning (Korda et al., 2021; Shulhai et al., 2022; Vallée et al., 2020), especially concerning those institutions in the occupied territory.

Innovative medical technologies involve bioengineering, biological cybernetics, bioinformatics, medical cybernetics, neurocybernetics, computational theory of algorithms și educational theory or training methodology. Mobile and blended learning are also often discussed in the literature. However, it is particularly challenging to fully develop clinical skills in future doctors through a distance programme that does not include in-person learning.

In wartime, ensuring the quality of medical education in Ukraine and worldwide becomes a particularly important task. Under such conditions, the demand for medical professionals increases, as does the need for their therapeutic efficacy. A central objective is to equip doctors with specialised training designed to enhance their capacity to deliver care in conflict environments.

Therefore, the article aims to: a) analyse how future medical professionals are prepared for service in medical settings; b) determine the prospects for developing and applying universal skills in the system of military medical education; c) carry out an empirical study on the quality of medical education during wartime and present the conclusions.

2. Preparing Future Medical Professionals for Service in Medical Environments

In today's world, particularly in the current situation in Ukraine, military actions result in significant medical, social, and economic consequences. This underscores the need for focused attention on preparing individuals involved in mitigating these consequences and engaging in preventive efforts.

The combination of the teaching staff's extensive expertise and professionalism, together with the contributions of military doctors from World War II (Eastern Front), has established the foundation for producing highly skilled medical specialists. Given the current conditions, offering psychological support becomes a crucial element of the training and development system (Korda et al., 2021).

As noted by Oleshchuk et al. (2018), it is important to promote collaboration among military, public and humanitarian sectors. These joint initiatives can improve medical training and equip healthcare professionals for effective service in wartime conditions in Ukraine.

The organisation of medical interventions is a core objective of medical training, being indispensable for coordinating support to individuals affected by armed hostilities. In the post-Soviet era, a new focus emerged in higher medical education structures, known as disaster medicine or military medicine.

In most former Soviet Union countries, specialised training follows the Soviet model. However, some nations actively pursuing European integration have restructured military departments or incorporated subjects related to aiding those affected by armed conflict into other disciplines. Many examples of this transformation can be observed in universities in the Baltic countries, Ukraine, and Georgia.

The current educational framework actively endorses a model of continuing medical education as a central component of professional development, encompassing both undergraduate and postgraduate studies. It underscores the significance of consistent professional development, learning, and proficiency. This is essential for adopting new organisational, diagnostic, and rehabilitation technologies in emergency medical care (Vallée et al., 2020).

This discipline, while building upon earlier teachings in extreme and military fields such as disaster medicine, brings forward innovative perspectives. Changes in wartime medicine mainly involve restructuring the subject, consolidating toxicology and medical defence, maintaining certain instructional content, and reducing instructional hours. These alterations pose several challenges in structuring educational and methodological support for the subject.

Newman & Lattouf (2020) believe that educating doctors globally during wartime necessitates a distinct approach and a profound understanding of the intricacies of medical practice in such conditions. Doctors undergo practical training in simulated environments, replicating real situations that may arise during armed conflicts. Still, the application of seemingly basic yet skillful and timely first aid measures in diverse situations may avert severe consequences and even fatalities for individuals impacted by various forms of military actions (Shulhai et al., 2022).

Notably, many countries place significant emphasis on providing first aid training in military operations. Various training tools include field models, respirators, skin protection equipment, medical protective gear, radiation and chemical reconnaissance devices, monitoring equipment, medical kits, emergency rescue and transportation gear, educational materials, multimedia tools, video equipment, and computer-based educational programmes.

The presentation and discourse on educational videos, simulation training, simulation technologies, engagement in competitions, and hands-on exercises are highly relevant (Vozenilek et al., 2004). The incorporation of phantom simulators for training in emergency medical assistance in military settings is actively pursued. Such platforms facilitate the honing of skills, notably in first aid provision, adapted to the particular emphasis of the speciality under instruction.

Importantly, phantom simulators are primarily used for executing cardiopulmonary resuscitation and simulating scenarios for adults and children experiencing convulsions, as well as for gastric lavage. Moreover, certain simulators, notably mobile units, offer the flexibility to be operated beyond traditional classroom settings, in both alternative indoor spaces and outdoor contexts. The preparation of doctors in a novel scientific-practical direction within medical science and practical healthcare, specialising in military medicine, should significantly contribute to addressing these numerous tasks. This approach is essential for tackling the intricate challenges in the field.

According to Regmi and Jones (2020), the training for organising medical services during wartime should primarily occur in postgraduate education. This is the stage when a physician is already familiar with the structure and management system of healthcare organisations.

Beyond traditional methods such as oral examinations, reviewing summaries and tests, interactive tools and methods hold particular significance in the study of this discipline. These methods encompass simulating situations, analysing role behaviour within a specified scenario model, and engaging in simulation games. Documentation, compiling situational tasks, and an assessment sheet with scoring are also integral components.

In certain scenarios, solving situational tasks requires completing documentation during the stages of medical evacuation, such as the primary medical record and accompanying notes for casualties in extreme situations. The preparation of future medical professionals for work in wartime conditions is feasible when they possess good physical fitness and maintain a proper attitude towards health. Their actual capability to perform this work also depends on their adaptability to unusual conditions.

Equipping medical professionals for service in wartime conditions presents several challenges. It follows that instructors must serve not only as educators but also as psychologists and, in some cases, even possess acting skills. Indeed, the instructor's creative potential should be nurtured through social experience and psycho-pedagogical knowledge, as well as the infusion of new ideas, skills, and abilities. This approach enables the discovery and application of innovative solutions, new teaching methods, and forms. Ultimately, it increases the professionalism and educational quality of prospective doctors, pharmacists, and psychologists.

3. Improving Universal Skills in the System of Military Medical Education

The education of military medical professionals, which encompasses the social commitment to healthcare and the political objective of national security, centrally involves the mastery of universal skills. It is relevant to examine both their professional duties and their commitment to the populace and the homeland, as demonstrated by the comprehensive scope of a military doctor's profession, which spans civilian and military responsibilities.

In this context, the training of doctors during wartime assumes a distinctive role within the educational framework implemented under military service conditions. The specific nature of military medical education inherently mandates the integration of universal skills into the prerequisites for these professionals right from the outset. The emphasis is particularly on social sciences and humanities. While the teaching of these disciplines involves acquiring the theoretical foundations of the subject, the level of universal skills goes beyond this. It transcends the provision of fundamental knowledge, skills, and abilities specific to a particular professional field.

A systematic comparison of medical training methods during wartime and peacetime should help to better understand the differences in training approaches. It also allows the identification of key elements needed for effective medical training in these contexts (see Tables 1 and 2).

Table 1. Learning objectives of medical training in wartime and peacetime

Peacetime	Wartime
Preparing to provide planned and emergency medical care in stable conditions.	Instructions for offering medical services in challenging, poorly resourced locations.
Boosting medical competencies and expert understanding within a defined speciality.	Developing skills in patient assessment, triage, and emergency care.
Building ethical and interpersonal skills for effective patient and peer interaction.	Building resilience, decision-making under pressure, and the ability to work in extreme conditions.

Source: the authors' own conception

Table 2. Content of medical training in wartime and peacetime

Peacetime	Wartime
In-depth study of foundational medical sciences, clinical disciplines, and specialised subjects.	Focusing on emergency, field, and combat casualty treatment.
Experience in a clinical environment, with a focus on patient well-being and rehabilitation.	Trainees undergo simulated warfare, complete with fabricated injuries, explosions, and psychological pressure.
To educate medical professionals in surgery and clinical proficiencies, simulations, and direct patient interaction are used.	Training in triage, performing rapid diagnostics, controlling bleeding, restoring airway patency, and providing treatment for shock and other critical conditions.

Source: the authors' own conception

The Ukrainian educational system, with its inclusion of military education, is characterised by a longstanding legacy of effective practices in preparing professionals. Nevertheless, the transition to a new way of life and market relations has instigated fundamental changes. Opportunities in technology, communication, and information available to society, coupled with the active evolution of social consciousness, have significantly influenced people's conventional perceptions. These factors continue to shape views on safety, quality of life, and health. As a result, the criteria for assessing the quality of work in socially significant spheres of society have undergone a profound transformation.

The activity involves not only the enhancement of standards but also a qualitative redefinition of the criteria for assessing the outcomes of professional activities in related fields. The rapid advancement of scientific and technical innovations, coupled with a shift towards

knowledge-intensive modes of production, shapes the preparation of specialists. These specialists are equipped to expand their professional expertise while acquiring comprehensive scientific knowledge and experience. The delineation of foundational universal skills has been influenced by various adverse processes. This underscores the urgent need to integrate socially responsible elements within the higher military medical education system.

An important dimension of the professional landscape is its structural asymmetry, arising from the state's limited requirement for expertise in social sectors. At the same time, the long-term displacement of civilian and military doctors from top, prestigious professions has had a significant impact on the field. This shift has contributed to the degradation of the quality of military medical education.

Mainly, a decrease in motivation and the reduced importance of research and teaching staff in developing Ukrainian science and education have caused many professionals to leave the field. Secondly, most future job applicants preferred fields such as administration, management, economics, finance, or law over the medical field. A major negative factor was the lack of recruitment and training programmes for cadets in military medicine from 2021 to 2023.

Consequently, the established coherence of the educational mechanism, which had evolved over many decades and, in certain higher education institutions, over centuries, faced considerable challenges. These challenges include the preservation of distinctive professional military medical traditions, also involving the interrelation among different parallels and generations within the framework of military doctors, as well as the enduring legacy of military doctors at the interregional and interfaith levels.

At the same time, Ukraine has managed to keep most educational institutions operational, which has been especially difficult in the frontline regions. Besides, Ukrainian medical universities quickly adapted by switching to hybrid learning. In Syria, however, education often took place underground, without access to advanced technologies or textbooks, and clinical practice was mainly carried out in mobile hospitals.

Despite the war, Ukrainian medical universities continue to offer full training programmes, including theoretical and practical skills, adapted to the new realities, such as tactical medicine and providing care in resource-limited settings.

Ukrainian medical schools have received significant assistance from international organisations, such as the World Health Organisation, the Red Cross, and several European universities. At the same time, international aid in Syria and South Sudan was either limited due to safety concerns or focused mainly on humanitarian relief, rather than supporting educational programmes.

Future military doctors, who must uphold high standards of expertise and accountability in their professional, social, and ethical conduct, require specific training to navigate organisational, legal, socio-psychological, and financial complexities, encompassing routine duties and team collaboration. This study investigates the development of such crucial skills, which are underpinned by the strong foundations and systematic approach characteristic of Ukrainian higher education.

A comprehensive understanding of the economic aspects of their professional role enables them to respond promptly and adapt effectively to changing economic conditions, making informed decisions.

Military medical professionals need relevant skills to define and legally delineate fundamental professional concepts that essentially shape the legal framework of their professional activities. The evolving realities of Ukrainian society necessitate changes in the standards for medical services, influencing the requirements for professional medical education, including military medical education (Tutarel et al., 2000).

Besides, military medical practitioners should be able to acquire a diverse set of competencies to make informed decisions based on the understanding, proficiencies, and capabilities they gain through their daily professional activities and implement them efficiently. Teaching methods for social sciences and humanities within the country have evolved around two

contrasting instructional models. The first model, observable in diverse manifestations in Ukrainian pedagogy, prioritises the cultivation of an integrated system of knowledge, skills, and abilities among students (a traditional, technocratic teaching model). In contrast, the second model is rooted in students' preparedness to adapt to changes and address current challenges (a developmental, problem-oriented, and innovative model).

The determination and selection of a teaching model depends on the level and specificity of societal development, addressing this challenge. Essentially, the field of science primarily involves describing the existing system and its challenges, particularly within the education system.

Therefore, the changes observed in the educational system's early stages were essentially responses to societal demands. Notably, education, as a means of meeting one of society's most crucial needs, namely, the provision and cultivation of professional skills, is presently well-defined and institutionalised. Moreover, demonstrating commitment and a sense of civic responsibility, military doctors and volunteers have managed evacuations, operated mobile medical facilities, and instructed new staff (Rubryka, 2023).

Science is increasingly tasked with anticipating developments prior to the identification of issues and the recognition of the necessity for transformations in societal consciousness. Social sciences and humanities are leading the way, driving innovative social changes to shape positive socio-economic and socio-political trends in society. Consequently, the adoption of a competence-based approach has emerged as one of the pivotal processes in the ongoing higher education reform in Ukraine.

4. Empirical Analysis of Medical Education Quality in Wartime

In the framework of a study examining the quality of medical education during wartime, semi-structured interviews were conducted. The interviews involved 15 medical interns from various regions of Ukraine, including Kyiv, Kharkiv, Dnipro, and Lviv.

Study Structure

Aim: To identify the main challenges faced by young doctors during their training and internships in wartime conditions.

The *objectives* are the following: 1) to assess how military actions affect the availability and quality of clinical practice for medical trainees; 2) to evaluate the emotional exhaustion and psychological stress levels among these trainees; 3) to determine their needs for additional educational resources and training that support effective work in wartime; 4) to offer recommendations for adapting medical training programmes to the realities of war in Ukraine.

Methodology

Approach: Qualitative descriptive research.

Method: Semi-structured interviews.

Participants: 15 medical trainees from Kyiv, Kharkiv, Dnipro, and Lviv.

Sampling: Purposive sampling with regional diversity to ensure a wide range of perspectives.

Participant Selection Criteria

Status: Medical trainees (intern doctors).

Regions: Kyiv, Kharkiv, Dnipro, and Lviv to ensure geographic representation.

Experience: Involvement in training and/or internships during wartime.

Consent: Voluntary agreement to participate in interviews.

Ethical approval for this study was obtained from the ethics committees of the institutions. All participants gave their voluntary informed consent.

Study Period

The study took place during the ongoing war in Ukraine (between September 7 and October 9, 2025).

Data Collection Tools

Semi-structured interviews (over the course of one month): A list of open-ended questions was prepared in advance. Interviewers were allowed to adjust the order and wording of questions based on participants' responses.

Data Analysis Methods

Thematic analysis: Thematic analysis involves systematically identifying, analysing, and interpreting patterns, or themes, within textual material (Braun & Clarke, 2006). This method allows the researcher to uncover the key meanings in the data and to understand how participants construct their experiences and social reality. In this study, the data were coded independently by two researchers. Differences in coding were discussed and resolved through consensus to enhance the reliability of the analysis.

Key findings are presented in Table 3 below.

Table 3. Key findings from interviewing medical students and interns

Key findings	Description	Number of respondents (out of 15)	Quote/example
Limited access to clinical practice	A significant part of practical training was replaced by simulations or online classes due to the threat of airstrikes or forced displacement.	11	–
Emotional exhaustion and stress	High levels of anxiety, stress, and signs of emotional burnout among students and interns.	13	“We are learning not only to treat patients, but also to work under the constant sound of sirens, which is mentally exhausting.” (Intern No 5)
Need for specialised courses	The need for training in tactical medicine, field surgery, and psychological first aid.	12	–

Source: the authors' own conception

Thus, focus should be placed on developing rapid response skills in extreme conditions and providing psychological support for students and interns.

This particular method for military medical schooling unites classic and current teaching methods, and it has definite strengths. This helps achieve a clearly defined, anticipated outcome, outlined through specific formulations of the corresponding skills. Thus, the establishment of the foundations of knowledge and abilities is ensured throughout the development of each competence, incorporating both traditional teaching methods and the application of pertinent developmental learning methods. An opposing aspect to integrating the competence-based approach in the military

medical education system is the ongoing process of its digital transformation. During the intervention, it was decided to use virtual reality (VR).

As was mentioned above, the study included 15 medical interns from four major Ukrainian cities: Kyiv, Kharkiv, Dnipro, and Lviv. The specific sample offers some regional variety but cannot comprehensively represent interns from rural or frontline areas, and its small size limits the generalisability of the findings. Given the wartime conditions, the results may have limited applicability to peaceful regions or alternative conflicts. Despite contextual differences, these observations could be instructive for countries facing analogous crises, contingent upon careful consideration of local conditions.

The interviews were conducted during the current stage of the war (between September and October, 2025). However, the situation is highly dynamic, which may affect both the needs and challenges in medical education. The information reflects a moment in time, and reactions might have been affected by anxiety, dread, or survival instincts. This could have affected the depth or openness of their answers.

5. Conclusions

This article highlights the unique importance of training military doctors within the educational framework tailored to military service conditions. Given its specific nature, military medical education intrinsically demands the integration of universal skills within the criteria for its professionals.

Wartime medical training, as highlighted by the article, necessitates particular expertise, encompassing combat zone healthcare, intraoperative patient management, and the transport of casualties. In accordance with NATO medical standards and WHO emergency response guidelines, the development of military medicine should be grounded in the integration of theoretical instruction and practical skills within the Armed Forces' medical support system (NATO Standardization Agency, 2023; World Health Organization, 2021). . This approach will lead to the formulation and application of a comprehensive medical framework as the unified strategy of both the government and the military medical service.

Finally, the article indicates that in Ukraine, professionals improving the diverse medical informational systems currently fail to ensure interoperability among these systems, lacking a unified state strategy on this matter. According to reports from the Ministry of Health of Ukraine (Kabinet Ministriv Ukrainy, 2025; Malakhov, 2023) and analytical reviews by the World Health Organization (2021), integrated information systems are a crucial factor in advancing modern medical science, digital transformation, and innovation in healthcare. . This issue becomes particularly crucial during wartime, when the quality of medical education and care in Ukraine and urban areas becomes paramount due to the heightened demand for medical professionals and their efficacy. Specialised training for doctors to operate effectively in conflict conditions can be of utmost importance.

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