

DOI: 10.21802/artm.2022.3.23.134
UDC 61:378.091.214.18:378.018.43:355.01(477)

DISTANCE LEARNING DURING THE WAR IN UKRAINE: EXPERIENCE OF INTERNAL MEDICINE DEPARTMENT (ORGANISATION AND CHALLENGES)

O.O. Khaniukov, O.V. Smolianova, O.S. Shchukina

*Dnipro State Medical University, Department of Internal Medicine 3, Dnipro, Ukraine,
ORCID ID: 0000-0003-4146-0110, e-mail: khanyukov.al@gmail.com;
ORCID ID: 0000-0002-8654-381X, e-mail: smolyanova.ukr@gmail.com;
ORCID ID: 0000-0002-9543-1545, e-mail: shchukina.olena@gmail.com*

Abstract. The beginning of the military aggression by the Russian Federation induced the suspension of education at all levels. Starting from March 14th, the training has continued in a remote format. But, although all educational institutions had the experience of distance learning, teaching during the war revealed its own features. During the war in Ukraine, health care facilities remain a military target, causing casualties among medical personnel. This, together with medical workers' abduction and migration, resulted in a shortage of medical staff. Under such conditions, the contribution of senior students and higher medical institution graduates was significant. Therefore, the continuation of medical education during the war is of great importance for an effective health care system functioning.

The aim. Highlight the experience of distance learning organisation at the clinical department during the war and the problems were discovered during the class.

Materials and methods. Classes were held daily with the mandatory synchronous and asynchronous parts, and the organisational component ensured their connection. The asynchronous component was organised by answering an extended clinical case, which included several theoretical questions and five mandatory tasks. To decrease the load for the teacher, the time limit for answering clinical case has been set, and a template of standard comments has been created. In addition, students were required to answer KROK2 tests. The synchronous component of distance learning was implemented using a Google Meet video conference, held daily according to a pre-approved schedule. In order to increase the level of student's communication skills, improve clinical thinking, as well as the practical application of the acquired knowledge, a "clinical" simulation was carried out during each video conference.

Due to the pandemic of COVID-19, institutions of higher medical education had a well-established mechanism of the distance learning organisation. However, active hostilities on the territory of Ukraine led to additional obstacles. The lack of sufficient resources to meet the physiological needs limited the students' opportunities to study because, according to A. Maslow, the fulfilment of basic needs is important to an effective cognitive activity. The sound of air raid sirens required interrupting the online part and descending into a bomb shelter. A chronic shortage of basic needs realisation led to a disturbance of the emotional state and consequently hindered the effective processing and memorisation of the material. The absence of stable Internet and being in different time zones also interfered with efficient education. Students' participation in volunteer activities impeded their ability to engage in and concentrate on the educational process.

Conclusions. Despite the sudden start of military aggression, institutions of higher medical education quickly switched to distance learning. As in the times of the COVID-19 lockdown, online education consisted of synchronous and asynchronous parts connected through the organisational component. However, active military operations and the constant threat of aerial attacks have created additional obstacles: security issues during the study, emotional state of students and teachers, problems with the Internet, power blackout, and being in different time zones. In addition, students' volunteer activities impeded full engagement in the learning process.

Keywords: war in Ukraine, medical education, distance learning, clinical simulation, medical students.

The beginning of the military aggression by the Russian Federation on February 24th, 2022, the direct conduct of hostilities, and the launching of missile strikes on the Ukrainian territory, induced the introduction of martial law and the temporary suspension of tuition at all levels of education. After a two-week break, starting from March 14th, the training has continued in a remote format. But, although all educational institutions had the experience of distance learning due to the pandemic caused by SARS-CoV-2, teaching in war conditions revealed its own features [1-4].

During the war in Ukraine - as in other armed conflicts (in particular, in Syria and Iraq) - despite the provisions of the Geneva Convention, health care facilities

remain a separate military target, which causes casualties among medical personnel [5-10]. Moreover, the cases of abduction of medical workers who assisted the wounded in the armed conflict zone directly and in the occupied territories were revealed [5, 6, 8]. An equally important problem also resulting in a shortage of medical staff is war-caused migration to other countries [10]. The aforementioned led to an imbalance: on the one hand, due to military actions directly (for example, injuries, wounds) and indirectly (for example, decompositions of somatic pathology, in particular, due to chronic stress), the total of patients' referrals increased, on the other hand, the number of medical personnel which can provide qualified assistance decreased. Under such conditions, the contribution

of senior students, who worked in hospitals as nursing staff during their study, and higher medical institutions graduates, who during their internship provided medical care alongside doctors, and after its completion, began to work independently, was significant; it helped to ease the personnel shortage to some extent. Therefore, the continuation of medical education during the war is of great importance for an effective health care system functioning, both in conditions of armed conflict and after its end.

The aim. Highlight the experience of distance learning organization at the clinical department during the war and the problems discovered during the class.

Materials and methods. According to the Regulations on Distance Learning [11], classes at the department were held daily with the mandatory use of synchronous and asynchronous components. We singled out an organisational component separately to organise better distance education. The block scheme of the educational process structure is shown in Fig. 1.

Distance education		
I. Organizational component	II. Asynchronous component	III. Synchronous component
<p>Moodle page of the department</p> <ul style="list-style-type: none"> List of practical classes (date, theme, number of hours). Schedule of class (specific scheduled time of being online and breaks between). Schedule of reworks of missed practical classes. Link for connection with a teacher via Google Meet (specific for each group). A theme folder for each class with the methodical recommendation, lecture, guidelines for diseases management, YouTube video (relevant to the theme), a clinical case, and MCQs (with time limitation) to answer before the class. <p>Viber group with students</p> <ul style="list-style-type: none"> Quick information about organizational issues (e.g., problem with the Internet, an emergency, etc.). 	<p>Moodle page of the department</p> <ul style="list-style-type: none"> Answers to clinical cases (according to the scheduled class theme). Analysis of additional methods of investigation (CBC, urinalysis, biochemical analysis, ECG, spirogram, chest X-ray, etc.). Answer on KROK 2 format tests (according to the scheduled class theme). 	<p>Google Meet Videoconference</p> <ul style="list-style-type: none"> Discussion of different aspects of the theme (most important, complicated). Analysis of students' answers to a clinical case (have to be sent before the class). Clinical case simulation (teacher plays the role of a patient, student – of a doctor).

Fig. 1. Block diagram of the organisation of distance education.

Organisational component. The organisational component was necessary to connect synchronous and asynchronous parts of education. For its implementation, Moodle and the Viber messenger were used (Fig. 1). Additionally, the thematic plan and schedule of classes, the schedule for rework of missed classes, and the link to the Moodle section "Internal Medicine" were posted on the department page on the official website of the Dnipro State Medical University. A group in Viber with the class has ensured the quick exchange of information (links, materials, etc.) under the teacher's control and allowed to respond rapidly to students' questions (related to the class organisation). Necessarily, it was emphasised that the teacher would answer the questions in the group only during work hours.

Asynchronous component. The asynchronous component was implemented by answering an extended clinical case posted on the department's page on Moodle. Each case included complaints, anamnesis, a detailed description of the objective examination by systems, and data of additional investigation methods with obligatory (presented in any case, regardless of the theme) and optional parts. The obligatory part included a complete blood count, clinical biochemistry tests (glucose, kidney and liver function tests, plasma proteins), urinalysis, electrocardiogram, and chest X-ray. The optional part included tests specific

to the particular disorder, e.g., C-reactive protein, anti-double-stranded DNA antibodies, rheumatoid factor, cyclic citrullinated peptide antibodies, troponin, N-terminal prohormone of brain natriuretic peptide, ultrasound diagnostics, sputum analysis, etc.

Considering that the solution of a clinical case is not only intended for summative assessment but also pursues educational purposes, each case included several theoretical questions requiring a short answer. Such questions direct the student's attention during preparation to the most relevant aspects for understanding the topic. In addition, each case had five mandatory tasks: 1) to establish a preliminary diagnosis and make its rationale; 2) to list the diseases you need to carry out a differential diagnosis with; 3) to interpret the results of additional investigation methods; 4) to develop therapy tactics and a treatment plan; 5) to determine the patient's prognosis.

Working with the clinical case had the greatest load for both the teacher and the student. Here, it was crucial to limit the time for sending a response to enable the teacher to check and comment on the work within the framework of working hours. Another powerful time-saving tool was the creation of a template of standard comments that could be expanded upon as needed. A more detailed case analysis took place during the Google Meet conference.

Given the importance of medical students' preparation for the licensed testing exam, they were required to answer KROK2 tests related to the theme during each class. Automatic assessment of tests by Moodle, and the possibility to view tests with an incorrectly selected answer, helped the teacher save time and understand what needs to be paid more attention to during online communication with the group.

Synchronous component. The synchronous component of distance learning was implemented using a Google Meet video conference, held daily according to a pre-approved schedule. During the online communication, the teacher focused on frequent mistakes in answering the clinical case without individualisation (specific feedback was provided to each student in writing on Moodle) and analysed tests answered wrong. Furthermore, important and difficult-to-understand theme aspects were also discussed.

In order to increase the level of students' communication skills, improve clinical thinking, as well as the practical application of the acquired knowledge, a "clinical" simulation was held during each video conference. For its organisation, a clinical scenario with a description of the disease related to the theme was used. During the simulation, a teacher played the role of a patient, and a student played the role of a doctor. In this performance, complaints gathering and medical history taking did not differ

from communication with the real patient. And to receive objective examination data, the student had to ask the teacher what he could see, palpate, percuss and auscultate in a particular area. According to the communication results, the student had to establish a preliminary diagnosis based on which he had to prescribe additional methods of investigation and treatment. After each clinical scenario, the provision of the feedback took place by sorting out the errors with highlighting their possible consequences to real clinical practice.

Features of distance medical education during the war. Due to the pandemic of COVID-19, institutions of higher medical education had a well-established mechanism for the distance learning organisation. However, active hostilities on the territory of Ukraine led to additional obstacles to its effective implementation. The most common problems faced by both teachers and students were security issues during the educational process, emotional state of students and teachers, instability/lack of the Internet connection, power blackout, and being in different time zones. It is also necessary to single out separately the volunteer activities of students during the study.

According to A. Maslow, safety needs are at the base of the hierarchy of human needs, directly above physiological ones. The fulfilment of the basic needs is of fundamental importance to an effective cognitive activity that is at the top of this pyramid (Fig. 2).

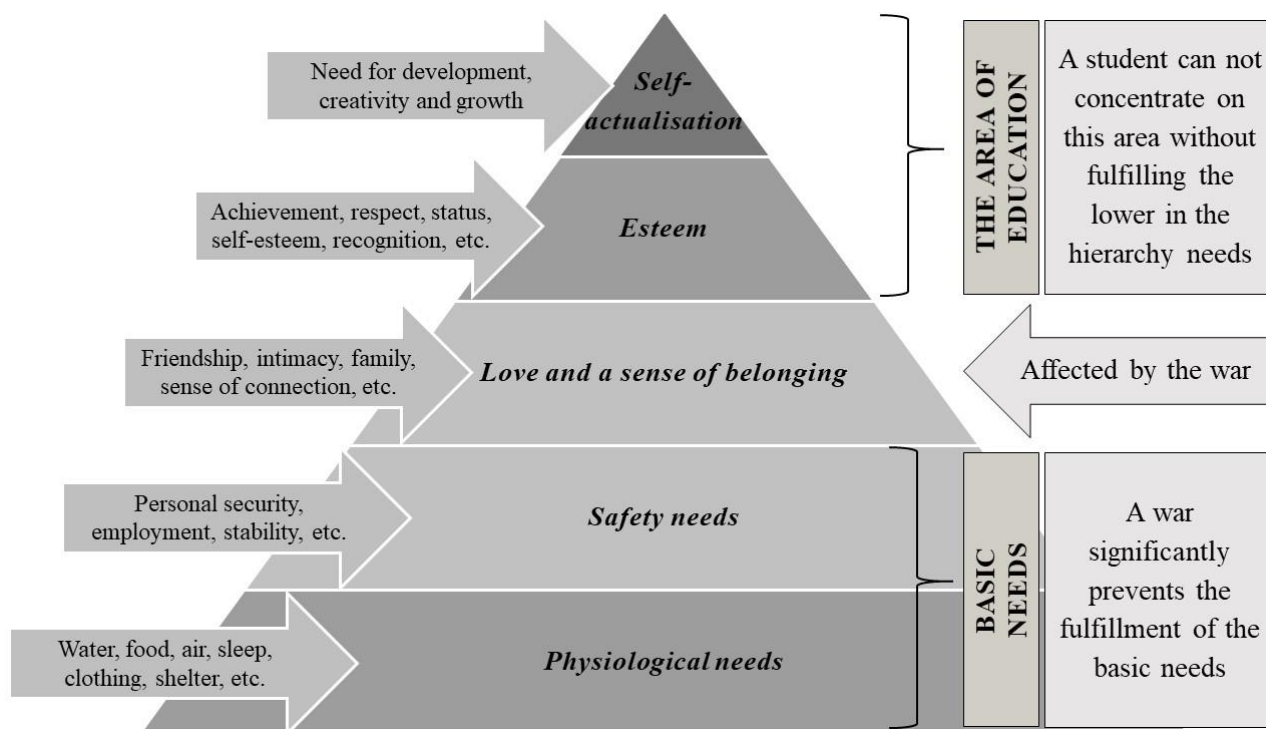


Fig. 2. The influence of war on education: a perspective from Maslow's hierarchy of needs.

The lack of sufficient resources to meet the physiological needs (life threats, problems with the food and water supply) in the areas where hostilities took place (which was often accompanied by a lack of electricity and/or Internet access) limited the students' opportunities to study. The sound of air raid sirens warning of possible missile strikes (potentially life-threatening - the absence of safety needs realisation) required interrupting the online

part of distance learning and descending into a bomb shelter. Another serious obstacle was the location of the students and the teacher in different cities of Ukraine, where the sirens did not sound simultaneously: some students had to leave the video conference for security reasons.

A chronic shortage of basic needs realisation led to a disturbance of the emotional state of both students and teachers, resulting in the appearance of mental disorders,

which hindered the effective processing and memorisation of the material. These problems were observed not only among Ukrainian students/teachers in the territories with active hostilities but also among those in other regions of Ukraine or abroad.

Although the absence of stable Internet was most evident in the combat area, the students and teachers also encountered the problem during movement between the cities. Unstable connection interfered not only with being present during the online part but also with finishing tasks on Moodle and especially answering tests, which have a time limit for completion. If the Internet connection was lost after starting an attempt, the test was sent automatically after the expiration of the time allotted for its passing. In such cases, the issue was resolved individually, most often - one more attempt to pass the test was given to the student. Even though the lack of the Internet connection sometimes made it impossible to keep the camera turned on during the entire lesson, constant voice contact with random short questions for each student made it possible to control their presence during the class.

The fact that students were in different time zones with a significant time difference also interfered with the effective use of the synchronous component. When working with foreign students who lived in approximately the same time zone, this issue was resolved by rescheduling the start of the lesson. However, there have been occasional instances when only one/two students were in a different time zone, which required their significant work to adapt to the hours of the online part of distance learning.

Students' active participation in volunteer activities impeded their ability to engage in and concentrate on the educational process. Students actively helped internally displaced persons, took part in the organisation of first aid courses for the population, and collected necessary medicines and consumables for city hospitals and fighters in the war zone. Volunteers devoted a significant part of their time to this activity, which reduced the opportunity for good rest (violation of basic needs realisation – see Fig. 2). However, despite this activity, all volunteering students mastered the competencies required by the program at a sufficient level and successfully passed the certification of graduates.

Conclusions. Despite the sudden start of military aggression by the Russian Federation, institutions of higher medical education quickly switched to a distance format for providing educational services. As in the times of the lockdown due to the COVID-19 pandemic, online learning consisted of synchronous and asynchronous parts connected through the organisational component. However, active military operations and the constant threat of aerial attacks have created additional obstacles to the educational process, namely, security issues during the study, emotional state of students and teachers, instability/lack of Internet connection, power blackout, and being in different time zones. In addition, students' volunteer activities impeded full engagement in the learning process.

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УДК 61:378.091.214.18:378.018.43:355.01(477)
ДИСТАНЦІЙНЕ НАВЧАННЯ ПІД ЧАС ВІЙНИ В УКРАЇНІ: ДОСВІД КАФЕДРИ ВНУТРІШНЬОЇ МЕДИЦИНИ (ОРГАНІЗАЦІЯ ТА ПРОБЛЕМИ)

О.О. Ханюков, О.В. Смольянова, О.С. Щукіна

Дніпровський державний медичний університет,
кафедра внутрішньої медицини 3, м. Дніпро, Україна,
ORCID ID: 0000-0003-4146-0110,
e-mail: khanyukov.al@gmail.com;
ORCID ID: 0000-0002-8654-381X,
e-mail: smolyanova.ukr@gmail.com;

ORCID ID: 0000-0002-9543-1545,
e-mail: shchukina.olena@gmail.com

Резюме. Після зупинки навчального процесу у зв'язку з військовою агресією Російської Федерації він був продовжений дистанційно. І хоча всі навчальні заклади мали досвід онлайн навчання, викладання під час війни виявило свої особливості.

Мета. Висвітлити досвід організації дистанційного навчання на клінічній кафедрі в умовах війни та проблеми, виявлені під час занять.

Заняття проводилися з використанням синхронного та асинхронного форматів, пов'язаних з допомогою організаційної складової. Асинхронний компонент був організований шляхом відповідей на клінічний кейс та тести в Moodle, а синхронний – за допомогою Google Meet конференції.

Незважаючи на налагоджений механізм організації дистанційного навчання, бойові дії призвели до додаткових перешкод. Відсутність ресурсів задоволення базових потреб обмежувала можливості студентів у навчанні. Хронічний дефіцит їх реалізації призводив до порушення емоційного стану і, як наслідок,

перешкоджав ефективній обробці та запам'ятовуванню матеріалу. Звук сирен вимагав переривати онлайн-частину та спускатися до бомбосховища. Відсутність стабільного інтернету, перебування у різних часових поясах, волонтерська діяльність студентів також заважали ефективному навчанню.

Висновки. Незважаючи на раптовий початок воєнної агресії, заклади вищої медичної освіти швидко перейшли на дистанційне навчання. Як і за часів карантину COVID-19, воно складалося з синхронної та асинхронної частин, пов'язаних організаційною складовою. Однак бойові дії створили додаткові перешкоди: питання безпеки під час навчання, емоційний стан студентів та викладачів, проблеми з інтернетом, відключення електрики, перебування у різних часових поясах. Крім того, волонтерство студентів заважало повноцінному залученню до навчання.

Ключові слова: війна в Україні, медична освіта, дистанційне навчання, клінічна симуляція, студенти-медики.

Стаття надійшла в редакцію 04.07.2022 р.

Стаття прийнята до друку 22.07.2022 р.