






Current Issues in Pharmacy and Medical Sciences

Formerly ANNALES UNIVERSITATIS MARIAE CURIE-SKLODOWSKA, SECTIO DDD, PHARMACIA

journal homepage: <http://www.curipms.umlub.pl/>



The influence of military actions on the Ukrainian territory on the work of the healthcare system

TARAS GUTOR¹ , OKSANA KOVALSKA¹ , NATALIYA ZAREMBA¹ ,
IRYNA HERASYMOVYCH¹ , VIRA DIACHYSCHYN¹ , ZORIANA MYSAK¹ ,
NATALIIA TIMCHENKO¹ , NAZAR NEGRYCH¹ , IRYNA KOVALSKA¹ , ROMAN LYSIUK^{2*} 

¹ Department of Social Medicine, Economics and Organization of Health Care, Danylo Halytsky Lviv National Medical University, Ukraine

² Department of Pharmacognosy and Botany, Danylo Halytsky Lviv National Medical University, Ukraine

ARTICLE INFO

Received 08 April 2023
Accepted 19 January 2024

Keywords:

health care system of Ukraine,
healthcare quality,
demographic shifts,
internally displaced people,
relocations,
field hospitals.

ABSTRACT

The multi-sided damages caused by the large-scale invasion of Russia has become a great challenge for the medical care system of Ukraine. This research is aimed at studying, analyzing and summarizing data from scientific publications, personal experience, and open sources of relevant information concerning changes that occur in the work within Ukraine's healthcare system and the activity of medical staff due to the Russian invasion. Special attention has been paid to processes related to relocations of medical staff and health care establishments, field hospitals as an important tool during martial law, as well as for the different types of support provided by the international partners of Ukraine. Data concerning demographic shifts in Ukraine due to the 2022 Russia-Ukraine war are also presented. Moreover, SWOT analysis of changes in the system of health care in Ukraine during martial law has been performed.

INTRODUCTION

Aspects of influence of the ongoing Russia - Ukraine war during the period of 2014-2022 on the state of the health care system in Ukraine, on physical and mental health in different social groups, on the provision of various types of humanitarian aid and other types of support are being actively researched, both domestically and internationally [1-15], by among others, World Health Organization (WHO) specialists [9]. The war in Ukraine is also of particular concern because of the unfinished COVID-19 pandemic. Notably, there acute questions raised regarding the possibility of providing services and medicines to pregnant women, diabetic and dialysis patients [1-3,7,8].

In 2018, a fundamental reform of the primary health-care on the principles of general practice (family medicine) was implemented. Instead of the Semashko model, based on central budgetary state financing ("pay-per-bed"), the National Health Service of Ukraine (NHSU) has become a single-payer authority, and the so-called 'money-follows-the-patient' model is used for payment of provided services, in accordance with the Medical Guarantee Programme. The reform of secondary level (inpatient care) provides the funds

for healthcare facilities on the basis of per treated case [12]. What is more, the "Affordable Medicines" Programme, followed since April 2019, allows to reimburse 264 items of medicines by the NHSU for patients with cardiovascular ailments, bronchial asthma and type 2 diabetes mellitus. In April 2020, a digital user system for booking medical appointments was also implemented [10].

Both public and private and healthcare facilities exist in Ukraine. While in 2021, only 6.4% of Ukrainians have signed declarations with family physicians that practice in private clinics, 255 private clinics provided free medical care under the Medical Guarantee Programme. In 2023, 1,458 healthcare establishments for specialized care were contracted by the NHSU, this comprising of only 82 private hospitals and 11 doctor-entrepreneurs [11].

Primary level medical-care in Ukraine accepts about 10% of all health care financing. The remainder goes to highly specialized medical care. There are over 2200 hospitals and 400,000 hospital beds (522 hospitals and 8907 beds per 100,000 population) in the public sector of Ukraine. In per capita terms, these indicators exceed the situation in the EU as a whole [12].

During the first 8 years of the on-going Russia-Ukraine war, 13,000 citizens of Ukraine have been killed and 30,000 wounded due to enemy action. In just only the first 5 weeks

* Corresponding author

e-mail: pharmacognosy.org.ua@ukr.net

of the full-scale Russian invasion into Ukraine, there were 3167 civilian victims, out of which: 1232 died (52 children in particular) and 1935 were wounded [1]. As of 4th of August 2022, 5552 Ukrainian civilians were known to have been killed and 8513 injured as a direct outcome of Russian invasion. Moreover, there has been at least 3000 premature deaths among people with chronic diseases because they could not gain access to treatment for such diseases as HIV/AIDS and cancer. War time conditions have also contributed to an increase in HIV/AIDS, tuberculosis and Coronavirus (COVID-19) morbidity [2].

In addition, as of 4th of August 2022, 24 328 citizens of Ukraine have been estimated to have been killed in mass atrocities, with Mariupol being the largest (22 000 deaths). Moreover, hospitals and health care facilities from 21 cities across the country have also come under attack [2].

During the imposed martial law, as of 7th of June 2022, Ukraine has received 8,5 thousand tons of medical humanitarian aid for a total of over UAH 12 billions from 35 countries. The obtained aid consisted of more than 108 mln units of medications, 23,2 mln units of consumables, 320 units of medical vehicles, 8,6 mln of individual protection means, and above 178 hundred units of medical equipment.

The war has led to the death of loved ones, loss of home, property and work, physical and mental traumas that have great influence on the mental health of Ukrainian population, including both civilians and military personnel. One of the leading mental health outcome of the war comprises post-traumatic stress disorder [8]. According to prognoses of the MHU, more than 15 million Ukrainians will need psychological help due to the consequences of this brutal war for Ukrainian survival.

Demographic shifts due to the 2022 Russia-Ukraine war

As a result of the Russian invasion into Ukraine, the lives of many Ukrainians have changed significantly. Ukrainians have been forced to hide themselves in bomb shelters and basements among large crowds of people, in dampness and darkness. Due to the Russian invaders' intentional shelling and bombing of health care institutions and other infrastructure facilities, changes in the organization of provision of medical care to the population have had to occur.

As an outcome of the Russian military aggression, a significant part of the population of Ukraine, as of the 16th of June, 2022, have become officially designated internally displaced persons (IDP), searching for safe haven on Ukrainian territory, or refugees who have gone abroad (7,704 mln people), of which 2,559 mln have returned [14]. In Europe, currently there are 5,97 mln Ukrainian refugees, and beyond Europe – 470,000 [14]. According to calculations made by the Office of the United Nations High Commissioner [14], dating from the 23rd of April, 5, 2022, about 2,9 mln had been taken in by Poland, 774 thousand – by Romania, 490 thousand – by Hungary, 443 thousand – by Moldova, 354 thousand persons – by Slovakia. As of the end of May 2022, the total number of persons older than 60 years who went abroad after the 24th of February 2022, has amounted to 502980 people [5]. The largest number of 60+ refugees are from the southern and eastern parts of Ukraine (51.5%), and from the northeast, particularly from

the Kharkiv region (19%). According to the gathered statistics, as of April, 2022, the overwhelming majority of all refugees (83%) were women. Of these, 67.4% went abroad with children or grandchildren.

From the beginning of the war and until the end of March 2022, about 2 mln children have left the country (out of them, 672 thousand schoolchildren) and 2,5 mln Ukrainian children are considered to be IDPs. This figure does not include those forcibly taken to Russia. The Ministry of Health of Ukraine (MHU) in conjunction with the European Union has established six humanitarian corridors with European Union countries and allied nations, where 309 children with oncological diseases have been hospitalized for further provision of health care in European clinics, the USA, Canada and several other countries. In addition, over 2354 patients who had severe diseases, complicated traumas and wounds, whose treatment in Ukraine was impossible due to damaged or destroyed healthcare establishments, were evacuated [8].

The surveys conducted during the period between March and April, 2022, by the sociological service of the Razumkov Center at checkpoints across the state border of Ukraine, revealed that among those who left Ukraine starting from the 15th of March till the 1st of April, more than half were residents of the eastern and southern parts of Ukraine (51,5%) and central regions (45%, including 31% from Kyiv city and Kyiv region), and only 4% – residents of the western regions [4]. Five regions from which people traveled the most were: Kharkiv – 21%, Kyiv city – 19%, Kyiv region – 18%, Donetsk – 15%, and Luhansk – 5%. The IDP were most accepted by the following regions of Ukraine: Dnipropetrovsk – 11%, Kyiv – 10%, Lviv – 9%, Vinnytsia – 7%, and Poltava – 7% [13].

Amongst those who at the beginning of the war had left the country, the largest group comprised people of the age category of 30-39 years (37%). With regard to those refugees who have since returned, the share of representatives of this age group was equal to 25%. Of those who have returned, 44,8% came home with children. Amongst the returnees, the vast majority (69%) were residents of the central regions of Ukraine - predominantly of Kyiv city (35%) and Kyiv region (17%); 12% – of the eastern, 9% – southern, 10.5% – western regions. In addition, 73% of all returnees are planning to settle in the same area wherein they lived before the war, and 26% – in another region (mostly, these are residents of the eastern regions), the latter more commonly select areas in the western part of Ukraine (15%) or Kyiv city or Kyiv region (7%) [4].

Relocations of medical staff and establishments

Although considered a warcrime, the infrastructure facilities of Ukraine have become the targets of the Russian invaders' attacks. These actions have impacted the lives, well-being and safety of Ukrainian population and caused disruption of healthcare services and related supplies [2,6]. As of 18.06.2022, in Ukraine, beginning from the full-scale war of Russia, 12 medical specialists have been killed, another 47 have been seriously injured. Because of the conflict, about 1000 health facilities are located near the front line or are in zones not under full Ukrainian control.

Moreover, a number of hospitals have been urgently converted to care for the wounded, which led to a change in the provision of the basic health services and primary care. As of the 22nd of March, 2022, the WHO has confirmed 64 cases of attacks on Ukrainian health facilities, which has led to 15 deaths and 37 injuries. In addition, approximately half of all apothecaries in Ukraine have been closed [9], and thousands of medical workers have become displaced within Ukraine or abroad.

During the first year of the full-scale invasion, 334 attacks on 267 Ukrainian healthcare establishments were documented, including 230 causing significant damage and 37 bringing about complete destruction. Mainly, these attacks were within the first three months and in the eastern regions. With time, general hospitals, primary care clinics, emergency departments and children's hospitals have become routine targets and this action has resulted in wide disruptions of routine and acute emergency care, maternal and child health – and might contribute further to the uncontrolled spread of infectious ailments [6]. As a result of the Russian aggression, critical shortages of vitally important medical preparations, namely, medical oxygen, insulin and anti-cancer agents in particular, have become important medical and social problems [3].

As of 2023, in Ukraine, the enemy has damaged around 1200 medical facilities and completely destroyed over 160 medical institutions [8]. Out of them, 9 health facilities were destroyed on the territory of Mykolaiv region, 6 – in Kharkiv and Chernihiv regions, 2 – in Kyiv, Luhansk, Sumy and Zaporizhzhia regions, while Zhytomyr and Kherson regions lost one hospital each. In Donetsk region, over 74 medical institutions have been totally destroyed and 48 have been damaged. Over 400 medical facilities remain in temporarily occupied areas [8].

To cope with the situation, the network of mobile outpatient clinics has been expanded, notably in Vinnytsia and Khmelnytskyi regions, which host the highest number of IDP [8]. Moreover, some hospitals from the occupied territories have been temporarily relocated to safer places; e.g. from May 10 2023, the communal non-commercial enterprise “Regional territorial medical association, Kramatorsk” and its department Medical center of modern oncology have resumed activity in Lviv. Furthermore, from the war zone, the department of family medicine of the clinic “Medical star” has also been relocated to Lviv region, where seven doctors-migrants work together in the medical institution, while twelve doctors-migrants from Bucha, Hostomel, Iziur, Irpin, Mykolaiv, Sumy region, Kharkiv and Chernihiv united have augmented the medical staff of the dental clinic in Ternopil.

Over 30,000 medical workers have either joined the Ukrainian Armed Forces or have become volunteers, while over 2500 have left the country and 4500 have been internally displaced. As of January 2023, about 45,000 internally displaced healthcare workers have found employment in other medical establishments across the country, predominantly in Cherkasy, Kharkiv and Poltava regions [8]. In addition, 176 foreign medical specialists have come to Poland to assist in healing people on Ukrainian territory.

During the first three months of full-scale invasion in Ukraine, over 3073 internally displaced medical workers, including 1636 doctors, 991 other specialists (nurses, midwives, paramedics, pharmacist assistants), 446 technical workers, took advantage of work opportunity in other medical institutions. The largest number of employed medical workers, who were forcibly displaced to other regions, are registered in the following regions of Ukraine: Dnipropetrovsk – 440, Lviv – 308, Poltava – 303. As for other regions, the following numbers of medical workers-migrants were employed in different administrative regions: Cherkasy – 90, Volyn – 85, Zaporizhzhia – 42, Rivne region – 10.

With regard to the real-estate market, in most of the western and northwestern regions of Ukraine, as well as in regions with a large flow of internally displaced persons (Zaporizhzhia, Mykolayiv, Dnipropetrovsk), prices for living space of all classes has increased or remained at approximate the level of the previous years. Rental price in western and central regions in the summer of 2022 increased by 30-50% depending on the segment and location. The high demand for rent in Lviv, the largest city of the western part, has been dictated by the distance from the battle line, its developed infrastructure and, most importantly, the availability of employment vacancies.

Field hospitals as an important tool of martial law

Medical care in the Armed Forces of Ukraine is carried out in military hospitals, garrison and mobile military hospitals, medical rehabilitation centers and spa treatment centres, as administratively divided into the following structural subdivisions of the military-medical clinical centers: National (Kyiv), Central (Vinnytsia), Southern (Odessa), Northern (Kharkiv) and Western (Lviv) regions. During the acute phase of the Russia – Ukraine war, a significant amount of medical care to military men of the AFU was also provided in the Military Medical Clinical Center of the eastern region, in military hospitals in Cherkaske, and military mobile hospitals in Pokrovsk and Chasiv Yar. As part of the reform in the Armed Forces of Ukraine (AFU), the Command of Medical forces was created in February 2020; from the 1st of January, the Medical forces have received the status of separate kind of force.

A mobile hospital is a full-fledged facility on wheels, which is equipped with the latest medical equipment. It consists of reception, laboratory, X-ray premise, operating rooms (surgery, emergency care, intensive care), technical room, toilets and showers. The mobile hospital has its own generator, which allows it to work completely autonomously. It also might have a warehouse for medicines, systems for purification of water, premises for sterilization, dental room *etc.* Two teams of doctors can work in a mobile hospital at the same time. This translates into the ability to save up to 100 lives a day, based on the principle of triage. It should be underlined that field hospitals functioned at the same location for short periods of time so as to not to become a target of attack.

As of 29.03.2022, beginning from the full-scale war of Russia in Ukraine, 3 hospitals were brought and set up that increased the capacity of therapeutic aid. In the first month of martial law, the state purchased medicines and medical

supplies in the amount of UAH 2.1 billion and received humanitarian aid for more than UAH 2.5 billion. In addition, 13 tons of medicines for urgent care and treatment of chronic diseases worth over USD 20 mln were received from the USA (from the NGOs: “Heart to Heart International”, “HOPE worldwide”). Moreover, 50 armored ambulance cars, 1000 pieces of body armor, 590 satellite constellation systems such as StarLink were received from abroad by the MHU and transferred to specialists of the emergency medical care. Thanks to Internet connection via StarLink, doctors in Ukraine can consult with their colleagues from other countries. Of note, through the good graces of the Polish company InPost, two full trains of medical and humanitarian aid were received at no cost to the Ukrainian nation.

Since 2014, Germany has provided Ukraine with more than EUR 13 million for medical goods and equipment, and hundreds of military men of the AFU have undergone treatment and rehabilitation for their injuries in Germany. In February 8, 2022, the AFU received important aid in the sphere of military medicine from Germany and Estonia in the form of a modern, fully equipped mobile field hospital, for accelerated deployment and use in the field conditions. It renders medical help to wounded at the brigade level. All modules need 20 minutes for deployment and closure; they can be used one at a time, as well as together so as to form a fully equipped field hospital. Similar equipment has been received, for instance, from Canada.

In December 2021, the 407th military hospital in Chernihiv took charge of a 32-slice computer tomograph. The equipment was received due to an agreement, dated August 2020, between the Federal Ministry of Defense (Germany) and the Ministry of Defence of Ukraine (MDU) regarding the provision of a financial grant in the amount of EUR 3,1 mln in order to buy modern specialized medical equipment.

Beyond the aforementioned, six mobile hospitals were transferred by the Netherlands to Ukraine. One was redeployed in May to Mykolaiv region. Each of these hospitals is fully autonomous. Moreover, Israel has supplied a field hospital that was deployed from the 22nd of March till the 28th of April 2022, in Mostyska town of Lviv region; it rendered medical aid to forcibly displaced people, residents of Mostyska and neighbouring communities and military wounded. The project was jointly implemented by the Israel Ministry of Health and Ministry of Foreign Affairs of Ukraine with the assistance of the Schusterman Foundation and the Jewish charitable organization JDC. More than 100 medical staff, who arrived voluntarily from different Israeli hospitals, worked in the hospital. Within the period of the hospital deployment, more than 7000 patients were treated by the Israeli and Ukrainian medical specialists.

The hospital “Shining star” consisted of specially equipped tents where the Israeli doctors conducted initial examination, while a kit insulation room for COVID patients was separately equipped. There were also three hospital rooms for inpatients: men’s, women’s and children’s wards. In case of surgical intervention, the Israeli specialists operated upon the patients in the hospital premises. To ensure communication, patients’ registration was provided by the nearest Ukrainian medical facility. Besides rendering medical aid, the Israeli medical specialists provided training for doctors from local

communities and regions, and organized online consultations of hospital patients with Israeli specialists of various profiles.

Near Lviv, owing to the American NGO “Samaritan’s Purse”, a field hospital was set up from the 14th of March till the 18th of June 2022. In it, American medical specialists provided free medical care to LCDs and to military wounded. Some of the highly qualified medical volunteers had previous work experience in Iraq and Afghanistan. The hospital staff consisted of almost 100 persons – about 50 medical specialists (doctors, nurses, and pharmacists) and the same number of technical workers. The field hospital worked around the clock, with simultaneous accommodation of 60 patients. The equipment and everything needed for the hospital functioning was brought in from the USA. Within the three months, 4000 patients received medical aid and 100 surgical interventions were performed.

To understand the effect of the war upon Ukraine’s health services, we performed the a SWOT ANALYSIS of changes in the health care system (Table 1).

Table 1. The SWOT ANALYSIS of changes in the system of health care during the martial law

Strengths	Weaknesses
<ul style="list-style-type: none"> • system of health care of Ukraine is in the center of attention of specialists from the International organizations • WHO increased its presence in Ukraine in order to meet the growing needs in the field of health care • the Ukrainian health care system simultaneously with the component of the international humanitarian aid adapts to work in wartime • strengthening of policies and institutions of health care system of Ukraine in order to guide the process of post-war recovery 	<ul style="list-style-type: none"> • bombardment of hospitals, migration of medical specialists • inability to access people who need medical care in populated areas under the siege of Russian invaders • access to medicines and medical workers is limited or absent at all in areas in which the fierce battles occur • lack of necessary specialists in areas where they are needed • chain disruption and systems of drug supply and medical products • diagnosis and treatment of cancer and other socially significant diseases are disrupted across the country • instability on pharmaceutical market • inability to monitor the health care on the occupied territories
Opportunities	Threats
<ul style="list-style-type: none"> • continuation of work within the framework of the reform with adapted approaches in provision of medical services • development of powerful institutions, those who joined to reform in 2016 • support of foreign investors • predictive tendency of the WHO work as to the strengthening the health care system of Ukraine in future • consultations and exchange of experience between the domestic medics and international experts on military medicine • strategy of creation and development of health care system in peacetime and wartime • development of digital technologies 	<ul style="list-style-type: none"> • life of thousands of people on the temporarily occupied territories • jeopardy of outbreak of particularly dangerous and non-dangerous infectious diseases, including COVID-19 • spread of vaccine-preventable diseases • massive increase of the psychological harm (particularly post-traumatic stress disturbance) and sufferings • increase of mortality rate due to the most important socially significant diseases • traumas, massive victims, burns, chemical damages • a great number of amputations • constraint of practice in medical students (applicants of higher medical education) • biological, chemical and radiation safety of Ukraine and neighboring countries

The main healthcare challenges during the time of our study included the shortage of medical specialists, the increased workload for medical staff, destroyed or severely damaged medical facilities, outdated infrastructure, increased number of internally displaced persons and loss of their medical records *etc.* These difficulties were predominantly observed in the southern, eastern, and northern regions of Ukraine.

Other current challenges that hampered the provision of timely healthcare to the population, consisted of logistical disruptions, shortages of medical supplies, restricted access to healthcare services and non-adherence to prevention and treatment standards [8].

Prior to the war, 84% of all deaths in Ukraine were established to have been caused by non-communicable diseases such as CVD, diabetes, cancer, chronic diseases of the respiratory system and mental ailments. War-related disruptions in the treatment of chronic diseases has increased the level of morbidity and mortality. The unavailability of an uninterrupted supply of medicines for the treatment of chronic diseases is a significant reason for the increase in morbidity in the on-going conflict. The deterioration of the supply of medicines and medical products, the difficulty of access to basic medical care and the disruption of the processes of prevention, diagnosis and treatment of chronic diseases pose a significant threat to the country's population.

Since the main attention is currently shifted towards treatment of injuries, wounds, burns and related states, it partly contributes into a reduction of priority for treatment of chronically ill patients, including those suffering from cancer [15]. In addition, cases of chronic rheumatic ailments have increased, and patients have experienced relapses triggered by stress and disruption of continuous therapy, due to the current wartime situation. An increased number of cases of spondylarthritis amongst soldiers has also been recorded – due to the excessive load on the spine caused by long-term wearing of heavy body armour [8].











War-related injuries being treated in Ukraine include gunshot wounds, injuries from explosions, burns and traumatic amputations, which require immediate and ongoing therapy, often involving repeat surgery, hospitalization, and long-term rehabilitation. Indeed, numerous soldiers need prosthetics [8].

Still, despite the essential damage to its infrastructure, the healthcare system in Ukraine reveals considerable resilience and adaptability, transforming itself in accordance with new conditions and needs [8]. In summation, expansion of both rehabilitation and mental health services in Ukraine seems to be amongst the priorities for upcoming years to meet the new needs of affected veterans and civilians.

CONCLUSIONS

The military aggression of Russia, at a scale not seen in over seven decades, has caused significant demographic shift and a need of search by Ukrainian health care workers for all possible ways to implement measures aimed at provision of medical services and therefore the saving of Ukrainian lives. The carried out SWOT analysis summarizes the changes in the system of health care of Ukraine during this time of strife, and indicates the importance of connection to allied nations, to the creation of mobile field hospitals and clinics, and to the need for redundancy in rendered services and facilities. It also highlights the skill, bravery and professionalism of Ukraine's medical services, and that of volunteers from Ukraine's friends abroad.

ORCID iDs

Taras Gutor  <https://orcid.org/0000-0002-3754-578X>
 Oksana Kovalska  <https://orcid.org/0000-0001-5242-601X>
 Nataliya Zarembo  <https://orcid.org/0000-0001-8185-1752>
 Iryna Herasymovych  <https://orcid.org/0000-0002-9371-7689>
 Vira Diachyschyn  <https://orcid.org/0000-0003-2363-0059>
 Zoriana Mysak  <https://orcid.org/0000-0002-8468-9305>
 Nataliia Timchenko  <https://orcid.org/0000-0002-4709-226X>
 Nazar Negrych  <https://orcid.org/0000-0003-0642-9038>
 Iryna Kovalska  <https://orcid.org/0000-0002-6456-3414>
 Roman Lysiuk  <https://orcid.org/0000-0003-0961-2970>

REFERENCES

1. Awuah WA, Mehta A, Kalmanovich J, Yarlagadda R, Nasato M, Kundu M, et al. Inside the Ukraine war: health and humanity. *Postgrad Med J*. 2022;0:1-3.
2. Haque U, Naeem A, Wang S, Espinoza J, Holovanova I, Gutor T, et al. The human toll and humanitarian crisis of the Russia-Ukraine war: the first 162 days. *BMJ Glob Health*. 2022;7(9):e009550.
3. Jain N, Prasad S, Bordeniuc A, Tanasov A, Shirinskaya AV, Béla B, et al. European countries step-up humanitarian and medical assistance to Ukraine as the conflict continues. *J Prim Care Community Health*. 2022;13:21501319221095358.
4. *A quarter of refugees returning to Ukraine want to live in another region – survey*. [<https://www.pravda.com.ua/news/2022/05/16/7346580/>] (access: 10.02.2024).
5. *Almost half a million Ukrainian pensioners were forced to leave abroad due to Russia's large-scale military invasion of Ukraine*. [<https://www.rada.gov.ua/news/razom/224006.html>] (access: 10.02.2024).
6. Barten DG, Tin D, Granholm F, Rusnak D, van Osch F, Ciottone G. Attacks on Ukrainian healthcare facilities during the first year of the full-scale Russian invasion of Ukraine. *Confl Health*. 2023;17(1):57.
7. Zaliska O, Oleshchuk O, Forman R, Mossialos E. Health impacts of the Russian invasion in Ukraine: need for global health action. *Lancet*. 2022;399(10334):1450-2.
8. Goniewicz K, Burkle FM, Dzhus M, Khorram-Manesh A. Ukraine's healthcare crisis: Sustainable strategies for navigating conflict and rebuilding for a resilient future. *Sustainability*. 2023;15:11602.
9. WHO. *Ukraine: 28 days of war, 64 verified attacks on health care, and 18 million people affected*. [<https://www.who.int/europe/news/item/24-03-2022-ukraine-28-days-of-war-64-verified-attacks-on-health-care-and-18-million-people-affected>] (access: 01.12.2022).
10. Lyeonov SV, Kuzmenko OV, Koibichuk VV, Rubanov PM, Smiiianov VA. Behavioral, social, economic and legal dimension of the public health system of Ukraine: descriptive, canonical and factor analysis. *Wiad Lek*. 2021;74(12):3126-34.
11. *Private healthcare: development prospects in Ukraine*. Survey Results. Kyiv; 2023.
12. Romaniuk P, Semigina T. Ukrainian health care system and its chances for successful transition from Soviet legacies. *Globalization and Health*. 2018;14:116.
13. *The number of internally displaced persons (IDPs) in Ukraine exceeded 8 million people*. [<https://minre.gov.ua/2022/05/11/kilkist-vnutrishno-peremishhenyh-osib-vpo-v-ukrayini-perevyshhyla-8-mln-lyudej-zvidky-j-kudy-yihaly-najbilshe/>] (access: 10.02.2024).
14. UN Refugee Agency. *Operational Data Portal*. [<https://data.unhcr.org/en/situations/ukraine>] (access: 16.06.2022; 31.12.2023).
15. Zub V, Semenova Y, Tolstanov O, Kotuza A, Gutor T, Matsyura O, et al. Provision of medical care to cancer patients in Ukraine during Russo-Ukrainian war: A survey of oncologists' perceptions. *Int J Healthcare Manag*. 2023.