Chapter 4

NEW PROBLEMS AND CHALLENGES FOR WOMEN'S REPRODUCTIVE HEALTH IN UKRAINE AT THE BEGINNING OF THE 21ST CENTURY AND WAYS TO SOLVE THEM

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INTRODUCTION

Protecting women's reproductive health is an extremely important issue in the 21st century. Despite the rapid development of science, technology and the use of the latest new technologies, new challenges have come into our lives that have a significant negative impact on women's reproductive health. This is the COVID-19 pandemic that will sweep the world in 2020. For Ukraine, it is also the full-scale invasion by the troops of the Russian Federation. All these factors have contributed to the unfavourable epidemiological situation regarding the prevalence of HIV and tuberculosis in Ukraine. According to the Public Health Centre of the Ministry of Health of Ukraine, the prevalence of HIV infection in Ukraine was 384 per 100,000 population and the incidence of HIV was 28.4 per 100,000 population on 1 January 2004. This has had a significant negative impact on the mental health of the population, leading to a significant increase in the incidence of depression. Military actions and migration processes do not contribute to the harmonious and full exercise of women's reproductive functions. The frequency of postponing the first planned pregnancy and repeated pregnancies has increased significantly, even among the most prosperous couples. Finally, no one can currently guarantee 100% peace and security for future generations. Thus, the high prevalence of HIV and tuberculosis, sexually transmitted infections (STIs), the impact of the COVID-19 pandemic and military aggression have combined to create a layer of significant problems and challenges for women's reproductive health.

All of the above factors have also led to a deterioration in mental health, an increase in the incidence of depression, cases of domestic violence and have had a significant negative impact on the harmonious realisation of the reproductive function of women in Ukraine. This led to a decrease in the birth rate and the worsening of the demographic situation. For comparison, in the

period from 2010 to 2013, approximately 500,000 children were born in Ukraine each year. Before the pandemic, in 2019, 309,000 little Ukrainians will be born. In 2021, 256,814 babies were born in Ukraine, in 2022 – 190,393, and in 2023 – 187,387. This number of newborns per year is the lowest since the independence of Ukraine (24 August 1991). However, the statistics do not include data from the temporarily occupied territories.

For the last two years, since the beginning of the full-scale invasion by the troops of the Russian Federation, the women of Ukraine have been living in constant stress. We can call it chronic. It has been proven that stress has a negative effect on the body and health. For women in particular, it can manifest itself in a disruption of the menstrual cycle. Chronic psycho-emotional stress has a negative impact on women's reproductive health, leading to menstrual cycle disorders, hormonal disorders, infertility, complications in pregnancy and childbirth. What is the relationship between stress and the reproductive system?

Under the influence of stress factors, the so-called "hormonal pathway" in the human body – hypothalamus – pituitary – adrenal glands – is activated, which controls our body's response to stress. The result is an increase in the levels of cortisol, the corticotropin-releasing hormone (CRH). As a result of the increase in cortisol and CRH levels, reproductive hormones are suppressed and the following conditions occur

1. Abnormal ovulation – with new symptoms, deterioration in general well-being, etc;
2. Absence of ovulation – anovulation;
3. Amenorrhoea – absence of menstruation.

How does stress affect women's health?

Stress is a non-specific response of the body to a very strong external influence (stimulus), which exceeds the norm, and a corresponding response of the nervous system. The term "stress" was first introduced into physiology and psychology in 1932 by Walter Bradford Cannon in his classic research on the universal "fight-or-flight response" (Cannon W.B., 1932). The authorship of the term is often attributed to the famous Canadian physiologist Hans Selye, but it was not until 1946 that he began to use the concept of "stress" to explain general adaptive stress.

Stress can cause various disorders (menstrual cycle disorders, cysts, mammary gland disorders, mastopathy and thyroid problems). Menstrual disorders and bleeding are some of the most serious consequences, affecting a woman's ability to conceive in the future. They can cause infertility.

A clear definition of the existence of the above problems is necessary for an objective search for ways to overcome them. After our victory we will work constructively to solve these problems, but for now it is important to control the situation and prevent the above factors from having a significant negative

impact on the reproductive health of the population. Separately, there is also the significant role of migration processes with the departure of a significant number of the reproductively active population abroad. A particularly unfavourable factor is the loss of our brave defenders at the front, which may also have a significant negative impact on the demographic situation in Ukraine in the future.

Thus, the **aim of this paper** is to develop a modern approach to ensuring the population's reproductive health under difficult conditions (war, epidemics and other force majeure).

1. The role of a patient-centred approach in the effective provision of reproductive health reproductive health of the population under conditions of martial law

The concept of a patient-centred approach was proposed in the United States of America in the early 1990s. It was later used by the WHO in the development of the Programme for the Development of Health Care in the 21st Century. This approach shifts the focus from the traditional biomedical model, in which the physician is given the primary role in decision-making, to one that establishes a partnership between practitioners, patients and their families. Scientific publications define the eight main principles of patient-centred medical care: respect for the patient's values, preferences and needs; provision of necessary information and training skills; emotional support to reduce anxiety and fear; involvement of the patient's close environment in the treatment process; physical comfort, relief of symptoms; continuity and interaction between health care institutions; coordination of medical care; and access to medical care. [1]

A very important aspect is also the management of each clinical case according to the principles of case management, with the involvement of a multidisciplinary team consisting of a doctor, a nurse and social workers. The involvement of social workers is particularly relevant during the war in Ukraine, at a time when the number of internally displaced persons (IDPs) has increased. They need solutions to a range of problems (medical, social and psychological) at the same time.

Counselling and testing for HIV, syphilis, hepatitis B and C is an important aspect of maintaining the reproductive health of the population (free express tests are available in Ukraine). Patients with positive test results are referred to the appropriate specialists for further examination. At this stage, the social support services and the maintenance of a trusting relationship between the

[1] Introducing a patient-oriented approach and improving the organization of medical care at the current stage / D.D. Dyachuk, G.Z. Moroz, I.M. Gidzinska et al. *Clinical and preventive medicine*, № 1(232023, c.67-77 https://doi.org/10.31612/2616-4868.1(23).2023.10

doctor and the patient are also appropriate for their further interaction and monitoring of the patient's further steps to maintain health. Antiretroviral therapy (ART), which is used to treat HIV infection, is also free in Ukraine. Treatment of viral hepatitis C is also free. If the patient has negative test results for HIV, syphilis, hepatitis B and C, effective counselling should be given to the patient to prevent future infection. Counselling should include information on the use of barrier methods of contraception and family planning. If the patient has risk factors for HIV infection, the patient should be offered participation in prevention programmes, including the use of HIV pre-exposure prophylaxis (PrEP)[2]. PrEP is an antiretroviral drug used to prevent HIV infection in patients at increased risk of infection due to sexual practices or intravenous drug use. It is prescribed to prevent HIV infection in people at increased risk of infection, in key populations and in populations at high risk of HIV infection as part of combination HIV prevention. In Ukraine, PrEP is available free of charge. It is also particularly relevant for discordant couples, where one partner is HIV-positive and the other is HIV-negative. If the couple receives such a test result, the HIV-positive person is prescribed ART and the HIV-negative person is recommended PrEP. During the COVID-19 pandemic, vaccination issues have also become extremely relevant. And issues of prevention should be prioritised, as this is the most cost-effective, person-centred and health-promoting approach for the whole population.

Despite the state of war and migration processes, preventive gynaecological examinations are an extremely important aspect of maintaining women's reproductive health. After all, cervical cancer remains a serious problem in modern medicine. The award of the 2008 Nobel Prize to Harald zur Hausen for his discovery of the connection between the papillomavirus and cervical cancer has created opportunities for the development of effective prevention programmes to reduce the risk of this pathology progressing and possibly eliminate it in the future. According to the authors[3], primary and secondary prevention approaches, vaccination and screening for cervical cancer are effective and successful in reducing morbidity and mortality. Thus, for the first time in history, the elimination of a specific cancer on a global scale is an achievable goal. Two types of high oncogenic risk strains – 16 and 18 – are responsible for 70% of cervical cancers, 80% of vulvar and vaginal cancers, 92% of anal cancers, 95% of oral cancers, 89% of oropharyngeal cancers and 63% of penile cancers. Detection

[2] Koppe, U., Marcus, U., Albrecht, S. *et al.* Barriers to using HIV pre-exposure prophylaxis (PrEP) and sexual behaviour after stopping PrEP: a cross-sectional study in Germany. *BMC Public Health* . 2021. 21. 159 https://doi.org/10.1186/s12889-021-10174-4

[3] Kojalo, U., Tisler, A., Parna, K. *et al.* An overview of cervical cancer epidemiology and prevention in the Baltic States. *BMC Public Health* . 2023. 23.660 https://doi.org/ 10.1186/s12889-023-15524

of high oncogenic HPV increases the risk of cervical cancer by 70 times! HPV types 6 and 11 cause benign anogenital condylomas.

Improving cervical cancer screening programmes, including shifting to primary human papillomavirus (HPV) testing, is very important in accelerating the elimination of cervical cancer, according to studies using data from Norway, Australia, the United States of America and the United Kingdom. Vaccination against human papillomavirus infection is an important factor in eliminating the risk of developing cervical cancer in the future. Vaccination against papillomavirus infection in adolescent girls aged 9-14 years, before the beginning of sexual life, will prevent HPV infection and protect them from this pathology in the future. Thus, care for a woman's reproductive health should begin in adolescence. General practitioners should be thoroughly familiar with all the prevention programmes that are currently available. This is also an important part of maintaining a woman's reproductive health in the modern world. The possibility of free mammography in health care institutions of Ukraine allows for effective early diagnosis of breast cancer and also significantly reduces the risk of mortality from this complex disease, which is common not only in low-income countries, but also in high-income countries.

Testing for sexually transmitted infections (STIs) is also an important aspect of successful reproductive function in the female population. At present, the simultaneous detection of several STI pathogens is also common. Often there is no acute manifestation of infection, which reduces the number of visits to the doctor for examination and appropriate treatment. However, the impact of STIs on reproductive health is very negative. Previous gonorrhoea and chlamydia infections can be the cause of tubal infertility in women. Thus, screening for STIs and treatment of those found is the most important factor in maintaining a woman's reproductive health. The problem of infertility remains extremely serious at present, especially in Ukraine against the background of the full-scale invasion by the troops of the Russian Federation.

Approximately one in six people in the world (the global figure is 17.5%) suffers from infertility. This is stated in the report of the World Health Organisation (WHO). According to the WHO, the difference in the statistics between high-income and low-income countries is insignificant: 17.8% of the population of high-income countries and 16.5% of the population of low-income countries suffer from infertility.

In wartime, women must continue to look after their health, including their mental and reproductive health. They must also undergo preventive medical examinations, HIV and STD tests. The choice of pregnancy planning should be individual for each woman, taking into account the complex of all factors and features of each case. Preventive medical examinations are, of course,

possible in areas not occupied by enemy troops and where there are all possibilities for providing highly qualified medical care. In times of war, special attention should be paid to the medical care of women who have been in the occupied territories, who have been subjected to sexual violence, and who are in difficult living conditions. The use of a patient-centred approach and the work of a multidisciplinary team (medical and social workers, including representatives of NGOs, charitable foundations) is the key to ensuring an effective solution to the medical, social and psychological problems of women under the conditions of war in Ukraine. The help and support of the world community, the work of medical and social workers, psychologists and volunteers is extremely important for Ukraine at this difficult stage, when there is a significant number of complex crisis situations that require an integrated approach to overcome the challenges and solve the problems.

2. The use of modern diagnostic methods as a key to the effective management of reproductive health issues

In the previous section, we outlined the key elements of a comprehensive approach to supporting women's reproductive health in wartime. These are the basic components of preserving women's health in the conditions of the existence of modern promising technologies and the development of personalised medicine. Although the most modern medical technologies and the most advanced developments are currently in the arsenal of medical professionals, there are still significant risks of developing complications during pregnancy and the postpartum period.

The problem of maternal mortality remains relevant not only in low-income countries but also in high-income countries. The maternal mortality ratio is the number of maternal deaths per 100,000 live births. Every day, about 810 women around the world die from causes related to pregnancy and childbirth[4], and almost a third of these deaths occur in South Asia[5]. In about 60% of these cases, maternal death occurs during childbirth or in the postpartum period[6]. In Pakistan, a woman dies every 40 minutes from complications of pregnancy or childbirth.[7]

[4] Modern methods of the diagnostic of pathology of pregnancy and the postpartum period / O.V. Bulavenko and others ISSN: 2706-8757 *Ukrainian journal Perinatology and Pediatrics.* 2023. 4(96). p. 15-23

[5] WHO. Fact sheet of maternal mortality. World Health Organization. 2016.[https://www.who.int/news-room/fact-sheets/detail/maternal-mortality]

[6] Jamison, D.T., Feachem, R.G., Makgoba, et al. «Disease and mortality in sub-Saharan Africa»: World Bank Washington, DC. 2006.

[7] World Health Organization. Trends in maternal mortality: 1990 to 2013: estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division: executive summary. Geneva. 2014.

Even in a high-income country like the United States, 1,205 women died within 42 days of giving birth in 2021, compared with 861 in 2020 and 754 in 2019. The maternal mortality ratio was 32.9 deaths per 100,000 live births in 2021, compared with 23.8 in 2020 and 20.1 in 2019. The rate for women aged 40 and over was 6.8 times higher than for women aged under 25. The differences in the indicators between age groups were statistically significant. The increase in rates between 2020 and 2021 was statistically significant for each of these age groups.[8]

And the postponement of pregnancy by women, particularly in high-income countries, is not a favourable prognosis for the preservation of women's reproductive health. Maternal mortality therefore remains an urgent problem in the 21st century. Causes include severe haemorrhage (especially postpartum haemorrhage), infection, septic complications (usually postpartum), high blood pressure during pregnancy (pre-eclampsia and eclampsia), and postpartum complications. Abortion can also have a very negative impact on a woman's reproductive health.

As part of the Global Strategy and Prevention of Preventable Maternal Death by 2030, WHO recommends the following[9]:

1. Overcoming inequalities in the availability and quality of reproductive, maternal and newborn health services;
2. Ensuring universal health coverage for reproductive health care;
3. Eliminating all causes of maternal mortality, reproductive and maternal morbidity and related disability;
4. Strengthening health systems by collecting reliable data to respond to the needs and priorities of women and girls;
5. Ensuring accountability to improve quality of care and equity. [10]

Although the structure of maternal mortality in Ukraine changes from year to year, sepsis remains in the top positions in recent years. Thus, in 2009, 2010, 2011, 2012, 2014 it was in the third place in the structure of maternal mortality, and in 2015 it was in the fifth place, accounting for 8.2%, after extragenital pathology, pre-eclampsia, perinatal embolism water and

[8] Hoyert DL. Maternal mortality rates in the United States, 2021. NCHS Health E-Stats. 2023. DOI: https://dx.doi.org/10.15620/cdc:124678

[9] World Health Organization. Global Strategy for Women's, Children's and Adolescents' Health (2016-2030): Early Childhood Development: Report by the Director-General. World Health Organization. [Internet]. Geneva: WHO.2018. Available from: https://apps.who.int/iris/handle/10665/276426

[10] Zhylka N. Ya., Shcherbinska O. S., Netskar I. P. Situational analysis of the problem of maternal mortality in Ukraine and ways to solve it *// Reproductive health of woman.* 2023. № 4 (67) ISSN 2708-8723. DOI: https://doi.org/10.30841/2708-8731.4.2023.285759

haemorrhage. [11] The late diagnosis of obstetric sepsis delays effective treatment and increases the risk of maternal mortality.

Hence, the search for effective diagnostic biomarkers is one of the priority tasks of modern medical science. There are studies on C-reactive protein, procalcitonin and interleukins: IL-1, IL-6, IL-8, IL-10, IL-12, tumour necrosis factor (TNF-α), platelet activation factor (PAF), transforming growth factor-β (TGF-β), presepsin (PSP), lactate. However, there is currently no gold standard for the diagnosis of sepsis. Attention should be paid to the search for new methods at the intersection of sciences, in particular the importance of using physical research methods in medical practice, in particular the method of fluorescence spectroscopy (MFS).[12]

In patients with sepsis, endogenous intoxication (EI) increases significantly. At the same time, the albumin molecules in their blood become part of the partially blocked system. The albumin molecules perform transport, detoxification, antioxidant and ligand binding functions. It is a complex mechanism. It is necessary to find ways to maintain the vital activity of the body with such pathological changes. The pathogenesis of the development of this phenomenon has not yet been analysed and described. During the last 23 years, beginning in 2001 in Lviv (Ukraine), on the initiative of Prof. Ihor Herych, [13] systematic studies of blood serum of patients with purulent-inflammatory diseases[14] and sepsis[15] within the framework of MFS began. Several stages of in vitro and in vivo research were carried out. The scientific basis for the use of this diagnostic method is the pathogenetic concept developed by the authors, which is based on the change of albumin molecules in patients with septic conditions. The research algorithm is based on the scientific approach, on the developed modified pathogenetic concept. The concept is based on the fact that in patients with diseases associated with EI, some of the albumin molecules are blocked by toxins. As a result, there are two types of albumin molecules in the patient's blood: normal

[11] Analysis of cases of maternal mortality from sepsis in the Vinnytsia region. Ways to improve diagnosis and treatment from the standpoint of evidence-based medicine / I.L. Kukuruza *Medicine of non-urgent conditions* p-ISSN 2224-0586, e-ISSN 2307-1230.2017. № 3 (82). p. 34-39.

[12] Kovalenko O., Ostapiuk, L. and Voloshinovskii A. Current Problems of the Diagnostics and Treatment of Sepsis and Burn Injuries: The Modified Pathogenetic Concept. *International Journal of Clinical Medicine*. 2023. 14. 20-33. doi: 10.4236/ijcm.2023.141002.

[13] Gerych, I.D., Bulavenko, O.V., Ostapiuk L.R., et al. «Method for Early Diagnosis of Septic Complications by the Method of Fluorescence Spectroscopy. Pat. №76953 Ukraine A61B 17/00 G01N 33/48, G01N 21/64 ; Applicant and Patentee: Pirogov Vinnytsia National Medical University. – № 201207441; stat. 19.06. 2012; 25.01.2013, Bull. №2: 4.

[14] Gerych, I.D., Bulavenko, O.V., Ostapiuk, L.R. «Spectral-Fluorescent Properties of Serum as a Reliable Marker for Early Diagnosis of Sepsis». Journal Gynecology and Obstetrics. 2014. 2. 71-74

[15] Bulavenko, O., Ostapiuk, L., Voloshinovskii, A., et al. «A Prognostic Model of the Development of Postpartum Purulent-Inflammatory Diseases». *International Journal of Clinical Medicine*. 2020. 11.p. 32-42. doi: 10.4236/ijcm.2020.112004.

(concentration (X)) and blocked (concentration (1-X)). Blocked albumin molecules lose their ability to perform their main functions, which are transport and detoxification. This allows us to better understand the genesis of sepsis in the patient's body. The use of MFS and the excitation of the blood serum of patients with sepsis at a wavelength of 280 nm, which corresponds to the excitation range of human serum albumin, allows us to record the changes in the fluorescence spectra of the blood serum in time and to diagnose the septic state 24-48 hours before the development of a detailed clinical picture, when other diagnostic methods are not sufficiently informative. Therefore, the use of infusion therapy with albumin solutions is an effective pathogenetic component in the treatment of purulent-inflammatory diseases and sepsis. At the same time, it is necessary to continue traditional treatment: surgical, etiotropic and symptomatic. And albumin infusion allows us to provide pathogenetic therapy by replenishing the amount of albumin capable of performing detoxification and transport functions.

The use of modern methods and advanced technologies enables women to maximise their diagnostic options in order to maintain their reproductive health and give birth to healthy offspring. The use of innovative approaches is an essential asset of modern medicine.

Unfortunately, for obvious reasons, the conduct of large-scale multicentre studies is limited under martial law conditions. However, it is the task of scientists and practitioners of practical medicine to ensure the development of medical science and the provision of high-quality medical services to the population in accordance with modern standards, even under such difficult conditions. We have already mentioned the importance of applying the principles of personalised medicine and a patient-centred approach in accordance with WHO standards in implementing this direction.

CONCLUSIONS

The early 21st century was difficult for Ukraine. The COVID-19 pandemic, Russian aggression and full-scale invasion by the troops of the Russian Federation, large-scale migration of the population posed significant challenges to the realisation of the reproductive function of women in Ukraine. The above factors combined to create a less than favourable situation in terms of the prevalence of HIV and tuberculosis, as well as an increase in the incidence of depression and a significant deterioration in the mental health of the population.

The full-scale invasion of the troops of the Russian Federation led to the emergence of new challenges and problems for the residents of Ukraine, which can negatively affect the reproductive health of the population of Ukraine. However, the presence of new challenges requires a rapid and constructive solution to the problems that have arisen, with the provision of

comprehensive medical care, psychological support and the provision of quality social services to the population affected by Russian aggression, in particular to internally displaced persons. At this stage, it is important to maintain a balance between the implementation of large-scale screening studies for broad segments of the population and the provision of highly qualified specialised care in the event of the detection of a specific pathology, in accordance with the most modern quality standards.

The combination of these factors may have a negative impact on the demographic situation in Ukraine, contributing to the postponement of pregnancies due to uncertainty about the future. If in 2010-2013 about 500,000 babies were born in Ukraine every year, in 2023 only 187,387 births will take place. This is the lowest number of newborns per year since Ukraine's independence. Therefore, any case of pregnancy planning, especially in Ukraine during the period of martial law, needs due attention.

Obstetric sepsis has long been one of the top five causes of maternal mortality in Ukraine. This seems rather paradoxical, given the use of advanced modern technologies and diagnostic methods in clinical practice. For the past 23 years, studies have been conducted in Ukraine using the method of fluorescence spectroscopy for the diagnosis of purulent-inflammatory diseases and sepsis, including in obstetric practice. The modified pathogenetic concept was developed in Ukraine, which made it possible to propose the use of albumin solution infusion as a pathogenetic component of sepsis treatment.

Adherence to the principles of a patient-centred approach and the work of multidisciplinary teams with the participation of medical and social workers, psychologists, using the latest modern methods of diagnosis, prevention and treatment where necessary, are the key to preserving the reproductive health of the population in wartime conditions. The development of effective state programmes for the implementation of these directions will allow the population of Ukraine to overcome such serious challenges and maintain high quality standards of medical care even during the war and in the future after Ukraine's victory over the aggressor.

SUMMARY

The martial law, population migration, increased incidence of depression, and negative effects on mental health have created a number of new challenges for pregnancy planning and the full exercise of women's reproductive function in Ukraine. Overcoming these challenges requires an effective government programme to support women's reproductive health in times of war. At this stage, it is important to maintain a reasonable balance between the large-scale implementation of effective screening programmes for broad segments of the population and the provision of highly specialised, qualified care when certain pathological conditions are detected. The detection of certain pathologies

requires the use of effective diagnostic and treatment methods that meet modern quality standards.

However, the postponement of pregnancy and the increase in the number of births in late reproductive age increase the risk of complications during pregnancy, childbirth and the postpartum period. It also leads to the possibility of maternal mortality. And this problem is still relevant in the 21st century, in the era of the most advanced technologies, even in high-income countries such as the USA. Postpartum infections and sepsis have long been among the top five causes of maternal mortality in Ukraine. This manuscript briefly presents the pathogenetic concept of early diagnosis of purulent-inflammatory diseases and sepsis based on the method of fluorescence spectroscopy, and pathogenetic treatment is proposed.

The application of a patient-oriented approach, the work of a multidisciplinary team consisting of medical and social workers, psychologists, and the use of the latest modern technologies are the key to preserving the reproductive health of women in Ukraine under martial law and provide a basis for improving the demographic situation in Ukraine after the victory.

Bibliography

1. Дячук Д., Мороз Г., Гідзинська І., Кравченко А. Запровадження пацієнт-орієнтованого підходу та удосконалення організації медичної допомоги на сучасному етапі (огляд літератури). *Клінічна та профілактична медицина*. 2023. № 1). С. 67-77. https://doi.org/10.31612/2616-4868.1(23).2023.10
2. Koppe, U., Marcus, U., Albrecht, S. *et al.* Barriers to using HIV pre-exposure prophylaxis (PrEP) and sexual behaviour after stopping PrEP: a cross-sectional study in Germany. *BMC Public Health* 2021. 21. 159. https://doi.org/10.1186/s12889-021-10174-4
3. Kojalo, U., Tisler, A., Parna, K. *et al.* An overview of cervical cancer epidemiology and prevention in the Baltic States. *BMC Public Health* 2023. 23. 660. https://doi.org/10.1186/s12889-023-15524-y
4. Modern methods of the diagnostic of pathology of pregnancy and the postpartum period / O.V. Bulavenko and others ISSN: 2706-8757 *Ukrainian journal Perinatology and Pediatrics* 2023. № 4(96). p.15-23.
5. WHO. Fact sheet of maternal mortality. World Health Organization. 2016.[https://www.who.int/news-room/fact-sheets/detail/maternal-mortality]
6. Jamison, D.T., Feachem, R.G., Makgoba, et al. «Disease and mortality in sub-Saharan Africa»: World Bank Washington, DC; 2006.
7. World Health Organization. Trends in maternal mortality: 1990 to 2013: estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division: executive summary. Geneva; 2014.

8. Hoyert DL. Maternal mortality rates in the United States, 2021. NCHS Health E-Stats. 2023.DOI: https://dx.doi.org/10.15620/cdc:124678

9. World Health Organization. Global Strategy for Women's, Children's and Adolescents' Health (2016-2030): Early Childhood Development: Report by the Director-General. World Health Organization. [Internet]. Geneva: WHO; 2018. Available from: https://apps.who.int/iris/handle/10665/276426

10. Жилка Н. Я., Щербінська О. С., Нецкар І. П. Ситуаційний аналіз проблеми материнської смертності в Україні та шляхи її вирішення. *REPRODUCTIVE HEALTH OF WOMAN РЕПРОДУКТИВНЕ ЗДОРОВ'Я ЖІНКИ*. №4 (67)/2023 ISSN 2708-8723 (print) ISSN 2708-8731 (online) DOI: https://doi.org/10.30841/2708-8731.4.2023.285759

11. Аналіз випадків материнської смертності від сепсису у Вінницькій області. Шляхи покращення діагностики та лікування з позиції доказової медицини / І.Л. Кукуруза. *Медицина невідкладних станів.* p-ISSN 2224-0586, e-ISSN 2307-1230 2017. № 3 (82). С. 34-39.

12. Kovalenko O., Ostapiuk, L. and Voloshinovskii A. Current Problems of the Diagnostics and Treatment of Sepsis and Burn Injuries: The Modified Pathogenetic Concept. *International Journal of Clinical Medicine*. 2023. 14. 20-33. doi: 10.4236/ijcm.2023.141002.

13. Пат. № 76953 Україна A61B 17/00 G01N 33/48, G01N 21/64 Спосіб ранньої діагностики гнійно-септичних ускладнень за допомогою методу флуоресцентної спектроскопії / І.Д. Герич, О.В. Булавенко, Л.Р. Остап'юк, А.С. Волошиновський, С.В. Мягкота, заявник та патентовласник Вінницький національний медичний університет. – № 201207441; заявл. 19.06. 2012; опубл. 25.01.2013, Бюл. № 2.

14. Gerych, I.D., Bulavenko, O.V., Ostapiuk, L.R. Spectral-Fluorescent Properties of Serum as a Reliable Marker for Early Diagnosis of Sepsis. *Journal Gynecology and Obstetrics.* 2014. № 2. p. 71-74.

15. Bulavenko, O., Ostapiuk, L., Voloshinovskii, A., et al. «A Prognostic Model of the Development of Postpartum Purulent-Inflammatory Diseases». *International Journal of Clinical Medicine*. 2020. 11.p. 32-42. doi: 10.4236/ijcm.2020.112004.

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