

Assessment of the perinatal care effectiveness during the COVID-19 pandemic at the regional level

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Considering the importance of perinatal health care, it is necessary to carry out constant monitoring and analysis of the effectiveness of this direction both at the state level and in the section of individual regions

The objective: to assess the effectiveness of perinatal care during the COVID-19 pandemic at the regional level (Ivano-Frankivsk region).

Materials and methods. A comparative analysis of the indicators of the effectiveness of perinatal care at the state and regional level (Ivano-Frankivsk region) for 2017–2021 was carried out, which in particular includes 2 years of the COVID-19 pandemic and previous years for the analysis of dynamic trends using statistical data of the Ministry of Health of Ukraine.

Results. Despite the fact that perinatal care in Ivano-Frankivsk region for 2017–2021 is at a fairly high level compared to the average indicators in Ukraine, there are certain shortcomings and corresponding reserves for improving its effectiveness. The deterioration of some indicators during the years of the COVID-19 pandemic (2020–2021) in comparison with the last years before the pandemic (2017–2019) was noted: a sharp decrease in the birth rate in 2021 (by 9.76%); in 2020 – an increase in the proportional indicator (per 1,000 births) of early neonatal mortality (from 2.85 to 3.62 of the actual indicator and from 6.47 to 7.82 in real terms), in 2021 – an increase in the proportional indicator of perinatal mortality at weighing less than 1500 g (3 2.27 to 3.44 per 1000 live births), in 2021 a sharp increase in maternal mortality (from 23.98 to 37.4 per 100,000 live births).

Conclusions. The obtained indicators reflect both the direct impact of the COVID-19 pandemic on the health of the woman, the fetus and the newborn, as well as the increased load on the perinatal care system and the lack of readiness for crisis challenges. It is necessary to develop a complex of improving the efficiency of perinatal care at all stages (antenatal, intranatal and neonatal) and strengthening the stability of the system in possible crisis situations.

Keywords: pregnancy, newborns, COVID-19, effectiveness of perinatal care, perinatal mortality, maternal mortality.

Оцінка ефективності надання перинатальної допомоги в період пандемії COVID-19 на регіональному рівні

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Враховуючи важливість перинатальної охорони здоров'я, необхідно здійснювати постійний моніторинг та аналіз ефективності цього напрямку як на державному рівні, так і в розрізі окремих регіонів.

Мета дослідження: оцінити ефективність надання перинатальної допомоги в період пандемії COVID-19 на регіональному рівні (Івано-Франківська область).

Матеріали та методи. Проведено порівняльний аналіз показників ефективності перинатальної допомоги на рівні держави та регіону (Івано-Франківська область) за 2017–2021 рр., що зокрема включає 2 роки пандемії COVID-19 і попередні роки для аналізу динамічних тенденцій з використанням статистичних даних МОЗ України.

Результати. Не дивлячись на те, що перинатальна допомога в Івано-Франківській області за 2017–2021 рр. перебуває на достатньо високому рівні порівняно із середніми показниками в Україні, є певні недоліки та відповідні резерви для підвищення її ефективності. Відзначено погіршення деяких показників у роки пандемії COVID-19 (2020–2021 рр.) порівняно з останніми роками до пандемії (2017–2019 рр.): різке зниження народжуваності у 2021 р. (на 9,76%); у 2020 р. – підвищення пропорційного показника (на 1000 народжених) ранньої неонатальної смертності (з 2,85 до 3,62 фактичного показника та з 6,47 до 7,82 реального), у 2021 р. – зростання пропорційного показника перинатальної смертності при масі тіла менше 1500 г (з 2,27 до 3,44 на 1000 народжених), у 2021 р. – різке зростання материнської смертності (з 23,98 до 37,4 на 100 тис. народжених живими).

Висновки. Отримані показники відображають як прямий вплив пандемії COVID-19 на здоров'я жінки, плода та новонародженого, так і підвищення навантаження на систему надання перинатальної допомоги та недостатню готовність до кризових викликів. Потрібно розробити комплекс заходів для підвищення ефективності надання перинатальної допомоги на всіх етапах (антенатальному, інтранатальному та неонатальному) та зміцнення стійкості системи у можливих кризових ситуаціях.

Ключові слова: вагітність, новонароджені, COVID-19, ефективність перинатальної допомоги, перинатальна смертність, материнська смертність.

Reducing maternal and perinatal mortality continues to be a priority on the global development agenda, as evidenced by its inclusion in the Sustainable Development Goals (SDGs) of the United Nations [1].

Maternal and child health care, an important part of which is perinatal care, is recognized worldwide as a prior-

ity area of medicine [2, 3]. Perinatal care plays an important role in reducing the risk of stillbirth, reducing neonatal mortality, minimizing hospitalization of newborns in the neonatal intensive care unit [4, 5].

Worldwide, more than 12,000 perinatal deaths (stillbirths and neonatal deaths) occur every day [6–8]. Reduc-

ing perinatal mortality is an urgent imperative, as many of these deaths are preventable [9, 10]. A structured interdisciplinary case review and identification of preventable factors is considered an important strategy to improve care and reduce adverse outcomes [9]. Perinatal mortality audit is described as a systematic way to improve the quality of health care by collecting and analyzing data, aligning decisions and ensuring accountability for changes in care [11]. Evidence-based, high-quality audits can improve understanding of adverse perinatal outcomes and are recognized as a cornerstone of future prevention of perinatal deaths [12, 13].

Differences in stillbirth rates persist in high-income countries. If all high-income countries achieved a stillbirth rate similar to that of the best-performing countries, 19,439 late-term stillbirths (28 weeks or more) could be avoided in 2015. The proportion of stillbirths for no apparent reason is high and can be addressed through improved data collection, research and classification, and a better understanding of causal pathways. Inadequate care accounts for 20-30% of all stillbirths, and this contribution is even higher for stillbirths late in pregnancy. National perinatal mortality audit programs should be implemented in all high-income countries. In high-income countries, a woman living in disadvantaged socioeconomic conditions has twice the risk of stillbirth compared to more affluent women. Programs at the community and country level should improve health in disadvantaged families to address these disparities [13].

In 2010, the UN Secretary General launched the EWEC (Every Woman Every Child) movement to address the major health challenges faced by women, children and adolescents worldwide [14]. Since 2015, the movement has been linked to the Global Strategy for Women, Children and Adolescents' Health (2016–2030), which was developed as a concrete road map for achieving the relevant SDG goals [15].

Since March 2020, when the COVID-19 pandemic was declared, the challenges and prospects facing the EWEC movement have changed radically.

In 2019, the number of deaths among children under 5 years of age reached a record low, and the number of maternal deaths decreased by approximately 35% over the past two decades [16, 17].

The pandemic and governments' responses are beginning to reverse some of the progress made since EWEC was founded 10 years ago. Efforts to contain COVID-19 often result in disruptions to essential services, putting women, children and adolescents at increased risk of death, disease and disability from preventable and treatable causes. Among the services most affected were routine immunization services, family planning and antenatal care services [18–20]. As a result of these disruptions in health services, potentially catastrophic consequences for women, children and adolescents are predicted. [21, 22].

Addressing the COVID-19 crisis and the complex challenges of climate change and ongoing conflict lies in simultaneous action across all three pillars of the health care model. This includes investing in health systems to ensure access and quality services for all and to be resilient to shocks; coordination between sectors to prevent

any mother, child or adolescent from going without health care; and empowering communities so that people can help shape programs and policies that meet their needs and hold governments accountable.

The COVID-19 pandemic has affected mental health, which may also have negative perinatal consequences [23, 24].

Given the importance of perinatal health care, it is necessary to carry out constant monitoring and analysis of the effectiveness of this direction both at the state level and in the context of individual regions, taking into account the decentralization and reform of medicine in Ukraine.

The objective: of the study is to assess the effectiveness of perinatal care during the COVID-19 pandemic at the regional level (Ivano-Frankivsk region).

MATERIALS AND METHODS

In Ukraine, when monitoring the quality of the provision of medical services during the reform of obstetric and pediatric care for the population of Ukraine, a matrix of weight at birth and age at death is used for the intervention and evaluation system MATRIX - BABIES BABIES (Birth weight and Age-at-death Boxes for Intervention and Evaluation System). The BABIES Matrix provides a simple, standardized way to track perinatal health outcomes to inform evidence-based quality improvement strategies [25, 26].

The «MATRIX - BABIES» methodology makes it possible to identify problems in the provision of medical care, in particular by analyzing the proportional indicator (PI) of perinatal mortality. The high level of this indicator is usually due to the high level of perinatal mortality of those born with low body weight.

A comparative analysis of perinatal care effectiveness indicators at the state and regional level (Ivano-Frankivsk region) for 2017–2021 was conducted, which in particular includes 2 years of the COVID-19 pandemic and previous years for the analysis of dynamic trends using statistical data from the Ministry of Health of Ukraine [25].

In the course of the research, the methods of the system approach, bibliosemantic, analytical, statistical, graphic and conceptual methods were used.

The work is a fragment of the NDR «Improving tactics of preconception counseling and management of early pregnancy of women with reproductive health disorders» (state registration number 0124U001616).

RESEARCH RESULTS AND DISCUSSION

As can be seen from the data in Table 1, for 4 years (from 2018 to 2021), there was a constant decrease in the number of births: in Ukraine it decreased by a quarter (25.11%), and in the Ivano-Frankivsk region – by 21.2%, the rate of such annual declines decreased until 2021, and in 2021 they increased sharply: more than twice in Ukraine (8.14% compared to 3.59% in 2020) and more than threefold in Ivano-Frankivsk region (9, 76% relative to 3.07%).

The PI level of perinatal mortality both in Ukraine and in the Ivano-Frankivsk region increased slightly (by 0.25 and 0.31, respectively) in 2020, while in 2021 in Ukraine it increased even more by 0.32, and in Ivano-Frankivsk region it almost did not change (increased by 0.02). For the entire period, the indicator in Ivano-Frankivsk region was lower by approximately 2 units.

Table 1

Born alive at a gestational age of 22 weeks or more

Administrative territories	Year				
	2017	2018	2019	2020	2021
Ukraine	347,835	318,733	294,148	283,587	260,502
Rates of birth rate decline, %		-8.37	-7.71	-3.59	-8.14
Iv.-Frankivsk Region	13,573	12,773	12,225	11,850	10,694
Rates of birth rate decline, %		-4.29	-3.07	-9.76	-21.21

Table 2

Proportional rate of perinatal mortality per 1,000 live and stillbirths

Administrative territories	Year				
	2017	2018	2019	2020	2021
<i>In total</i>					
Ukraine	9.10	8.65	8.64	8.89	9.21
Iv.-Frankivsk Region	7.63	6.63	6.84	7.15	7.17
<i>Less than 1500 grams</i>					
Ukraine	3.67	3.54	3.59	3.65	3.86
Iv.-Frankivsk Region	3.15	2.81	2.61	2.27	3.44
<i>1500 grams or more</i>					
Ukraine	5.43	5.11	5.05	5.24	5.35
Iv.-Frankivsk Region	4.47	3.82	4.24	4.88	3.72

The analysis of the PI perinatal mortality rate in terms of the weight of newborns showed (Table 2) that in Ukraine, the rate at a weight of less than 1500 g increased by 0.06 in 2020, and by 0.21 in 2021, in Ivano-Frankivsk oblast in 2020, it even decreased by 0.34, and in 2021 it increased sharply by 1.17 and amounted to 3.44, remaining at the same time lower by 0.42 relative to the corresponding value in Ukraine. As for PI of perinatal mortality at a weight of 1,500 g and above, in Ukraine it also slightly increased in 2020 and 2021 (by 0.21 and 0.11), and in Ivano-Frankivsk region, having increased in 2020 by 0,34, in 2021 – on the contrary, it decreased by 1.16 and amounted to 3.72 against 5.35 in Ukraine.

PI of both stillbirth and early neonatal mortality in Ivano-Frankivsk region is lower than in Ukraine as a whole (Table 3). According to WHO analysis, the ratio of stillbirths to those who died in the early neonatal period should be close to one. Both in Ukraine and in the Ivano-Frankivsk region, the number of stillbirths exceeds the number of newborn deaths in the early neonatal period (see Table 3). In Ivano-Frankivsk Oblast, the indicator in 2017 was slightly higher than in Ukraine, but then decreased to 0.98 in 2020, rising to 1.66 in 2021, but remaining lower than Ukraine's indicator by 1.04.

According to the WHO, the high rate of antenatal fetal death in fetuses weighing 1,000 g or more among all dead

Table 3

Proportional indicator of the components of perinatal mortality stillbirth and early neonatal mortality per 1000 live and stillbirths

Administrative territories	Year				
	2017	2018	2019	2020	2021
<i>Antenatal mortality</i>					
Ukraine	5.18	5.10	5.17	5.50	5.92
Iv.-Frankivsk Region	4.77	3.43	3.91	3.36	4.47
<i>Intranatal mortality</i>					
Ukraine	0.59	0.56	0.50	0.49	0.35
Iv.-Frankivsk Region	0.15	0.39	0.08	0.17	0.00
<i>Stillbirth</i>					
Ukraine	5.77	5.66	5.67	5.99	6.27
Iv.-Frankivsk Region	4.92	3.82	3.99	3.53	4.47
<i>Early neonatal mortality</i>					
Ukraine	3.34	2.99	2.97	2.90	2.94
Iv.-Frankivsk Region	2.71	2.81	2.85	3.62	2.70
<i>The ratio of stillbirths to deaths in the early neonatal period</i>					
Ukraine	1.73	1.89	1.91	2.07	2.13
Iv.-Frankivsk Region	1.82	1.36	1.40	0.98	1.66

Table 4

Proportional rate of antenatal fetal death in the weight category of 1,000 g and more per 1,000 live and stillbirths

Administrative territories	Year				
	2017	2018	2019	2020	2021
Ukraine	4.15	4.03	4.07	4.28	4.52
Iv.-Frankivsk Region	3.82	2.65	3.42	3.11	3.07
<i>Specific weight in the overall rate of antenatal mortality, %</i>					
Ukraine	80.12	79.02	78.72	77.82	76.35
Iv.-Frankivsk Region	80.08	77.26	87.47	92.56	68.68

Table 5

Proportional rate of intranatal fetal death per 1,000 live and stillbirths depending on birth weight

Administrative territories	Year				
	2017	2018	2019	2020	2021
<i>Up to 1500 grams (low weight)</i>					
Ukraine	0.2	0.22	0.22	0.17	0.14
Iv.-Frankivsk Region	0	0	0	0	0
<i>1500–2499 grams (intermediate weight)</i>					
Ukraine	0.09	0.07	0.05	0.06	0.07
Iv.-Frankivsk Region	0.00	0.08	0.00	0.00	0.00
<i>2500 grams or more (normal weight)</i>					
Ukraine	0.30	0.27	0.23	0.26	0.14
Iv.-Frankivsk Region	0.15	0.31	0.08	0.17	0.00

fetuses indicates the shortcomings of providing medical services to pregnant women at the level of women's consultations (a fetus weighing 1,000 g must be born alive). The rate of antenatal death of a fetus weighing 1000 g or more in 2017–2021 in Ukraine increased from 4.15 to 4.52 (Table 4), and in the Ivano-Frankivsk region, already in 2017 it was lower than in Ukraine, on the contrary, it decreases (from 3.82 to 3.07), which may indicate a sufficiently high level of care for the mother and fetus in the antenatal period.

According to the data in Table 5, in 2021, in Ukraine, the PI level of intranatal death of fetuses in the weight category of 1,500 g and more (0.21) exceeded the corresponding indicator among fetuses in the weight category of less than 1,500 g (0.13), which indicates deficiencies in the provision of medical assistance to the mother and the fetus during childbirth. In the Ivano-Frankivsk region for 2017–2021, there were no cases of intranatal mortality among fetuses weighing up to 1,500 g, in the intermediate category the indicator differed from zero only in 2018 and amounted to 0.08, among fetuses with a normal weight the indicator is lower than in Ukraine (except for 2018), and in 2021 it was zero, which indicates a higher level of assistance in childbirth.

The problem in Ukraine is the high level of PI intranatal mortality among fetuses weighing 2500 g and more. This can be considered not the ability to give birth with a normal weight of fetuses (according to WHO). In 2019–2020, the indicator in Ivano-Frankivsk region is significantly lower than in Ukraine, and in 2021 – zero.

According to WHO, the PI of early neonatal mortality among infants with a birth weight of more than 1500 g should be 1.0 per 1000 live and stillbirths. In Ukraine, its level does not meet international standards (Table 6), although it decreased from 1.66 to 1.45 in 2021. In Ivano-Frankivsk region in 2017, the indicator was better than in Ukraine (1.17) and close to 1, but it grew and in 2020 was 2.27, decreasing to 1.3 in 2021, which may indicate some shortcomings of the neonatal service, which were eliminated in 2021.

According to the WHO methodology, the actual level of early neonatal mortality of babies in Ukraine is significantly underestimated (the share of newborns weighing 1000–1499 g is less than 1%) – by 2 or more times. The listed real indicator (Table 7) in the Ivano-Frankivsk region in 2017–2019 is slightly lower than in Ukraine, but in 2020 it rises sharply and exceeds the indicators in Ukraine by more than 2 times, which may indicate short-

Table 6

Proportional rate of early neonatal mortality per 1,000 live and stillbirths depending on birth weight

Administrative territories	Year				
	2017	2018	2019	2020	2021
<i>Up to 1500 grams (low weight)</i>					
Ukraine	1.68	1.51	1.50	1.44	1.45
Iv.-Frankivsk Region	1.54	1.48	1.39	1.35	1.40
<i>1500 grams or more</i>					
Ukraine	1.66	1.48	1.47	1.46	1.49
Iv.-Frankivsk Region	1.17	1.33	1.47	2.27	1.30

Actual and real proportional rate of early neonatal mortality per 1000 live and stillbirths

Administrative territories	Year				
	2017	2018	2019	2020	2021
<i>Actual rate</i>					
Ukraine	3.34	2.99	2.97	2.90	2.94
Iv.-Frankivsk Region	2.71	2.81	2.85	3.62	2.70
<i>The real indicator, if the weight category of 1000-1499 g was equal 1%</i>					
Ukraine	7.23	6.79	6.89	6.50	5.65
Iv.-Frankivsk Region	6.53	6.70	6.47	7.82	7.09

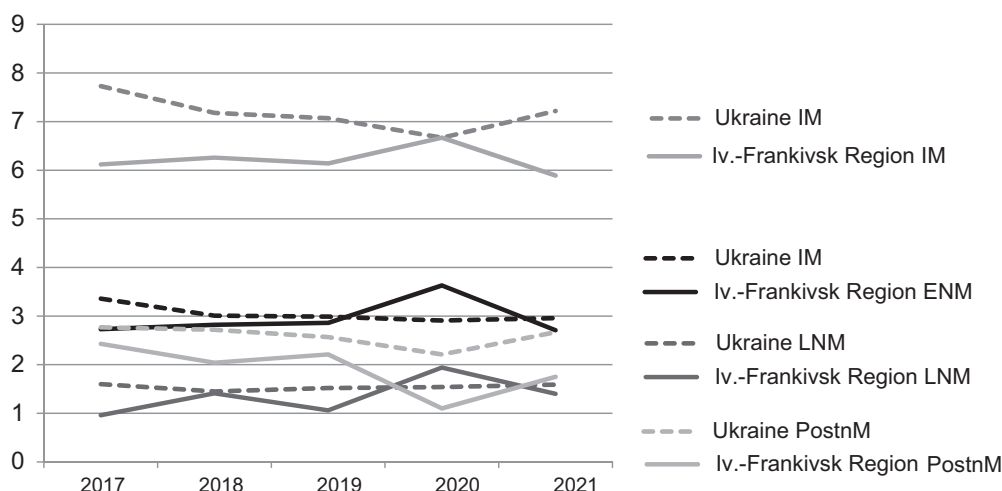


Fig. 1. The specific rate of infant mortality (from 0 days to 1 year) and its components per 1,000 live births weighing 500 g or more

Notes: IM – infant mortality; components: ENM – early neonatal mortality; LNM – late neonatal mortality; PostnM – postnatal mortality.

comings in the registration primary documentation and statistical reporting.

According to the WHO, births with a weight of 1000–1499 g should be from 1% to 1.5% among all live and stillbirths, births with a weight of 500–999 g should also be from 1% to 1.5%. In the structure of live births and dead births by body weight at birth with a weight of 1000–14999 g both in Ukraine and in the Ivano-Frankivsk region, the percentage is very low (table 8), and if in Ukraine it has slightly increased from 0.61% to 0.73%, then in the region it even decreased from 0.62% to 0.56% from 2017 to 2021, respectively. This may indicate non-compliance with weighing requirements and possibly underweight in non-viable newborns.

As can be seen from fig. 1 indicator of infant mortality (from 0 days to 1 year) and its components per 1,000 live births weighing 500 g or more in Ukraine decreased from 7.73 to 6.67 from 2017 to 2020, and sharply in 2021 rose to 7.22. In the Ivano-Frankivsk region, the indicator in 2017 was significantly lower (6.12) and in 2020 it reached the indicator in Ukraine, and in 2021 it sharply decreased to 5.89, mainly due to early neonatal mortality, which makes the largest contribution to infant mortality. Postnatal mortality in the Ivano-Frankivsk region during the years of observation had a wave-like character, but was always lower than in Ukraine.

An important indicator of the effectiveness of the obstetric service is the maternal mortality rate. From the data in Table 12, it can be seen that in Ukraine in 2020,

compared to 2019, the absolute number of women who died during pregnancy increased by more than a third, and in 2021, this number almost doubled. In Ivano-Frankivsk region, this indicator did not change in 2020 (3 people), and in 2021 it increased by one person.

A more accurate idea of the level of maternal mortality is not given by absolute, but relative indicators. Thus, maternal death (without injuries and accidents) per 100,000 live births jumped sharply in 2021 (Figure 2): by 2 times in Ukraine and by 50% in Ivano-Frankivsk region, which may be due to direct and as an indirect effect of the pandemic, according to the literature, the Delta virus strain, which prevailed in 2021, caused the greatest risk of a severe course of the disease and maternal mortality (up to 7%) [27].

A comparative analysis of the effectiveness of perinatal care according to the “MATRIX – BABIES” methodology in the Ivano-Frankivsk region in relation to indicators in Ukraine in dynamics: during the 2 years of the COVID-19 pandemic (2020–2021) in comparison with the last years before the pandemic (2017–2019) showed a fairly high level of perinatal care in the region compared to the average indicators in Ukraine, which corresponds to the conclusions of other authors who evaluated the effectiveness of perinatal care at regional levels [28, 29].

In Ivano-Frankivsk region, as well as in Ukraine as a whole, there is a decrease in the birth rate, the rate of which decreased slightly until 2020, but in 2021 there was a sharp

Table 8

Frequency of live births and stillbirths weighing less than 1,500 grams per 1,000 live and stillbirths

Administrative territories	Year				
	2017	2018	2019	2020	2021
<i>500–999 g</i>					
Ukraine	0.39	0.39	0.41	0.42	0.46
Iv.-Frankivsk Region	0.31	0.30	0.24	0.24	0.39
<i>1000–1499 g</i>					
Ukraine	0.61	0.62	0.61	0.64	0.73
Iv.-Frankivsk Region	0.62	0.61	0.64	0.58	0.56

Table 9

The number of women who died during pregnancy, childbirth and in the postpartum period

Administrative territories	Year				
	2017	2018	2019	2020	2021
<i>Death related to pregnancy (including injuries, accidents)</i>					
Ukraine	49	62	50	68	129
Iv.-Frankivsk Region	3	2	3	3	4
<i>Including maternal death (without injuries, accidents)</i>					
Ukraine	41	46	44	61	124
Iv.-Frankivsk Region	1	2	3	3	4

decrease in the birth rate (by 9.76%), which may be due to the tendency to postpone reproductive plans for the period after the pandemic, which is also noted by other researchers. According to several studies, about 50.0% of women who planned pregnancy before the pandemic changed their reproductive plans during the pandemic [30, 31].

Of 969 women who were included in a study in Poland [32], 57.2% did not change their birth plans, 28.4% changed their plans, and 14.4% of respondents answered «not sure» to this question. Most women changed their birth plans during the pandemic due to the possible absence of a partner during the birth (56% of women who changed their plans). Another reason was the fear of separation from the child after childbirth (33% of women who changed their plans).

The proportional indicator of perinatal mortality with a weight of less than 1,500 g per 1,000 births in Ivano-Frankivsk region decreased until 2020, and in 2021 it slightly increased, but remained lower than in Ukraine (3.72 versus 5.35). This indicator is considered due to the state of health of women before conception, that is, its growth in 2021 may also be related to COVID-19. The level of the proportional indicator of antenatal death of fetuses weighing 1,000 g or more for the years 2017–2021 in Ukraine is increasing from 4.15 to 4.52, and in the Ivano-Frankivsk region, being already lower than in Ukraine in 2017, on the contrary, it is decreasing (from 3.82 to 3.07) which may indicate a sufficiently high level of care for the mother and fetus in the antenatal period.

In the Ivano-Frankivsk region for 2017–2021, there were no cases of intranatal mortality among fetuses weighing up to 1500 g (zero rate), in the intermediate category (1500–2499 g), the rate differed from 0 only in 2018 and amounted to 0.08, among fetuses with a normal weight, the indicator is lower than in Ukraine (except for 2018), and in 2021 it was zero, which indicates a high level of assistance in childbirth.

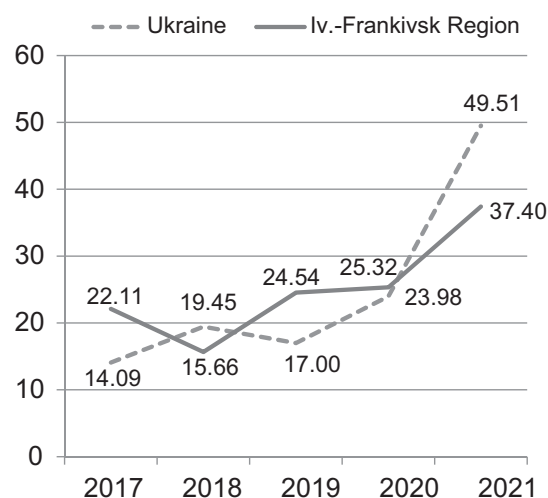


Fig. 2. Maternal mortality per 100,000 live births

The proportional indicator of early neonatal mortality per 1,000 live and still births in Ivano-Frankivsk region in 2017 was better than in Ukraine (1.17), but it was increasing and in 2020 it was 2.27, decreasing to 1.3 in 2021, which may indicate some shortcomings of the neonatal service, which were eliminated in 2021.

According to the WHO methodology, if the share of newborns weighing 1000–1499 g is less than 1%, then the actual level of early neonatal mortality is significantly underestimated, that is, the real level of early neonatal mortality [25]. Recalculation of the actual level of early neonatal mortality to the real level according to the WHO methodology showed that it is 2 or more times higher than the actual level in Ukraine. In Ivano-Frankivsk region in 2017–2019, it was

lower than in Ukraine, and in 2020 it increased sharply from 6.47 to 7.82 and exceeded the indicator in Ukraine (6.5), the same trend remained in 2021 r., which may indicate certain shortcomings of statistical reporting [28].

In the structure of live births and dead births by body weight at birth with a weight of 1000–14999 g both in Ukraine and in the Ivano-Frankivsk region, the percentage is very low, and if it has increased somewhat in Ukraine, it has even decreased from 0.62% in the region to 0.56% from 2017 to 2021, respectively. This may indicate non-compliance with weighing requirements and possibly underweight in non-viable newborns.

The specific rate of infant mortality (from 0 days to 1 year) per 1,000 live births weighing 500 g or more in Ukraine decreased from 7.73 to 6.67 from 2017 to 2020, and in 2021 it sharply increased to 7.22. In the Ivano-Frankivsk region, the indicator in 2017 was significantly lower (6.12) and in 2020 it reached the indicator in Ukraine, and in 2021 it sharply decreased to 5.89, mainly due to early neonatal mortality, which makes the largest contribution to infant mortality. Postnatal mortality in the Ivano-Frankivsk region during the years of observation had a wave-like character, but was always lower than in Ukraine. The main contribution to infant mortality is made by early neonatal mortality, however, if in Ukraine this share was approximately the same 41.0–43.7%, then in Ivano-Frankivsk region it always exceeded the all-Ukrainian indicator and amounted to 44.6–46.2 % with a jump in 2020 up to 54.4%, which may indicate certain shortcomings of the neonatology service.

Maternal death (without injuries, accidents) per 100,000 live births jumped sharply in 2021: by 2 times in Ukraine and by 50% in Ivano-Frankivsk region, which may be due to the direct and indirect impact of the pandemic, according to data literature, the Delta virus strain,

which prevailed precisely in 2021, caused the greatest risk of a severe course of the disease and maternal mortality (up to 7%) [27].

In Norway, the highest percentage of intensive care unit hospitalizations per pregnant woman with a positive test was during the Delta period (17.8 per 1000 with a positive test) [33], similar conclusions were made by domestic researchers [34]. Other researchers also note the increase in the maternal mortality rate in 2021 [35, 36].

CONCLUSIONS

1. Despite the fact that perinatal care in Ivano-Frankivsk region for 2017–2021 is at a fairly high level compared to the average indicators in Ukraine, there are certain shortcomings and corresponding reserves for improving its effectiveness.

2. The deterioration of some indicators during the years of the COVID-19 pandemic (2020–2021) in comparison with the last years before the pandemic (2017–2019) was noted: this is an increase in the rate of decline in the birth rate in 2021; in 2020 – an increase in the proportional rate of early neonatal mortality (actual and real) and the proportional rate of perinatal mortality at a weight of less than 1,500 g, a sharp increase in maternal mortality.

3. The obtained indicators reflect both the direct impact of the COVID-19 pandemic on the health of the woman, the fetus and the newborn, as well as the increased load on the perinatal care system and the lack of readiness for crisis challenges. It is necessary to develop a complex of improving the efficiency of perinatal care at all stages (antenatal, intranatal and neonatal) and strengthening the stability of the system in possible crisis situations.

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