Scientific reviews

COMPARATIVE ANALYSIS OF THE DYNAMICS OF INDICATORS OF TIMELY DETECTION OF MALIGNANT NEOPLASMS OF THE STOMACH IN UKRAINE AND BUKOVYNA FOR 2006-2020

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Resume. *Oncological morbidity usually increases with age, and also depends on gender composition and inequalities in access to specialized medical care. Malignant neoplasms of the stomach (MNS), which affect the population of different countries of the world with different frequency, were no exception. Ukraine belongs to the countries with high morbidity and mortality, and the indicators of survival and the specific weight of detection at different stages indicate the usually late detection of this pathology.*
The aim of the study is to assess the scale of the problematic situation of morbidity and mortality from malignant neoplasms of the stomach in Ukraine as a whole and in Bukovyna in particular.
Material and methods. *In the process of research, using system-historical and bibliosemantic methods, data from the State Statistics Service of Ukraine (results of the last population census in 2001 and estimated data for the following years 2002-2021) were processed; National Cancer Registry of Ukraine for the past 15 years (2006-2020) and annual "Reports on malignant neoplasms" (form No. 7) for 2016 and 2020.*
Results. *It was established that in Ukraine during 2007-2020 there was a gradual decrease in the specific weight of cases first detected at the I-II stages, and an increase in the frequency of late diagnosis - at the IV stage, which was especially pronounced in the Chernivtsi region. On the other hand, the share of cases of MNS diagnosed at the IV stage, on the contrary, increased in Ukraine from 30.9% in 2007 to 42.7% in 2020 and even more intensively in the Chernivtsi region - from 29.1% to 52.0%. At the same time, the situation with the timely detection of MNSs began to deteriorate both in the country and in the region. Against the background of established low levels of detection of MNSs during preventive examinations and high percentages of late diagnosis, the mortality rate within a year after detection of the pathology was consistently high. The study proved a strong inverse, reliable relationship between the specific weight of preventive examinations and the percentage of diagnosed cases at the neglected IV stage: rxy=-0.90, p<0.05.*
Conclusion. *Over the past fifteen years in Ukraine, and especially in the Chernivtsi region, there has been deterioration in the indicators of early detection of MNSs among the male population.*

ПОРІВНЯЛЬНИЙ АНАЛІЗ ДИНАМІКИ ПОКАЗНИКІВ ВЧАСНОСТІ ВИЯВЛЕННЯ ЗЛОЯКІСНИХ НОВОУТВОРЕНЬ ШЛУНКА В УКРАЇНІ ТА НА БУКОВИНІ ЗА 2006-2020 роки

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Резюме. *Онкологічна захворюваність зазвичай зростає з віком, а також залежить від статевого складу і нерівностей у доступності до спеціалізованої медичної допомоги. Не стали винятком й злоякісні новоутворення шлунка (ЗНШ), які уражають населення різних країн світу з неоднаковою частотою. Україна належить до країн із високою захворюваністю та смертністю, а показники виживаності та питомої ваги виявлення на різних стадіях – свідчать про зазвичай пізнє виявлення цієї патології.*
Мета дослідження *– оцінка масштабів проблемності ситуації захворюваності та смертності від злоякісних новоутворень шлунка в Україні в цілому та на Буковині зокрема.*

Матеріал і методи. У процесі дослідження, використовуючи системно-історичний та бібліосемантичний методи, опрацьовані дані Державної служби статистики України (результати останнього перепису населення 2001 р. та оціночні дані за наступні 2002-2021 рр.); Національного канцер-реєстру України за останні 15 років (2006-2020 рр.) та річних «Звітів про злоякісні новоутворення» (форма № 7) за 2016 і 2020 роки.

Результати дослідження. Встановлено, що в Україні впродовж 2007-2020 рр. спостерігалось поступове зниження питомої ваги випадків, вперше виявлених на I-II стадіях, і зростання частоти пізньої діагностики – на IV стадії, особливо виражене в Чернівецькій області. Натомість частка випадків ЗНШ, діагностованих на IV стадії, навпаки, зростала: в Україні з 30,9% у 2007 р. до 42,7% у 2020 р. і ще інтенсивніше в Чернівецькій області – з 29,1% до 52,0%. Паралельно ситуація із вчасним виявленням ЗНШ стала погіршуватись як у країні, так і в області. На тлі встановлених низьких рівнів виявлення ЗНШ при профілактичних оглядах і високих відсотках запізнілої діагностики показник летальності впродовж року після виявлення патології був стабільно високий. У дослідженні доведено сильний зворотний достовірний взаємозв'язок між питомою вагою виявлених на профілактичних оглядах і відсотком діагностованих випадків на занедбаній IV стадії: rxy=-0,90, p<0,05.

Висновок. За останні п'ятнадцять років в Україні та особливо акцентовано в Чернівецькій області і серед чоловічого населення спостерігалось погіршення показників раннього виявлення ЗНШ.

Every year, more than a million new cases of malignant neoplasms of the stomach (MNS) are diagnosed worldwide, and more than 600,000 people die from it despite the stabilization of the incidence in some developed countries [1, 2, 3]. The incidence of gastric malignancies varies greatly depending on the region and culture, and the highest levels are recorded in East and Central Asia and Latin America [4, 5, 6]. Among the economically developed countries, the highest incidence of malignant neoplasms of the stomach is registered among men in Japan, and the lowest among white women in the United States [7,8]. In general, Japan, China, Estonia, and Ukraine, in particular, are in the top ten in terms of the incidence of malignant neoplasms of the stomach, and among the countries with a low incidence are such post-Soviet countries as Uzbekistan, Tajikistan, and Georgia [1,2].

MNS more often affects the male population and its incidence increases with age. Even though the role of infectious agents and genetic disorders in the pathogenesis of MNS has been proven, it is a polyetiological disease, in the occurrence and development of which risk factors play an important role: behavioral (harmful eating habits, alcohol abuse, tobacco smoking), social and psychological (chronic stress), socio-economic (low income and level of education associated with poorer access to medical care and awareness of risk factors), professional (harmful production factors), environmental (environmental pollution and introduction of carcinogens into the body through food, water, air), medical (precancerous stomach diseases) and others, most of which are manageable.

In many countries of the world, including Ukraine, population (national), territorial and hospital cancer registries are maintained, which makes it possible to analyze the statistics of morbidity, mortality, timeliness of detection and provided treatment, and thus to estimate and plan the resources necessary for oncological care.

The aim is to assess the scale of the problematic situation of morbidity and mortality from MNSs in Ukraine as a whole and in Bukovina in particular.

Material and methods. The study materials were data from the State Statistics Service of Ukraine [9] (results of the last population census in 2001 and estimated data for the following 2002-2021); the National Cancer Registry of Ukraine for the past 15 years (2006-2020) [10, 11]; annual "Reports on malignant neoplasms" (form No. 7) for 2016 and 2020 using the system-historical and bibliosemantic method (276 sources).

Results. It is reliably known that the population both in Ukraine and in Chernivtsi region has decreased over the past 20 years. According to the 2001 census, there will be 48.5 million people in Ukraine, and 9.2 million in Bukovyna. As a result, the population of the state decreased gradually to 45.4 million in 2013, and then sharply to 42.9 million in 2014, which was a consequence of the Russian Federation's occupation of Crimea and parts of the Donetsk and Luhansk regions. However, the population of Ukraine continued to decrease and reached 41.2 million in 2021, according to estimated data (since no more population censuses have been conducted since 2001 for various reasons).

After 2001, the population of Chernivtsi region initially decreased rapidly, but in 2007-2011 it was recorded at the level of 90.4-90.5 million people. Then there was some increase with a peak in 2014-2015 (91.0 million), which was also mainly a consequence of military events in the East and South of Ukraine and an increase in the corresponding migration of the population to other regions of the state. However, starting from 2016, the population of Bukovyna continued to decrease and as of 2021, it amounted to 89.0 million people.

In 2001-2020, the structure of the population by gender

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remained virtually unchanged. Both in Ukraine and in the region, the specific weight of women remained higher. Thus, in the state as a whole, this indicator was 54.0% in 2001 and 53.7% in 2020, and in the region - 53.0% and 52.9%, respectively.

Analysis of the age structure of the population revealed unfavorable trends. In particular, in Ukraine as a whole there was a decrease in the specific weight of children aged 0-14 (from 16.5% in 2001 to 15.2% in 2020) and an increase in the share of people aged 60 and older (from 21.3 % to 24.4%, respectively), incl. over 65 years old (from 14.4% to 17.4%), which is 2-2.5 times higher than the population aging threshold (>7% in accordance with WHO criteria, 1982).

The age structure of the population of Chernivtsi region during the considered period of time was characterized by a somewhat "younger" composition than in Ukraine in general, but it was also affected by aging processes and, therefore, remains unfavorable in the future. Thus, in 2001, the share of people aged 0-14 in the region was 19.4%, and in 2020 it decreased to 17.9%, which is still higher than the national indicator. At the same time, the specific weight of persons aged 60 and older in the region, on the contrary, was lower than the national levels, despite the fact that it grew during 2001-2020 from 19.5% to 20.9%, respectively, including the share of the population over 65 years old - from 14.2% to 14.6%.

In our study, an analysis of the dynamics of the indicators of the timeliness of the diagnosis of MNS was carried out (Fig. 1) and it was established that in Ukraine during 2007-2020 there was a gradual decrease in the specific weight of cases first detected at the I-II stages, and an increase in the frequency of late diagnosis at IV stage, especially pronounced in the Chernivtsi region. For example, if in 2007 the share of stage I-II stage I-II among the first detected cases of the disease was 30.9% in Ukraine and 29.1% in Bukovyna, then later its level decreased (more intensively in the region) and reached 29.2% in the country in 2019 and 23.9% in 2020 (the rate of decline is 18.2% compared to last year). While the relevant indicators in the region already in 2019-2020 were 1.5-1.8 times lower than the national ones and amounted to only 16.2% and 16.0%, respectively.
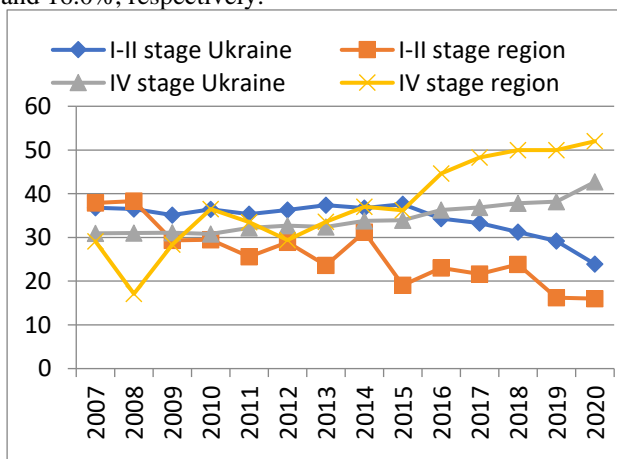
On the other hand, the share of cases of MNS diagnosed at the IV stage, on the contrary, increased: in Ukraine from 30.9% in 2007 to 42.7% in 2020 and even more intensively in the Chernivtsi region - from 29.1% to 52.0% respectively, which can be an explanation why, against the background of lower morbidity, mortality from MNSs in the region is the same as in Ukraine in general.

Fig.1 also clearly shows that the situation with timely detection began to deteriorate (both in the country and in the region) starting from 2016, i.e., with the beginning of real processes of decentralization in the health care system and its transformation, which made it possible to reduce the administrative pressure on control individual statistical indicators and show existing problems.

The analysis of indicators of the specific weight of detection of new cases of stomach during preventive examinations turned out to be indicative. As can be seen in Fig. 2, its levels turned out to be extremely low and with a clear downward trend. This indicator in Ukraine during the considered time period never exceeded 10% and gradually decreased from 8.9% in 2008 to 5.7% in 2019 and 4.8% in 2020. The similar regional coefficient showed extremely uneven value: from 8.4% in 2009 to zero in 2020, but the trend line clearly showed a tendency to their decrease.

A slightly better percentage of cases of MNS detected during professional examinations were observed among women than among men (Fig. 3).
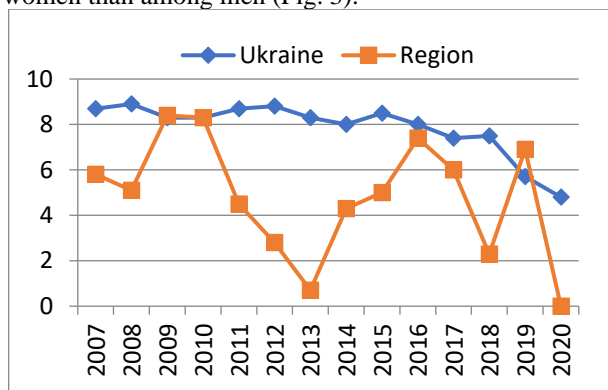

Fig. 2. The dynamics of indicators of the specific gravity of detection of MNSs during preventive examinations in Ukraine and the Chernivtsi region in 2007-2020
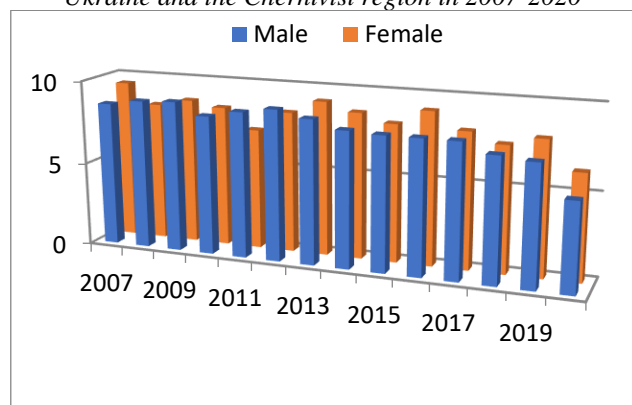

Fig. 3. Dynamics of indicators of the specific gravity of detection of MNSs during professional examinations among the male and female population of Ukraine in 2007-2020

Fig. 1. Dynamics of the indicators of timely diagnosis of MNS in Ukraine and the Chernivtsi region in 2007-2020

In our opinion, this is another evidence of the more attentive attitude of women to their own health, as established by other scientists, compared to men [12, 13].

The study proved a strong inverse, reliable relationship between the specific weight of those detected during preventive examinations and the percentage of diagnosed cases at the neglected IV stage: rxy=-0.90, p<0.05.

Against the background of the established low levels of detection of MNSs during preventive examinations and high percentages of late diagnosis, it is clear why another indicator of the timeliness of detection - the mortality rate within a year after the detection of the pathology, is consistently high (Fig. 4). Thus, in Ukraine its levels remained at the level of 60% in 2007-2016 (59.8-62.2%) and even despite a slight decrease in the mortality rate during 2017-2020 – from 58.1% to 53.0% indicating that more than half of patients with newly diagnosed gastric cancer die within a year of diagnosis.
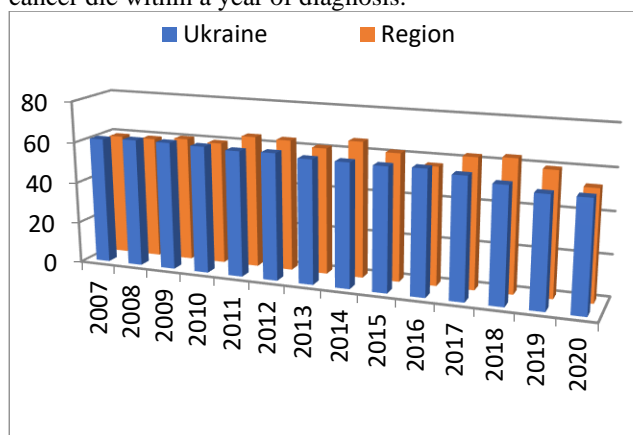

Fig. 4. Dynamics of mortality rates up to a year after the detection of MNSs in Ukraine and Chernivtsi region in 2007-2020

On the other hand, such a decrease in the annual mortality rate in recent years with a parallel increase in the same years in the share of late detection of cases of MNS does not seem entirely logical and requires an explanation. In our opinion, this may be a consequence of the improvement in the purchase of specialized drugs, and accordingly, the accessibility of patients to modern chemotherapy, which allowed, even in cases of late detection, to slightly increase the survival rate of such patients. In addition, as already noted, some people with an advanced stage of gastric cancer could become victims of the coronavirus disease during the 2020 pandemic.

In Chernivtsi region, mortality rates up to one year were mostly even worse than in the country as a whole. In 2007-2010, their levels almost did not exceed 60% (59.3-60.5%), and during 2011-2018, with a minor exception (56.8% in 2016), they exceeded this barrier (61.2-65.7%). Some decrease was again observed in 2019 and 2020 (59.5% and 52.9%, respectively).

Mortality rates up to one year were found to be slightly higher among men than among women (Fig. 5), and also showed a moderate downward trend, more pronounced in the last three years.
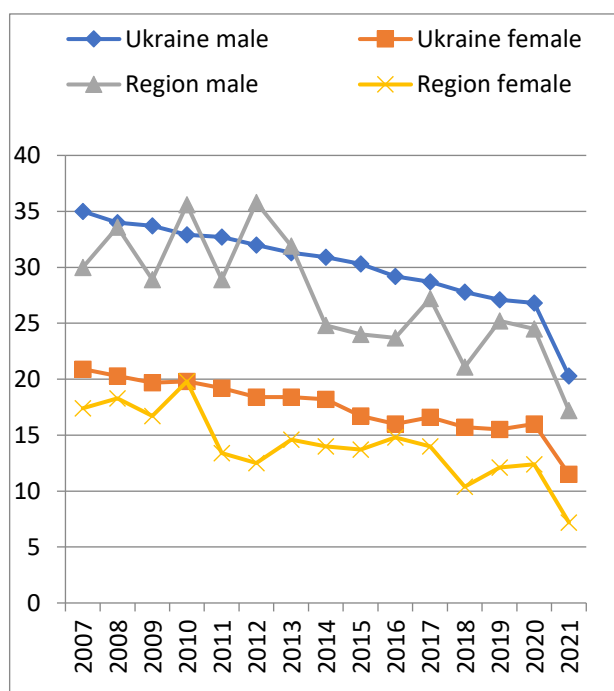

Fig. 5. Dynamics of the incidence rates of MNSs in the male and female population of Ukraine and the Chernivtsi region for 2007-2021

Thus, the mortality rate by the year in 2007 was 63.2% among the male population of Ukraine and 61.8% among the female population and gradually decreased to 56.9% and 53.4%, respectively, in 2019 and to 54.2% and 51.1% in 2020.

Conclusions. It is shown that during the period since the last population census, the demographic situation in Ukraine as a whole and in Chernivtsi region in particular has worsened due to the decrease in the number of the population and its aging. At the same time, in Bukovina, despite the slightly younger composition of residents than in the country as a whole, more than half of them live in rural areas, that is, in conditions of lower accessibility to medical care.

It was established that over the past 15 years, the national and regional rates of primary morbidity and mortality due to MNSs were 1.7-2.5 times higher among men than among women, and were characterized by a downward trend, which was accompanied by a corresponding increase in the number of patients.

It was found that the primary incidence of MNSs increases with age in a geometric progression with a peak at 70-79 years, both in men and in women.

It was found that in the last fifteen years in Ukraine, and especially in the Chernivtsi region and among the male population, there has been a deterioration in the indicators of early detection of MNSs: an increase in the already high (≈50%) specific weight of those first diagnosed at the IV stage, a decrease even without that very low (<10%) share of pathology detection during preventive examinations, which was accompanied by consistently high levels of mortality up to a year (≈60%).

It has been proved that there is a strong inverse reliable

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relationship between the specific gravity detected during preventive examinations and the percentage of newly diagnosed cases at the neglected IV stage (rxy=-0.90, p<0.05), which against the background of the established negative trends of these indicators and a significant (1.3-1.5 times) decrease in primary morbidity in 2020 during the COVID-19 pandemic indicates the danger of further growth of neglect rates.

Prospects for further research are the development and approval of a regional program to improve the prevention of malignant neoplasms with adequate financing of mass screenings among risk groups, communication companies and incentives for PMD doctors to adhere to preventive technologies.

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