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## KEY TRENDS IN MORBIDITY AND MORTALITY RATE DUE TO OVARIAN CANCER IN UKRAINE

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### **Abstract**

**Introduction.** Ovarian cancer is characterized by the unfavorable progression and is in the first place within the structure of women's mortality rate due to oncogynecological disorders.

**The purpose** is to conduct the comparative analysis of the morbidity and mortality rate due to ovarian cancer before COVID-19 pandemic and during quarantine measures.

**Materials and methods.** We conducted the analysis based on the statistical data from the National Cancer Register of Ukraine 2015 to 2021 without temporarily occupied territories using the statistical method, that is, analysis of time series. We analyzed the morbidity and mortality rate, distribution by age, structure of detection stages for ovarian

cancer by TNM classification, detection rate of patients with ovarian cancer during preventive examinations.

### **Research results and their discussion**

Long quarantine measures caused by COVID-19 pandemic have led to the broken communication between female patients and doctors within the primary and special medical assistance: limited possibility or full impossibility of getting a consultation by the general practitioner/family doctor due to a large number of COVID-19 patients, limited access to specialized healthcare institutions, personal fear of female patients to catch COVID-19 in healthcare institutions. These conditions have made women postpone their visits to doctors and a share of female patients with oncogynecological disorders detected at the stage III to IV by TNM classification increase.

2015 to 2019 there was a trend in decrease in the share of patients with ovarian cancer detected during preventive examinations by 19.7 %, which increased during quarantine measures due to COVID-19 pandemic (-27.4 %).

2015 to 2019 there was a stated trend in decrease in the share of detected patients with ovarian cancer at the stage I to II (-1.4 %) and III (-9.3 %) by TNM classification and increase in the share of detected patients with ovarian cancer at the stage IV (+17.2 %). During quarantine measures the share of patients with ovarian cancer at the stage I to II and III by TNM classification continued to decrease (-10.3 % and -0.7 %, respectively) and the share of patients with ovarian cancer at the stage IV increased (+20.4 %).

The decrease in the share of detected patients with ovarian cancer during preventive examinations is one of the factors for detecting patients with the extensive-stage disease, which was confirmed both at the national and regional level.

**Conclusion.** Obtained data are evidence of the fact that the morbidity rate due to ovarian cancer insignificantly increased (+3.9 %) 2015 to 2019 and decreased by 8.6 % during COVID-19 pandemic. The morbidity rate increased among women aged from 45, especially at the age 65 to 69. The decrease in the share of detected patients with ovarian cancer during preventive examinations is one of the factors for detecting patients with the extensive-stage disease, which was confirmed both at the national and regional level.

**Key words: ovarian cancer; COVID-19 pandemic; morbidity and mortality rate due**

**Introduction.** Despite existing achievements of the modern medicine regarding the diagnosis, treatment and prevention of oncological disorders, the prevalence rate of malignant

tumors of the female reproductive system tends to grow, affects the female health and causes the early disability. Due to the annual increase in the morbidity rate due to endometrial, cervical and ovarian cancer among women of childbearing age we can consider these tumors as a threat to female reproductive function [1-3].

The social significance of oncogynecological diseases is specified by the high percentage of working-age people who respond to the radical OP treatment and significant economic expenses related to use of expensive diagnostic and treatment methods as well as development of individual medical and social rehabilitation programs.

Researchers believe that during the progression of a disorder the most complicated and serious is ovarian cancer. According to research data of Ferlay J. and co-authors, ovarian cancer is in the 7<sup>th</sup> place among female malignant diseases and in the 8<sup>th</sup> place among causes of female deaths from oncological pathology worldwide. Accordingly, round 240 thousand of new ovarian cancer cases are registered and round 150 thousand of women die every year [4]. There is a trend in increase in the morbidity rate due to ovarian cancer in the last years, which appears more often in low-income countries and developing countries. The ethnic female makeup has an impact on the morbidity rate, in particular, Caucasian women suffer from the disease more often than African American, Asian and Latin American women [5-7].

Ovarian cancer is characterized by the unfavorable progression and is in the first place within the structure of women's mortality rate due to oncogynecological disorders [8].

**The purpose** is to conduct the comparative analysis of the morbidity and mortality rate due to ovarian cancer before COVID-19 pandemic and during quarantine measures.

**Materials and methods.** We conducted the analysis based on the statistical data from the National Cancer Register of Ukraine 2015 to 2021 without temporarily occupied territories using the statistical method, that is, analysis of time series. We analyzed the morbidity and mortality rate, distribution by age, structure of detection stages for ovarian cancer by TNM classification, detection rate of patients with ovarian cancer during preventive examinations.

### **Research results and their discussion**

According to data from the National Cancer Register of Ukraine 2015 to 2019, the morbidity rate due to ovarian cancer tended to increase from 17.9 in 2015 to 18.6 in 2019 per 100 thousand females (+3.9 %) and decreased 2019 to 2021 by 8.6 % from 18.6 to 17.0 per 100 thousand females (Fig. 1).

2015 to 2019 by Ukrainian regions the morbidity rate due to ovarian cancer increased mostly in Ivano-Frankivsk (+50.9 %), Volyn (+33.6 %) and Poltava (+28.2 %) regions, and

decreased significantly in Zaporizhzhia (-26.4 %), Kirovohrad (-22.8 %), Zhytomyr (-17.7 %) and Ternopil (-18.0 %) regions. At the same time, in 2019 the morbidity rate due to ovarian cancer exceeded the national Ukrainian morbidity rate in Vinnytsia, Kyiv, Lviv, Poltava, Sumy, Kharkiv, Kherson, Cherkasy regions and the city of Kyiv.

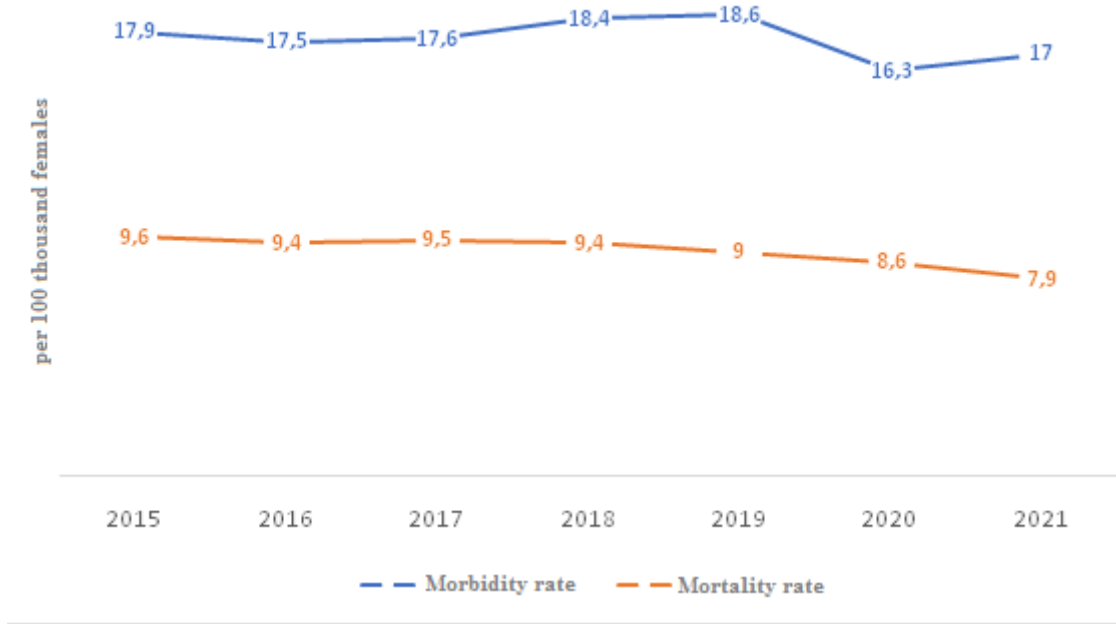


Fig. 1. Morbidity and mortality rate due to ovarian cancer 2015 to 2021

When studying the morbidity rate due to ovarian cancer in respect of distribution by age, we discovered that it exceeded national average data on the morbidity rate among women aged from 45. For example, the group ranging from ages 65 to 69 has shown the highest morbidity rate of  $39.18 \pm 0.67$  per 100 thousand females, which accurately exceeded the morbidity rate in groups ranging from ages 1 to 4 –  $0.12 \pm 0.05$  ( $p=0.000$ ), 5 to 9 –  $0.24 \pm 0.05$  ( $p=0.000$ ), 10 to 14 –  $1.02 \pm 0.10$  ( $p=0.000$ ), 15 to 19 –  $1.56 \pm 0.38$  ( $p=0.000$ ), 20 to 24 –  $2.46 \pm 0.28$  ( $p=0.000$ ), 25 to 29 –  $4.02 \pm 0.16$  ( $p=0.000$ ), 30 to 34 –  $5.80 \pm 0.20$  ( $p=0.000$ ), 35 to 39 –  $10.14 \pm 0.50$  ( $p=0.000$ ), 40 to 44 –  $18.30 \pm 0.46$  ( $p=0.000$ ), 45 to 49 –  $27.40 \pm 0.74$  ( $p=0.000$ ), 50 to 54 –  $30.86 \pm 0.63$  ( $p=0.000$ ), 55 to 59 –  $36.38 \pm 0.61$  ( $p=0.015$ ), 70 to 74 –  $33.96 \pm 1.222$  ( $p=0.006$ ), 75 to 79 –  $29.12 \pm 0.54$  ( $p=0.000$ ), 80 to 84 –  $20.82 \pm 1.72$  ( $p=0.000$ ), 85 years and over  $7.56 \pm 0.72$  ( $p=0.000$ ), except for the group ranging from ages 60 to 64 –  $38.16 \pm 0.78$  ( $p=0.352$ ).

According to WHO data, the standardized mortality rate due to ovarian cancer in Ukraine is lower than in a range of developed Western and Eastern European countries

(Germany, Great Britain, Poland, Lithuania), Canada and higher than in the USA and Japan. This rate decreased for the researched period worldwide (Fig. 2).

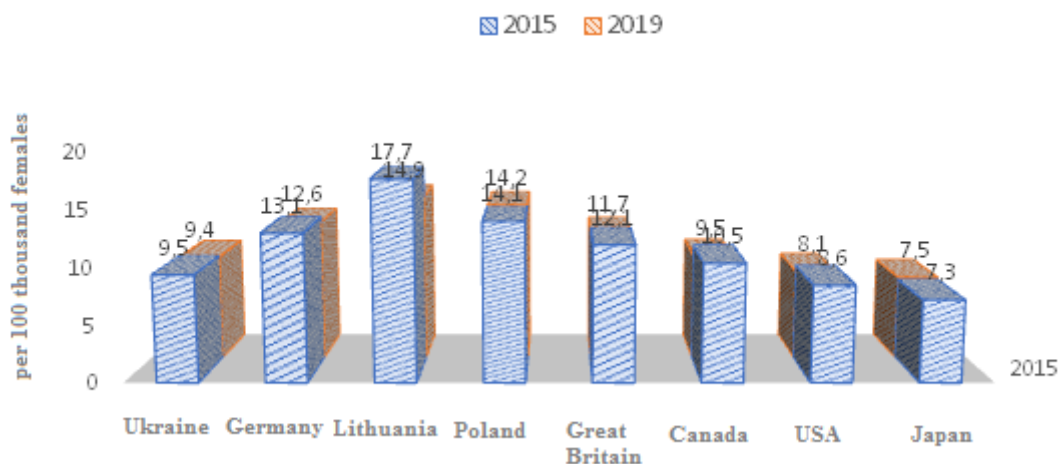


Fig. 2. Dynamics of the mortality rate due to ovarian cancer in Ukraine and worldwide per 100,000 (standardized rate by age groups) females in 2015 and 2019.

2015 to 2019 the mortality rate due to ovarian cancer decreased from 9.6 to 9.0 per 100 thousand females (-6.3 %) and continued to decrease during the quarantine to 7.9 per 100 thousand females (-12.2 %).

According to data from the National Cancer Register, the mortality rate due to ovarian cancer exceeds the national average data at the age 45 to 84. As well as the morbidity rate, the mortality rate due to ovarian cancer at the age 65 to 69 is the highest –  $25.54 \pm 1.08$  per 100 thousand females. This mortality rate is accurately higher than that in groups ranging from ages 10 to 14 –  $0.04 \pm 0.02$  ( $p=0.000$ ), 15 to 19 –  $0.22 \pm 0.09$  ( $p=0.000$ ), 20 to 24 –  $0.22 \pm 0.07$  ( $p=0.000$ ), 25 to 29 –  $0.52 \pm 0.05$  ( $p=0.000$ ), 30 to 34 –  $0.86 \pm 0.14$  ( $p=0.000$ ), 35 to 39 –  $2.38 \pm 0.09$  ( $p=0.000$ ), 40 to 44 –  $5.10 \pm 0.26$  ( $p=0.000$ ), 45 to 49 –  $9.84 \pm 0.63$  ( $p=0.000$ ), 50 to 54 –  $13.82 \pm 0.55$  ( $p=0.000$ ), 55 to 59 –  $19.18 \pm 0.63$  ( $p=0.001$ ), 80 to 84 –  $16.70 \pm 0.99$  ( $p=0.000$ ), 85 years and over –  $6.64 \pm 0.71$  ( $p=0.000$ ), except for groups ranging from ages 60 to 64 –  $23.30 \pm 0.29$  ( $p=0.080$ ), 70 to 74 –  $24.26 \pm 0.91$  ( $p=0.392$ ) and 75 to 79 –  $23.16 \pm 0.91$  ( $p=0.130$ ).

Before the pandemic there was a trend in decrease in the share of detected patients with ovarian cancer during preventive examinations from 22.3 % in 2015 to 17.9 % in 2019 (-19.7 %) (Fig. 3). The highest decrease in such patients was in Ivano-Frankivsk (-72.4 %), Vinnytsia (-62.3 %), Zaporizhzhia (-45.7 %) and Kirovohrad (-42.6 %) regions. Besides, it

should be noted that Ivano-Frankivsk and Odesa regions had the lowest detection rate of patients with ovarian cancer during preventive examinations (2.9 % and 4.3 % in 2019, respectively). The positive dynamics of increase in the share of detected patients with ovarian cancer during preventive examinations was in Poltava (+63.7 %), Zhytomyr (+32.5 %) and Kherson (+35.6 %) regions.

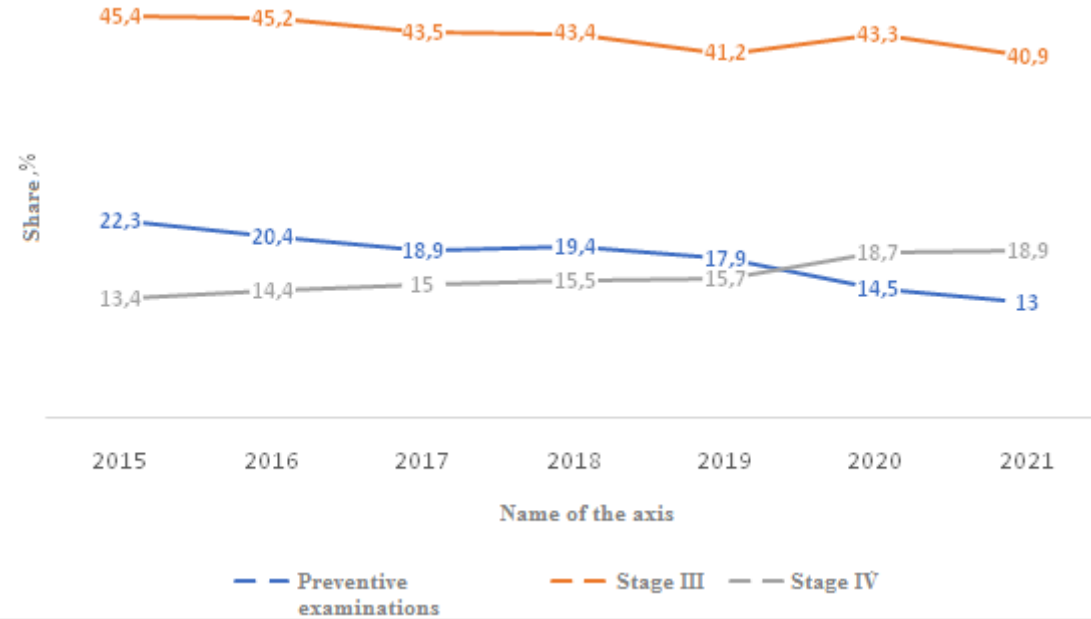


Fig. 3. Preventive examinations and detection of patients with ovarian cancer at the advanced stages

During the pandemic the number of preventive examinations decreased, which caused the decrease in the share of patients with ovarian cancer detected during preventive examinations. For example, the share of patients with ovarian cancer decreased from 17.9 % to 13.0 % (-27.4 %).

When comparing the morbidity rate due to ovarian cancer in respect of stages by TNM classification, we discovered that there was a trend in decrease in the share of patients with ovarian cancer at the stage I to II (-1.4 %) and III (-9.3 %) and increase in the share of patients with ovarian cancer at the stage IV (+17.2 %) 2015 to 2019. During quarantine measures the share of patients with ovarian cancer at the stage I to II and III by TNM classification continued to decrease (-10.3 % and -0.7 %, respectively) while the share of patients with ovarian cancer at the stage IV increased (+20.4 %) (Fig. 3).

When analyzing the morbidity rate due to ovarian cancer by regions, we discovered that there was a positive dynamics of increase in the share of patients with ovarian cancer at

the stage I to II by TNM classification in Vinnytsia, Dnipropetrovsk, Zhytomyr, Lviv, Ternopil, Kherson, Khmelnytskyi, Cherkasy, Chernivtsi, Chernihiv regions and the city of Kyiv. Unlike the decrease in the share of patients with ovarian cancer at the stage III in Ukraine, Kyiv (+12.9 %), Zakarpattia (+9.7 %), Ivano-Frankivsk (+8.7 %) regions and the city of Kyiv (+15.9 %) show the increase of such patients. The highest increase in the share of patients with ovarian cancer at the stage IV is in Ternopil (+82.5 %), Khmelnytskyi (+66.7 %), Mykolaiv (65.0 %) and Volyn (+56.4 %) regions, whereby this rate exceeds the national Ukrainian one in Ternopil, Mykolaiv and Volyn regions. The highest decrease in the share of patients with ovarian cancer at the stage IV we can see in Poltava (-58.2 %), Chernivtsi (-33.6 %) and Kirovohrad (-12.5 %) regions.

To assess the state of the oncogynecological care organization, we determined a ratio between the mortality and morbidity rate due to ovarian cancer that was 53.6 % in 2015 and 48.4 % in 2019. So, despite the existing dynamic increase in the morbidity rate due to ovarian cancer, the mortality/morbidity ratio was decreasing. This dynamic state of the above rate is indirect evidence of improved diagnosis and treatment of patients with ovarian cancer as well as increasing treatment efficacy.

Long quarantine measures caused by COVID-19 pandemic have led to the broken communication between female patients and doctors within the primary and special medical assistance: limited possibility or full impossibility of getting a consultation by the general practitioner/family doctor due to a large number of COVID-19 patients, limited access to specialized healthcare institutions, personal fear of female patients to catch COVID-19 in healthcare institutions. These conditions have made women postpone their visits to doctors and a share of female patients with oncogynecological disorders detected at the stage III to IV by TNM classification increase.

2015 to 2019 there was a trend in decrease in the share of patients with ovarian cancer detected during preventive examinations, which increased during quarantine measures due to COVID-19 pandemic. The decrease in the share of detected patients with ovarian cancer during preventive examinations is one of the factors for detecting patients with the extensive-stage disease, which was confirmed both at the national and regional level (exemplified by Ivano-Frankivsk region).

**Conclusion.** Obtained data are evidence of the fact that the morbidity rate due to ovarian cancer insignificantly increased (+3.9 %) 2015 to 2019 and decreased by 8.6 % during COVID-19 pandemic. The morbidity rate increased among women aged from 45, especially at the age 65 to 69. The decrease in the share of detected patients with ovarian

cancer during preventive examinations is one of the factors for detecting patients with the extensive-stage disease, which was confirmed both at the national and regional level.

**Perspectives of further research** consist in studying further the epidemiological situation in respect of ovarian cancer as well as studying further the consequences of limited access to the medical assistance caused by quarantine measures.

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