DOI 10.29254/2077-4214-2023-4-171-126-129
UDC 616. – 006:614.1

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PROSTATE CANCER INCIDENCE IN THE MALE POPULATION OF MYKOLAIV REGION AND REGIONAL FEATURES

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In order to study the incidence of prostate cancer (PCA), the use of statistical analysis methods was used to assess the spread of prostate cancer in the Southern region of Ukraine on the example of the Mykolaiv region, including the identification of areas characterized by a statistically significant increase in the incidence of prostate cancer, conducted in-depth analysis of factors that potentially influence the development of oncological diseases in areas with an increased risk of the occurrence and development of malignant tumors.

Regional peculiarities of ecological determinism in the development of prostate cancer in the Southern region of Ukraine were revealed using the example of the Mykolaiv region.

Statistical data on the primary detection of prostate cancer in 16 districts, 3 cities and the regional center – Mykolaiv for 6 years from 2015 to 2020 were used as research materials.

To build analytical maps of the distribution of the incidence of the analyzed type of cancer, data on the oncological incidence of the population, obtained on the basis of data provided by the organizational and methodical departments of dispensaries, as well as a normative database built on the basis of statistical reporting on the level of oncological incidence in Ukraine and sub-regions, were used entities of Ukraine. The standardized index of prostate cancer was considered as the main indicator.

The improved method of assessing and forecasting the medical and ecological situation at different territorial levels was based on a combination of traditional methods of researching cancer incidence and the use of information technologies.

Assessment of the contribution of individual environmental factors in the spread of oncological pathology with multistructural influence of the environment was carried out on the basis of the systematic analysis methodology. The methods of correlation, factor and cluster analyzes were used to assess the contribution of individual environmental indicators to the incidence of prostate cancer.

The statistical analysis included three directions:

1. Study of changes in objects by territory;

2. Study of territorial regularities;

3. Territorial forecast, which offers options for the development of the situation.

Territorial regularities of objects were investigated with the help of statistical analysis. Territorial statistics made it possible to analyze trends in the spread of disease, to identify cause-and-effect relationships between environmental factors and health indicators.

Key words: *prostate cancer, Mykolaiv region.*

Connection of the publication with planned research works.

This work is a fragment of a complex research interdepartmental (departments of hygiene, social medicine, public health and medical informatics; anatomy, clinical anatomy, operative surgery, pathomorphology and forensic medicine) theme "Influence of dangerous environmental factors on the morpho-functional state of the body's visceral systems". State registration number 011800033396.

Introduction.

The process of forming the health of the population over the last decades reflects the general trends of the socio-economic development of Ukraine. Until now, the defining parameters characterizing the state of health of the population are medical and demographic indicators [1].

Generally recognized marker criteria in the assessment of health at the population level, depending on the quality of the environment, are demographic and medical-genetic indicators, the frequency of malignant neoplasms. Malignant neoplasms are an indicator of pathologies, a highly informative and socially significant indicator of the state of health of the population as a whole [2, 3].

For several decades now, both in the world and in Ukraine, there has been a constant and steady increase in the incidence of malignant neoplasms. Malignant neoplasms are one of the main causes of disability and mortality of the population. In connection with the epidemiological and demographic crisis, a further increase in the incidence of this pathology is predicted [4].

In 2020, the "crude" rate of cancer incidence per 100,000 population of Ukraine was 388.2 or 22.4%, which is largely determined by the unfavorable direction of demographic processes in the population of Ukraine, which led to the "aging" of the population.

Statistical data on the incidence of malignant neoplasms in the population of Ukraine indicate the presence of pronounced regional differences. In 2020, the "crude" incidence rate of malignant neoplasms in the Central region of Ukraine was 406.2 cases per 100,000 population, which is 46% higher than in Ukraine. In the Mykolaiv region, this indicator exceeded these data in Ukraine and

in the Central region of Ukraine and amounted to 415.8 cases per 100,000 population [5].

The "crude" incidence rate of prostate cancer in Ukraine from 2015 to 2020 increased from 410 to 493 cases per 100,000 population. In the Mykolaiv region, this indicator in 2020 was 52.5 cases per 100,000 population, which is 64% higher than in Ukraine.

It should be noted that the incidence rate of prostate cancer in the Mykolaiv region in recent years exceeds this indicator in Ukraine, which indicates a tense oncological-epidemiological situation in the Mykolaiv region. The lack of a systematic approach in the analysis of the retrospective, current and forecast oncological situation will affect the quality of medical care for patients with malignant neoplasms. In order to develop funding priorities, adequate operational and strategic management decisions in the conditions of limited resource provision of the oncology service, the development of indicators of risk zones according to medical and environmental parameters based on the use of computer technologies is of particular importance [6, 7].

The aim of the study.

Determining the characteristics of the spread of prostate cancer in the Mykolaiv region using methods of statistical analysis to assess the spread of this pathology in the Southern region of Ukraine.

Object and methods of research.

The use of territorial statistics methods in combination with traditional statistical methods makes it possible to reveal territorial medical and ecological contrast (groups of districts with different public health quality ratings), territorial heterogeneity of prostate cancer incidence, the presence of "hot spots" of incidence, which can serve as a basis for a targeted analysis of factors that increase the risk of cancer development, and to develop on this basis a strategy for the monitoring and prevention of oncological diseases.

Research results and their discussion.

All districts of the Mykolaiv region, depending on the number of patients (per 100,000 population), were conditionally divided into 3 groups:

the 1st group – districts where the number of patients does not statistically differ from the average indicators for cities and districts of the Mykolaiv region. The oncogenic situation in these cities and districts is called "background";

the 2nd group – districts in which the number of patients exceeds the average indicators for cities and districts of the Mykolaiv region. Cities and districts with an oncogenic situation of "high risk";

the 3rd group – districts where the average incidence rate (per 100,000 population) is lower than the average indicators for cities and districts of the Mykolaiv region. This is a "minimum risk" group.

The standardized incidence rate of prostate cancer in the Mykolaiv region in 2020 was 58.3 cases per 100,000 population. In Mykolaiv, the incidence rate of prostate cancer among the urban population was 61 cases per 100,000 population. Among the rural population of the Mykolaiv region in 2020, the highest incidence of prostate cancer was noted in the Vradiyiv district. Berezanskyi, Berezneguvatskyi, Veselinivskyi, Novoodesskyi, Snigurivskyi districts of the Mykolaiv region belong to the districts with reduced oncological risk.

It can be assumed that there are factors common to all types of cancer, which initiate a high incidence of cancer in individual cities and regions, and specific factors for each type of cancer, which vary in different regions of the Mykolaiv region. The results of factor, correlation and cluster analysis testify to the commonality of external causes of high risk of oncology development in these areas.

However, the most effective results of the analysis of the oncological situation in this territory can be obtained from a retrospective analysis of the incidence of a particular form of cancer over a long period of time. The standardized incidence rate of prostate cancer in the Mykolaiv region for the period from 2015 to 2020 increased by 26% (p=0.05) from 49.2 to 62.0 cases per 100,000 population, respectively.

An analysis of the incidence of prostate cancer in the Mykolaiv region from 2015 to 2020 was conducted based on the Getis-Ord Gi statistical indicator. This indicator identifies statistically significant territorial clusters of high values (hot spots) and low values (cold spots) of the rate of primary detection of prostate cancer. The analysis of "hot spots" (Hot Spot Analisis) of the incidence of prostate cancer in the Mykolaiv region made it possible to single out territorial clusters of high values – "hot spots", where the level of incidence of prostate cancer remains high throughout the entire period analyzed, from 2015 to of 2020.

On the basis of a statistical set of accurate data, a territorial cube (a three-dimensional cubic figure) was built for further analysis by the method of "hot spots". Based on the analysis of time series by territory, a trend was calculated, the value of the number of points for all locations and time steps was grouped into time series and analyzed using Mann-Kendall statistics [8]. Trend analysis according to the Mann-Kendall algorithm is performed for each location with data as an independent analysis of bins of the time series and involves a ranking correlation analysis of the number of points or values and all time periods.

A comparison of the obtained data with the results of earlier studies confirmed the patterns identified earlier. Arbuzynskyi, Mykolaivskyi, Ochakivskyi, Pervomaiskyi, Novobuzkyi are among the regions with an oncogenic situation of increased risk, where the incidence of prostate cancer increased by an average of 20% over 5 years (p=0.05).

The maximum increase in the incidence of prostate cancer from 2015 to 2020 was noted in the Novobuz district, where the incidence of prostate cancer increased by 24% (p=0.05) (from 49.8 to 62.0 cases per 100,000 population). An unfavorable epidemiological situation was also noted in Mykolaiv. Thus, over the period from 2015 to 2020, the incidence of prostate cancer in the regional center increased by 13% (p=0.05) (from 50.1 to 63.2 cases per 100,000 population).

The group of reduced oncological risk includes the Berezneguvatsky, Berezansky, Novoodeshky, Snigurivskyi, Veselinivskyi districts, where the incidence rate during the entire observation period did not exceed the average indicators for the Mykolaiv region.

Malignant neoplasms belong to environmentally-dependent diseases, therefore, the growth of cancer incidence is often considered as a hygienic characteristic of an environmentally unfavorable area. On the basis of analyzes of the spread of oncological diseases, it is shown that malignant neoplasms are an ecological indicator of pathologies, a highly informative and socially significant indicator of the state of health of the population. The

increase in the incidence of cancer is exacerbated by an increase in the level of anthropotechnical burden, as well as demographic and socio-economic processes in the regions of the regions, such as depopulation and aging of the population, sex-age composition, standard of living, population migration, quality and availability of medical care.

Thus, the incidence rate of prostate cancer in the Mykolaiv region has remained high over the last decade. There is no doubt that the increase in the primary detection of prostate cancer, along with many exogenous reasons, is associated with the emergence of new medical technologies, the introduction of PSA monitoring, but the study of territorial statistics methods in combination with traditional statistical methods makes it possible to detect territorial medical-ecological contrasts (groups of districts with different ratings of the quality of public health), territorial heterogeneity of the incidence of prostate cancer, the presence of "hot spots".

There is no doubt that changes in the health of the population are influenced by the factors of the geographic environment, the level of anthropotechnogenic load, but the directed effect of such an influence is difficult. This is usually due to the fact that the research is focused on a specific speaker, while the influence of the environment on regional health is certainly complex and even synergistic in nature. An objective assessment of the level of medical and environmental safety of territories can be obtained only with the use of complex indicators.

Applied technologies will make it possible to optimize the process of managing medical care for patients with malignant neoplasms based on the identification of areas and risk groups from oncological pathology, to substantiate the principles of forming regional programs to reduce mortality from malignant neoplasms.

The process of forming the health of the population over the last decades reflects the general trends of the socio-economic development of Ukraine. Until now, important parameters characterizing the state of health of the population are medico-demographic indicators. Generally recognized marker criteria in the assessment of health at the population level, depending on the quality of the environment, are: demographic indicators and medical and genetic indicators, the frequency of malignant neoplasms. Malignant neoplasms are an indicator of pathologies, a highly informative and socially significant indicator of the state of health in general.

For several decades now, both in the world and in Ukraine, there has been a constant and steady increase in the incidence of malignant neoplasms. Malignant neoplasms are one of the main causes of disability and mortality of the population. In connection with the epidemiological and demographic crises, a further increase in the incidence of this pathology is predicted.

Conclusions.

Statistical data on the incidence of prostate cancer in the population of Ukraine indicate the presence of pronounced regional differences. In the Mykolayiv region, the "rough" rate of cancer incidence exceeds the data for both Ukraine and the Central region of Ukraine.

In the structure of the incidence of malignant neoplasms in the male population of Ukraine, prostate cancer ranks second after tumors of the trachea, bronchi and lungs. In recent years, the incidence rate of prostate cancer in the Mykolaiv region has exceeded this indicator for Ukraine, which indicates a tense onco-epidemiological situation in the Mykolaiv region.

Prospects for further research.

In our opinion, further studies of the morpho-functional features of prostate cancer under the influence of dangerous environmental factors are promising, which require the creation of an experimental model and effective methods of prevention of this pathology based on predicting the occurrence of prostate cancer and the course of the disease.

Further research into the study of regional characteristics of prostate cancer is also promising, which can serve as the basis for developing a strategy for disease monitoring and prevention in individual regions, for the implementation of medical and social programs aimed at early diagnosis and, accordingly, increasing the effectiveness of prostate cancer treatment.

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ЗАХВОРЮВАНІСТЬ НА РАК ПЕРЕДМІХУРОВОЇ ЗАЛОЗИ ЧОЛОВІЧОГО НАСЕЛЕННЯ МИКОЛАЇВСЬКОЇ ОБЛАСТІ ТА РЕГІОНАЛЬНІ ОСОБЛИВОСТІ

Савельєв А. О.

Резюме. У статті висвітлено питання захворюваності на рак передміхурової залози чоловічого населення в Миколаївській області та її регіональні особливості.

Процес формування здоров'я населення протягом останніх десятиліть відображає загальні тенденції соціально-економічного розвитку України.

Загальновизнаними маркерними критеріями оцінки здоров'я на популяційному рівні залежно від якості довкілля є демографічні та медико-генетичні показники, частота злоякісних новоутворень.

Злоякісні новоутворення є індикаторною патологією, високоінформативним і соціально значущим показником стану здоров'я населення в цілому.

Статистичні дані щодо захворюваності на злоякісні новоутворення в Україні свідчать про наявність виражених регіональних відмінностей.

Необхідно відзначити, що рівень захворюваності на рак передміхурової залози в Миколаївській області протягом останніх років перевищує цей показник по Україні, що свідчить про напружену онкоепідеміологічну ситуацію в Миколаївській області.

Відсутність системного підходу до аналізу ретроспективної, поточної та прогностичної онкологічної ситуації впливає на якість надання медичної допомоги хворим на злоякісні новоутворення.

Використання методів територіальної статистики в поєднанні з традиційними статистичними методами дає змогу виявити територіальну медико-екологічну контрастність (групи районів із різним рейтингом якості громадського здоров'я), територіальну неоднорідність захворюваності на рак передміхурової залози, наявність «гарячих точок» захворюваності, що може бути основою для спрямованого аналізу чинників, які зумовлюють збільшення ризику розвитку раку, та розроблення на цій основі стратегії моніторингу й профілактики онкозахворювань.

Злоякісні новоутворення належать до еколого-залежних захворювань, тому зростання онкологічної захворюваності часто розглядають як гігієнічну характеристику екологічно несприятливої території. Рівень захворюваності на рак передміхурової залози в Миколаївській області залишається високим протягом останнього десятиліття.

Не викликає сумніву, що підвищення первинного виявлення раку простати, поряд з багатьма екзогенними причинами, пов'язане з появою нових медичних технологій, впровадженням ПСА, дослідженням методів просторово-часової статистики в поєднанні з традиційними статистичними методами.

Застосовані технології дають змогу оптимізувати процес управління медичною допомогою хворим зі злоякісними новоутвореннями на основі ідентифікацій територій і груп ризику з онкологічної патології, обґрунтувати принципи формування регіональних програм зниження смертності від злоякісних новоутворень.

Ключові слова: рак передміхурової залози, Миколаївська область.

PROSTATE CANCER INCIDENCE IN THE MALE POPULATION OF MYKOLAIV REGION AND REGIONAL FEATURES

Saveliev A. O.

Abstract. The article covers the issue of prostate cancer incidence in the male population in the Mykolaiv region and its regional features.

The process of forming the health of the population during the last decades reflects the general trends of the socio-economic development of Ukraine.

Generally recognized marker criteria for assessing health at the population level, depending on the quality of the environment, are demographic and medical-genetic indicators, the frequency of malignant neoplasms.

Malignant neoplasms are an indicator pathology, a highly informative and socially significant indicator of the state of health of the population as a whole.

Statistical data on the incidence of malignant neoplasms in Ukraine indicate the presence of pronounced regional differences.

It should be noted that the incidence rate of prostate cancer in the Mykolaiv region in recent years exceeds this indicator for Ukraine, which indicates a tense onco-epidemiological situation in the Mykolaiv region.

The lack of a systematic approach to the analysis of the retrospective, current and prognostic oncological situation affects the quality of medical care for patients with malignant neoplasms.

The use of territorial statistics methods in combination with traditional statistical methods makes it possible to reveal territorial medical and ecological contrast (groups of districts with different public health quality ratings), territorial heterogeneity of prostate cancer incidence, the presence of "hot spots" of incidence, which may be the basis for the targeted analysis of factors that increase the risk of developing cancer, and the development of a cancer monitoring and prevention strategy based on this.

Malignant neoplasms belong to environmentally-dependent diseases, therefore, the growth of cancer incidence is often considered as a hygienic characteristic of an environmentally unfavorable area. The incidence rate of prostate cancer in the Mykolaiv region has remained high over the last decade.

There is no doubt that the increase in the primary detection of prostate cancer, along with many exogenous reasons, is associated with the emergence of new medical technologies, the introduction of PSA, the study of spatio-temporal statistics methods in combination with traditional statistical methods.

The applied technologies make it possible to optimize the process of managing medical care for patients with malignant neoplasms based on the identification of areas and risk groups from oncological pathology, to substantiate the principles of forming regional programs to reduce mortality from malignant neoplasms.

Key words: prostate cancer, Mykolaiv region.

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A – Work concept and design, **B** – Data collection and analysis, **C** – Responsibility for statistical analysis, **D** – Writing the article, **E** – Critical review, **F** – Final approval of the article.

Received 25.05.2023
Accepted 02.11.2023