

RESEARCH ARTICLE

Morbidity, Disability and Death Rates of The Population Due to Malignant Neoplasms in Uralsk City in The Republic of Kazakhstan

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Abstract

Objective: The dynamics of morbidity, disability and death rates due to malignant neoplasms in the population in Uralsk city of the Republic of Kazakhstan were studied for 2011-2015, with a focus on age and sex, as well as tumor location. **Methods:** Statistics for total morbidity, primary disability and mortality from cancer in the adult population of the city of Uralsk for 2011-2015 were calculated per 100 thousand. Estimation of morbidity was based on data from form - №12 «Report on the number of diseases registered in patients living in the area of health care organizations and patient population under medical observation». Evaluation of primary disability was based on form №7 «The distribution of newly recognized disabled by disease class, age, sex and disability groups» for 2011-2015 in Ural city and analysis of cancer was carried out using annual form 7 «Report on the sick, and diseases of malignant neoplasms». **Result:** The most common localizations of cancer were the trachea, bronchi, lungs, stomach and mammary glands. High death rates were noted for patients with cancer of the trachea, bronchi, lung, as compared to stomach and esophagus. **Conclusion:** The results of our investigation and data in the literature indicate that regional characteristics influence the impact of risk factors associated with cancer. An unfavorable environmental background contributes to ill health of urban populations, contributing to development of cancer. Moreover behavioral risk factors are very important, such as smoking, alcohol drinking, and an unhealthy diet. All these factors require urgent adoption of a package of measures for prevention, early detection and timely treatment. Detailed study of cancer is necessary to develop national programs and activities for prevention and control.

Keywords: Cancer rate- primary disablement- cancer mortality- city of Uralsk

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Introduction

Cancer is one of the main reasons of morbidity and death rate at the world market. In 2012 about 14 million of new cases and 8 million of death events, related to cancer, were registered worldwide. These morbidity and death ratios were 182 and 102 per 100 000 of population accordingly (World Health Organization, World Cancer Report 2014). The number is annually increasing and by 2025 it will be 19 million of new cases in least developed countries. In 2012 there were 43% of cases and 52% of mortality due to cancer worldwide in South, East and Southeast Asia (Moore et al., 2014). The most common diseases are those of lungs, stomach, mammary gland, hepar and colorectum. Depending on sex the most common disease among men in South, East and Southeast Asia was lung cancer. In West and Central Asia cancer of stomach and esophagus are the most common. Cancer of mammary gland among women takes a leading position

in most states of the region.

The increased morbidity rate due to malignant tumors is one of the negative trends in the health status of the population of the Republic of Kazakhstan. In localization structure affection of mammary glands are on the first place, trachea bronchi and lungs are on the second, dermhelminthiasis is on third place. The mortality due to malignant neoplasms in the country in the structure of total mortality occupies the second place (Kadyrov et al., 2014).

The study of cancer distribution across world regions, differences in relation to specific types of cancer, are key factors to understand any cause-and-effect relationships and therefore, the development of preventive measures. Reliable statistic data on cancer studies is an essential condition for national and regional cancer control programs, as well as for informing the population on the results of research in this area (Mamyrbayev et al., 2016).

Materials and Methods

In this work we studied statistics on total morbidity rate, primary disability and mortality from cancer of adult population of the city of Uralsk for 2011-2015, calculated per 100 thousand of population. The list of diseases was built on the basis of the “Guidelines on the International Statistical Classification of Diseases, Injuries and Causes of Death of tenth revision”. Estimation of diseases distribution was based on data of report forms - №12 «Report on the number of diseases registered in patients living in the area of health care organizations and patient population under medical observation”. Evaluation of the primary disability was based on form №7 «The distribution of newly recognized disabled by disease class, age, sex and disability groups” for 2011-2015 in Ural city. The analysis of cancer was carried out using annual forms 7 «Report on the sick, and diseases of malignant neoplasms”.

Results

Indicators of cancer incidence in the city of Uralsk exceed the data in the Republic of Kazakhstan with a clear growth trend. Considering the dynamics of primary disability there is an increase since 2011 (87.78) till 2014 (104.74), and then it reduced in 2015 up to 86.49. This fact has a significant impact on the structure of primary disability in the city of Uralsk. Disability due to malignant neoplasms for five years takes the 1st place in rank, aheading blood circulatory system diseases. The proportion of malignant neoplasms in the structure of primary disability also has the growth trend and an average of 30.9% of all nosologies. More than half of the patients were first taken to register with I-II disease stage (56.2%), with III - 33.5%, with IV – 10.3%. Within the first year from the time of diagnosis 17.3% of patients die. According to the survey results the most frequently

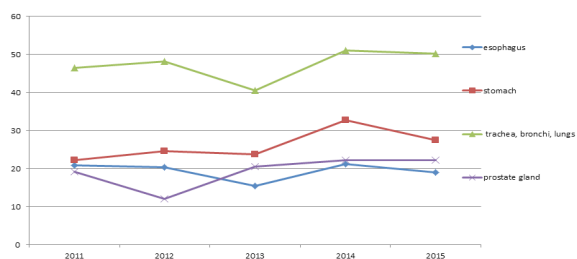


Figure 1. Morbidity Rate of the Main Forms of Oncologic Neoplasms among Men (Per 100,000 of Population)

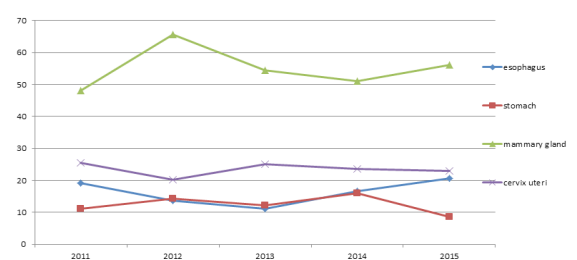


Figure 2. Morbidity Rate of the Main Forms of Oncologic Neoplasms among Women (Per 100,000 of Population)

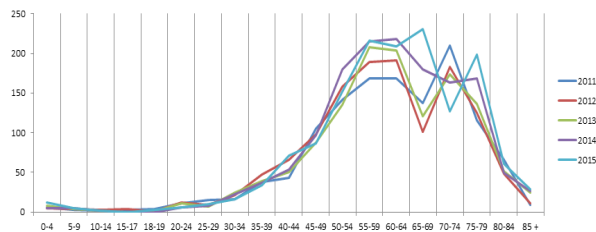


Figure 3. Diseases Distribution Due to Malignant Neoplasms by Age of Patients for 2011-2015

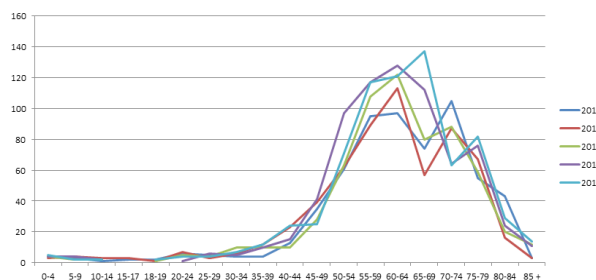


Figure 3a. Diseases Distribution Due to Malignant Neoplasms among Men for 2011-2015

occurring cancer localizations are trachea, bronchi, lungs, mammary glands, stomach, esophagus (Table 1). The highest affect rates among men are observed from trachea, bronchi, lungs, stomach, esophagus, prostate gland (Figure 1). Among women the first is the disease of mammary gland, then cervix uteri, stomach, esophagus (Figure 2).

Most often diseases are recorded at the age of 55-65 and 70-80 years. And in 2012 at the age of 65-69 years there has been a sharp decline in cases, but in 2015, on the contrary, there was an increase in this age group registration (Figure 3). High incidence among women is observed from 45 to 80 years (Figure 3a), and among men observed from 60 to 70 years (Figure 3b).

The mortality rate from cancer neoplasms is commonly observed in trachea, bronchi, lung, then stomach and esophagus. During the study period, the highest rate was recorded in 2012 and amounted to 237.3 per 100 000 of population (Table 2).

Discussion

As it is known many factors influence human

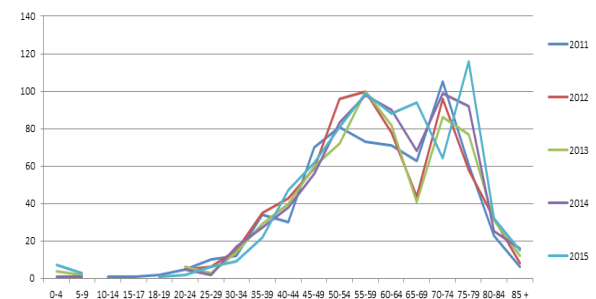


Figure 3a. Diseases Distribution Due to Malignant Neoplasms among Men for 2011-2015

Table 1. Oncologic Diseases Rate among Men and Women for 2011-2015 (Per 100,000 of Population)

| Malignant neoplasms localization | Sex | Annual rate | | | | |
|---|-----|-------------|-------|-------|-------|-------|
| | | 2011 | 2012 | 2013 | 2014 | 2015 |
| All malignant neoplasms, including, | m | 213.3 | 213.4 | 219.1 | 249.2 | 235.6 |
| | f | 226.6 | 241.9 | 229.9 | 249.5 | 244.4 |
| lips | m | 1.4 | 2.1 | 2.4 | 2.8 | 1.0 |
| | f | 0.0 | 1.4 | 1.0 | 1.0 | 1.0 |
| tongue, oral cavity and larynx | m | 6.3 | 7.5 | 8.0 | 5.6 | 4.9 |
| | f | 3.5 | 5.7 | 3.8 | 5.9 | 4.6 |
| esophagus | m | 20.9 | 20.3 | 15.4 | 21.2 | 19.0 |
| | f | 19.2 | 13.6 | 11.2 | 16.7 | 20.6 |
| stomach | m | 22.3 | 24.6 | 23.7 | 32.7 | 27.5 |
| | f | 11.2 | 14.3 | 12.2 | 16.0 | 8.5 |
| segmented intestine | m | 6.3 | 13.2 | 12.2 | 11.5 | 11.4 |
| | f | 12.5 | 14.3 | 10.1 | 13.6 | 10.5 |
| straight intestine, rectosigmoid junction, anus | m | 9.1 | 8.2 | 11.5 | 9.0 | 14.4 |
| | f | 7.0 | 8.6 | 11.5 | 10.8 | 8.5 |
| hepar and intrahepatic bile ducts | m | 12.2 | 6.8 | 12.9 | 16.0 | 6.5 |
| | f | 5.6 | 6.1 | 6.3 | 8.0 | 7.8 |
| pancreatic gland | m | 5.9 | 7.5 | 8.0 | 9.7 | 6.5 |
| | f | 5.6 | 7.8 | 9.4 | 8.7 | 7.2 |
| larynx | m | 5.2 | 3.6 | 5.9 | 5.9 | 5.6 |
| | f | 0.3 | 0.7 | 0.0 | 0.3 | 0.7 |
| trachea, bronchi, lung | m | 46.4 | 48.2 | 40.5 | 51.1 | 50.3 |
| | f | 9.4 | 8.2 | 9.1 | 7.6 | 9.2 |
| bones and arthrodial cartilages | m | 0.7 | 1.4 | 1.0 | 0.3 | 0.7 |
| | f | 1.4 | 0.7 | 1.0 | 1.0 | 1.0 |
| connective and other soft tissues | m | 2.8 | 1.4 | 0.7 | 1.7 | 1.6 |
| | f | 0.7 | 1.1 | 1.0 | 2.4 | 1.6 |
| cutaneous melanoma | m | 0.7 | 0.7 | 0.0 | 0.7 | 2.0 |
| | f | 1.4 | 0.7 | 0.7 | 0.3 | 1.3 |
| other skin neoplasms | m | 13.6 | 9.3 | 14.3 | 18.4 | 17.0 |
| | f | 17.4 | 12.1 | 15.0 | 21.9 | 23.2 |
| female mammary glands | f | 48.1 | 65.6 | 54.4 | 51.1 | 56.2 |
| cervix uteri | f | 25.4 | 20.3 | 25.1 | 23.6 | 22.9 |
| body of uterus | f | 11.5 | 13.6 | 14.0 | 11.5 | 17.0 |
| ovary | f | 13.2 | 15.7 | 12,6 | 17.7 | 13.7 |
| prostate gland | m | 19.2 | 12.1 | 20.6 | 22.2 | 22.2 |
| testis | m | 1.4 | 2.1 | 1.7 | 1.7 | 2.6 |
| renal system | m | 7.7 | 7.1 | 8.4 | 7.0 | 5.2 |
| | f | 5.2 | 5.0 | 6.3 | 3.8 | 2.9 |
| urinary bladder | m | 6.3 | 6.4 | 8.4 | 9.7 | 8.2 |
| | f | 1.0 | 0.7 | 1.7 | 1.4 | 1.6 |
| eye and its appendages | m | 0.3 | 0.0 | 0.3 | 0.0 | 0.3 |
| | f | 0.7 | 0.4 | 0.0 | 1.0 | 0.0 |
| cerebrum and central nervous system | m | 3.5 | 5.4 | 3.1 | 5.2 | 5.6 |
| | f | 1.4 | 3.9 | 2.1 | 2.8 | 2.9 |
| thyroid | m | 0.7 | 0.7 | 1.4 | 0.0 | 0.3 |
| | f | 2.8 | 0.7 | 4.9 | 4.5 | 4.9 |
| lymphoid and blood-forming tissues | m | 11.2 | 10.3 | 10.1 | 9.0 | 10.8 |
| | f | 10.8 | 11.1 | 7.3 | 7.0 | 6.9 |
| other malignant neoplasms | m | 9.4 | 14.3 | 8.4 | 7.6 | 12.1 |
| | f | 11.2 | 9.6 | 9.1 | 10.8 | 9.8 |

Table 2. Death Rate Due to Malignant Neoplasms (Per 100,000 of Population)

| Tumor localization | Sex | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|-----|-------|-------|-------|-------|-------|
| Malignant neoplasms, total | m | 130.4 | 138.8 | 113.4 | 116.1 | 110.1 |
| | f | 96.2 | 98.5 | 104.7 | 97.7 | 91.5 |
| including children up to 14 years old included | m | 1.4 | 1.1 | 1.0 | 1.0 | 2.3 |
| | f | 0.7 | 0.7 | 0.3 | 0.7 | 1.3 |
| From total amount – malignant neoplasms: lips | m | 0.3 | 0.4 | 0.7 | 0.0 | 0.3 |
| | f | 0.0 | 0.4 | 0.3 | 0.0 | 0.0 |
| tongue, oral cavity and larynx | m | 5.2 | 4.6 | 4.2 | 4.5 | 3.9 |
| | f | 2.8 | 3.2 | 3.1 | 3.5 | 2.6 |
| esophagus | m | 15.3 | 18.2 | 11.9 | 12.5 | 12.4 |
| | f | 7.0 | 10.3 | 6.3 | 7.0 | 6.5 |
| stomach | m | 16.4 | 14.6 | 15.4 | 13.6 | 14.1 |
| | f | 7.0 | 10.7 | 10.5 | 10.8 | 9.5 |
| segmented intestine | m | 5.6 | 5.7 | 6.3 | 4.2 | 6.5 |
| | f | 5.2 | 5.0 | 5.9 | 4.2 | 5.2 |
| straight intestine, rectosigmoid junction, anus | m | 4.5 | 4.3 | 4.9 | 7.0 | 4.2 |
| | f | 3.5 | 3.6 | 4.2 | 3.8 | 3.6 |
| hepar | m | 7.0 | 3.9 | 5.9 | 8.3 | 5.2 |
| | f | 5.2 | 3.6 | 3.5 | 7.0 | 4.9 |
| pancreatic gland | m | 4.5 | 6.1 | 6.6 | 4.9 | 5.9 |
| | f | 3.5 | 5.7 | 3.5 | 5.6 | 5.9 |
| larynx | m | 3.5 | 1.4 | 2.8 | 2.8 | 2.3 |
| | f | 1.7 | 1.1 | 1.4 | 1.7 | 1.0 |
| trachea, bronchi, lung | m | 30.0 | 25.3 | 24.8 | 22.9 | 22.2 |
| | f | 15.0 | 17.8 | 24.8 | 10.4 | 9.8 |
| bones and arthroial cartilages | m | 1.0 | 1.1 | 0.7 | 0.3 | 1.3 |
| | f | 0.7 | 1.1 | 0.3 | 0.3 | 0.7 |
| connective and other soft tissues | m | 1.0 | 0.4 | 1.7 | 1.0 | 0.7 |
| | f | 1.7 | 0.4 | 1.4 | 0.3 | 1.3 |
| cutaneous melanoma | m | 0.7 | 0.4 | 0.0 | 0.0 | 0.7 |
| | f | 0.7 | 0.0 | 0.0 | 0.7 | 0.3 |
| other skin neoplasms*) | m | 0.0 | 0.4 | 0.0 | 0.3 | 0.0 |
| | f | 0.3 | 0.0 | 0.0 | 0.3 | 0.3 |
| female mammary glands | f | 15.3 | 17.5 | 15.7 | 16.0 | 15.4 |
| | f | 9.1 | 10.0 | 6.6 | 11.1 | 6.5 |
| cervix uteri | f | 4.2 | 3.2 | 3.1 | 3.5 | 0.7 |
| | f | 4.9 | 6.1 | 5.9 | 8.7 | 9.2 |
| ovary | f | 4.9 | 6.1 | 5.9 | 8.7 | 9.2 |
| | f | 4.9 | 6.1 | 5.9 | 8.7 | 9.2 |
| prostate gland | m | 3.1 | 7.8 | 3.8 | 4.2 | 3.6 |
| | m | 0.7 | 0.4 | 0.3 | 0.3 | 0.3 |
| testis | m | 0.7 | 0.4 | 0.3 | 0.3 | 0.3 |
| | m | 0.7 | 0.4 | 0.3 | 0.3 | 0.3 |
| renal system | m | 4.2 | 2.1 | 2.4 | 2.1 | 1.3 |
| | f | 3.5 | 2.1 | 1.7 | 3.5 | 1.6 |
| urinary bladder | m | 2.4 | 1.4 | 2.4 | 2.4 | 1.3 |
| | f | 2.1 | 0.7 | 2.4 | 1.7 | 2.0 |
| eye and its appendages | m | 0.3 | 0.0 | 0.0 | 0.3 | 0.0 |
| | f | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| cerebrum and CNS | m | 2.8 | 2.9 | 2.4 | 1.4 | 1.6 |
| | f | 2.1 | 2.1 | 1.7 | 1.4 | 2.3 |
| thyroid | m | 0.3 | 0.7 | 1.0 | 0.3 | 0.3 |
| | f | 0.0 | 0.4 | 0.3 | 0.7 | 0.3 |

Table 2. Continued

| Tumor localization | Sex | 2011 | 2012 | 2013 | 2014 | 2015 |
|-------------------------|-----|------|------|------|------|------|
| malignant lymphadenosis | m | 2.4 | 2.1 | 1.7 | 2.4 | 2.9 |
| | f | 1.7 | 2.9 | 1.7 | 2.4 | 3.3 |
| leukaemia | m | 4.5 | 5.4 | 3.5 | 3.5 | 3.3 |
| | f | 3.5 | 3.6 | 3.5 | 3.1 | 1.6 |
| others | m | 6.6 | 9.3 | 7.0 | 6.3 | 9.5 |
| | f | 3.5 | 7.1 | 6.3 | 3.5 | 3.3 |

health, including environment, social and economic conditions, life style, genetic factors, the complex interrelations of which determine the health state of a person and population life expectancy. One of the most important factors in human environment, which affects the health, is the level of pollution. Dynamics of key environmental indicators shows an increase of negative impact on the environment. In the Western region of the Republic of Kazakhstan gas and oil fields are intensively developed extracted (Kaiser et al., 2007). It is known that the production and use of resources cause many environmental problems related to pollution by oil products, heavy metals, carbon, sulfur, nitrogen oxides compounds and other substances (Dahl et al., 2001). In the works of many researchers it is proved that air pollution is an established risk factor for the development and recrudescence of many forms of respiratory diseases, with the further development of the respiratory tract cancer (Demetriou et al., 2012; Johansson et al., 2015). They studied the effect on the occurrence of cancer of pollutants associated with traffic, such as ultra-fine particles or diesel fuel, heavily concentrated along busy roads, exceeding the high background concentrations (Anderson et al., 2012; Künzli et al., 2013). In addition to air pollution from vehicles, household fires, biowaste burning, which are similar in composition characteristics, toxicity and exposure, stationary air industrial pollution sources have a greater impact on the development of respiratory cancer (Laumbach et al., 2012). It is proved that smoking also leads both to lung cancer, and cancer of oral cavity, esophagus and larynx (Siddiqi et al., 2015; Sinha et al., 2016).

A great attention is paid to genetic predisposition in development of esophagus cancer, as there are peculiarities in Asian and west populations. Therefore a special attention should be paid to the Asian population. This fact should be considered in research and clinical practice (Zhang et al., 2012; Matejcic et al., 2015). According to studies of An-Hui Wang in 85% of cases esophagus cancer is diagnosed over the age of 55 years old, male morbidity rate is higher than female. Tobacco consumption is the predominant risk factor for its development. Moreover alcohol drinking, overweight, presence of GERD are also risks for esophagus cancer development (Wang et al., 2014; Fahey et al., 2015). Besides the specified factors, we discuss potential hazards, such as hot beverages drinking, bad oral hygiene, gastroesophageal reflux, overweight, tobacco smoking, gastroesophageal hernia, achalasia, low level of fresh fruit and vegetables consumption, drinking of carbonated soft drink, usage of H2-blockers,

nonsteroidal anti-inflammatory drugs (Kamangar et al., 2009).

The main risk factor for the development of stomach cancer is the presence of Helicobacter infection. Health-detrimental behavior and poor nutrition, including high content of salt, smoking and alcohol drinking, may cause genotypical and phenotypical mutation of stomach epithelial cells. Gene mutations (for example, E-cadherin) in stomach epithelial cells are the main genetic reasons of stomach cancer (Engel et al., 2003; Cheng et al., 2016).

According to data of research conducted in Kazakhstan there is a connection of pollution with high level of pollution emissions into the atmosphere from stationary sources and incidence of mammary gland cancer. These results indicate the presence of environment causation in development of mammary gland disease. We also conducted research of cervix uteri cancer, distribution epidemiologic evaluation, study of morbidity and death rates (Igissinov et al., 2012).

The results of our study comply with studies data of the neighboring region of the Western Kazakhstan. Both in Uralsk and Aktobe the main disease localization are trachea, bronchi, lungs, then oncologic disease of stomach and esophagus. The same pattern is in the structure of mortality (Bekmukhambetov et al., 2015).

Thus, the results of our investigations and literature data show that the regional characteristics influence the degree of expression of many risk factors associated with the possibility of cancer. Unfavorable environmental background contributes to ill health of urban population, contributing the development of cancer. Moreover behavioral risk factors are very important, such as smoking, alcohol drinking, unhealthy diet. All these factors require urgent adoption of a package of measures for prevention, early detection and timely treatment of cancer.

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