Modern Trends of Mortality from Cardiovascular Diseases in the Novgorod Region

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Abstract

Over-mortality (68%) due to cardiovascular diseases is typical for the Novgorod region. Among external causes of death, the mental, endocrine, musculoskeletal system diseases and road traffic injuries are the most underestimated. The analysis revealed a problem of poor quality of intravital diagnosis and inadequate treatment of patients with cardiac pathology, taking into account the multiplicity of concomitant diagnoses. The causes of death analyzed are rarely comparable with the data of intravital observations on the main classes of diseases, which indicates the widespread prevalence of medical errors.

INTRODUCTION

Socio-economic changes taking place in Russia during the period 1990-2000, among other consequences, led to a pronounced deterioration in the health of the population, including an increase in mortality in all age and sex groups, and life expectancy reduction [10]. It is important to emphasize that such dynamics was noted both in Russia as a whole and in its separate regions [10].

It is expected that by 2020 85% of the global cardiovascular diseases (CVD) prevalence will be in developing countries. Therefore, there is an urgent need to understand how social changes in LIC, MIC and high IC (HIC) cause the increase in chronic diseases, such as CVD, to develop strategies that mitigate these effects [10,11, 12, 24].

In-depth analysis taking into account the factors affecting the health of the population is needed, and the development of an evidence-based information system that provides analysis and forecasting of the processes of population reproduction and health is required. A number of problems related to an in-depth analysis of the causes of morbidity and mortality arise for the analytical medicine. The inclusion of only those states that are the initial (main) cause of death in mortality statistics does not provide an opportunity to estimate the actual prevalence of pathology in the population.

All this causes the growing urgency of developing new methodological approaches in studying the mortality of the population and the creation of new information and analytical systems to ensure the integration of statistical information on mortality from various sources.

METHODS

Data of state statistics are used to characterize mortality. The analysis was carried out on the basis of data for 1991 - 2016. The causes of death are given in full accordance with the International Statistical Classification of Diseases and Health Related Problems of the Tenth Revision (ICD-10) [2, 4, 23]. All statistical indicators (coefficients) are calculated for 1000 (‰) or for 100 thousand of the population.

RESULTS

Cardiovascular diseases remain the main cause of high mortality of the entire population. Annually, the specific gravity of cardiovascular diseases is more than 60% of the total mortality in the region, about 70% of the deaths of women and more than 50% of men.

This ratio can be explained by the fact that the expected life expectancy of men is less than that of women, and the representatives of the older age group are most susceptible to cardiovascular diseases. The region entered the new century with the mortality rate from the CVD - 2013.1 per 100 thousand, which was a consequence of the growth of the indicator that began in 1991. In the first years of the 21st century, the death rate continued to increase and reached its peak at 2,246.3 per 100,000 in 2005. In the following years, the indicator was stabilized in the range of 1740 people per 100 thousand of population. In the proportional ratio, CVD occupy the leading average annual position in the range of 60% of all causes of death (Figure 1)
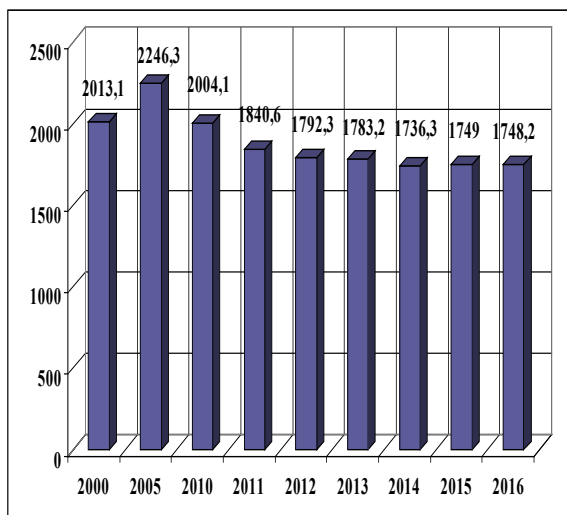

Figure 1. *The dynamics of mortality from cardiovascular diseases in the Novgorod region (per 100 thousand population)*

A similar picture is observed when assessing the dynamics of mortality of the population from cardiovascular diseases, which exceeds the indices for both the North-West Federal District and the Russian Federation. Moreover, this indicator is stable when accounting for hospital lethality is within 5-6% of the number of retired.
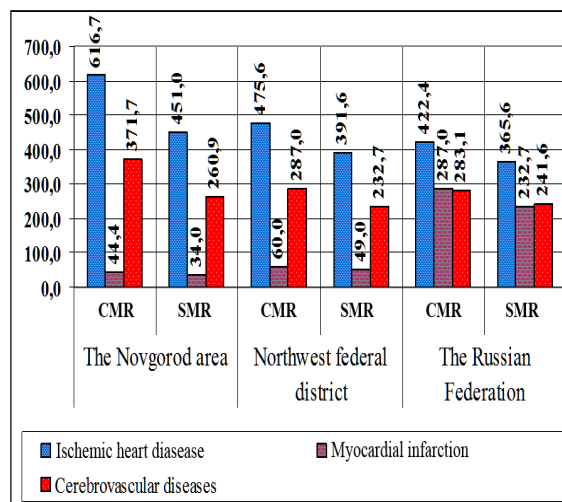

Figure 2. *The structure of mortality from cerebrovascular diseases per 100 thousand people (CMR – crude mortality rate, SMR – standartized mortality rate)*

The relative decrease in the index of hospital mortality from myocardial infarction is associated, first of all, with a sharp decrease in the number of cases of repeated infarctions.

When considering the structure of mortality from all cardiological pathology (Figure 2), one can see the prevalence (at times) of the death rate from ischemic heart disease (IHD) and cerebrovascular diseases in the Novgorod Region in relation to the death rate from acute and repeated myocardial infarction significantly different from those in the North-West Federal District and the Russian Federation.

The age-specific mortality rates from cardiovascular pathology are of dependent nature. This is especially evident in the incidence of IHD, although in general mortality is cascaded with a clearly defined linear regression step and can be described by a simple linear equation. Against the backdrop of the growing number of IHD and cerebrovascular diseases, mortality from myocardial infarction (MI) is very specific, as this indicator has significantly grown younger in recent years.

The presence of a repeated myocardial infarction (RMI) or third infarction of the myocardium (MI) in a patient is often associated not with the intensity of development of atherosclerotic changes, but with the quality of specialized medical care (the proportion of

beds with intensive methods of treatment in the area with MI is no more than 0.7% of the demand).

When assessing the age structure of the causes of death from the BSC, attention is drawn to a high proportion of diseases of the younger age group, which accounts for about 9% of all deaths. If in older age groups the main cause of death is IHD with atherosclerosis (the ratio of the death rate is 1.4, then in the younger age groups this ratio is 2.5). Obviously, in younger age groups, the frequency of both MI and IHD is of great importance for the spread of other cardiovascular risk factors [1, 19].

When assessing the official statistics, the prevalence of diseases characterized by AH (per 100,000 population) is 9324.7 in the Russian Federation; SPb 11685.0; the Novgorod Region – 16217.0. The death rate of persons of working age from cardiovascular diseases was – in RF - men - 234.1 and women 82.5; in the NWFO - men - 489.7 and women - 112.4; in the Novgorod region - men - 639.0 and women - 161.1 [4, 10].

With a gender assessment of the causes of death from CVD, it was found that the death rate from all cardiovascular diseases among men is significantly higher than that of women (P<0.0002). Moreover, the most interesting fact is that the structural relationship of gender does not depend on the disease and the ratio of the ratio is statistically homogeneous for the whole group of diseases (P>0.05).

Thus, it was established that cardiovascular diseases are the main cause of increased morbidity in the population and, respectively, mortality. The leading cause of death of the population is primarily ischemic heart disease and the second - myocardial infarction. If the myocardial infarction does not have a preclinical expression, then ischemic heart disease is a manifestation of a disease that can be detected already in the early stages of the disease. The reason is, first of all, in the absence of an emphasis on the early prevention of diseases on the health care system, but only on the orientation of the elimination of consequences.

An extremely important consequence of CVD is ischemic or traumatic cerebral stroke. In recent years, there has been a significant activation of the frequency of cerebral stroke (CS) as a complication of IHD or hypertension (AH). At the same time, there was a marked stabilization of the number of patients with CS in the last 5 years. However, this stabilization did

not occur at the expense of a decrease in the number of CS among the population, but due to the complete filling of the beds of neurological departments in the region's medical institutions, the low level of diagnosis of comatose patients and the almost complete absence of a system of early primary prevention of CS causes. Existing schools of arterial hypertension are focused on primary prophylaxis of AH and IHD without taking into account their fatal complications.

Accounting for the monthly dynamics of the incidence of CS among the population showed that the seizure for CS is characteristic due to the excess of the number of diseases immediately after the New Year holidays and during the mass harvesting works at the garden sites (September). In the rest of the time, the frequency of cerebral stroke is relatively stable.

On the background of changes in cardiac mortality, the internal picture deteriorated (Figure 3), primarily due to the increase in mortality from other heart diseases. In this regard, it is necessary to take into account its alcoholic component, which manifests itself not only through death from alcoholic cardiomyopathy (other heart diseases), but also increases the risk of death from coronary heart disease and cerebrovascular diseases, especially in the female population.
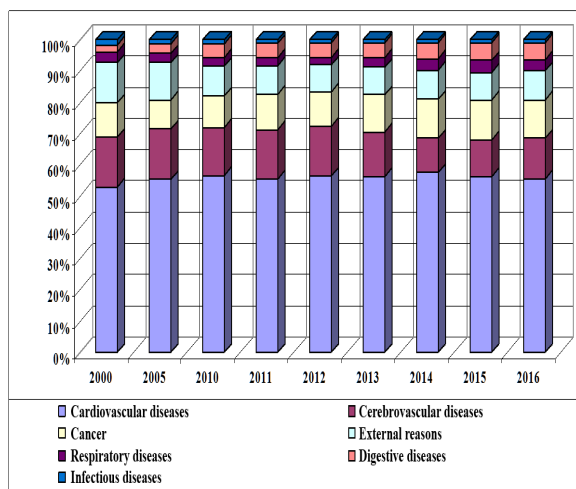
Figure 3. *Dynamics of the standardized death rate from the leading diseases in the Novgorod Region*

The abovementioned dependence affects, especially, the age group older than the working age. And this age group is characterized mainly by the incidence of IHD, mostly, angina pectoris of 2 or 3 functional class. The ability to detect unstable angina in the area is extremely limited due to the need to use functional tests in the diagnostic process.
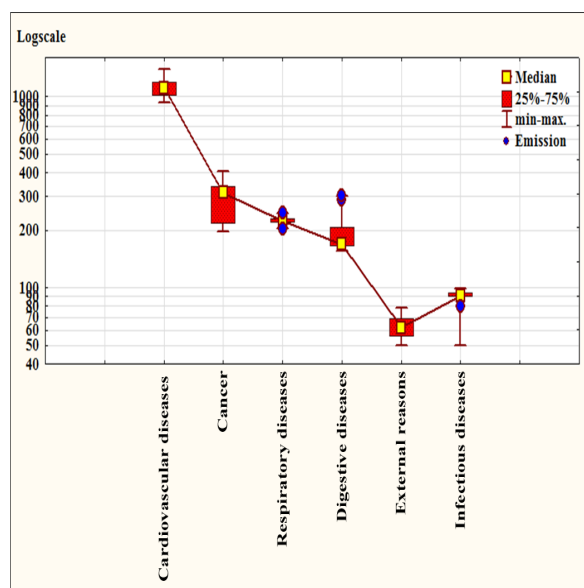
Figure 4. *Causes of death relation graph for Novgorod region*

As shown in Figure 4, the leading cause of death among the population of the Novgorod region is the class of circulatory system diseases, significantly, both in median size and in Gaussian density, exceeding other classes.

When assessing the dynamics of the severity of diseases of the cardiovascular system, it has been established that the duration of the case of arterial hypertension, coronary heart disease (in terms of stenocardia and acute myocardial infarction and chronic ischemic heart disease) has a clearly pronounced tendency to decrease. This was not due to a decrease in the severity of the disease, but to a reduction in the length of stay of the patient on the bed due to an increase in the turnover rate of the bed. A similar trend is due to a sharp increase in the number of diseases and a lack of specialized beds [1, 3, 4, 19].

A slightly different picture is observed when assessing the severity of cerebrovascular diseases. An increase in the length of the case for traumatic cerebrovascular diseases was noted, while a reduction in the duration of the case with a cerebral infarction was observed. Thus, the factors that influence mortality are not taken into account in studies: the general socioeconomic situation, the working and living conditions of the population, its way of life, behavior related to health and life expectancy, ecological and sanitary and hygienic conditions. While all these factors play a big

role in assessing the health status of the population, identifying unresolved health problems. At present, original research based on other methodological approaches that take into account these factors is needed.

Discussion

The data presented in the article indicate that the mortality rate in the Novgorod region is not typical for Russia. Each region of Russia has its unique risk factors and mortality in these regions also has its own peculiarities, as indicated by a number of Russian authors [13, 15, 16, 19]. Being the indigenous territory of Russia with a stable ethnic composition of the population, it is an endangered territory not by the prevalence of various diseases, but from one class of the disease that has a tendency to growth. This phenomenon in the statistics of mortality in the scientific literature has not previously been described and does not have such a pronounced tendency in other regions. We associate this phenomenon with a high level of depression (regardless of gender) among the population, a massive outflow of population to the megacities (Moscow and St. Petersburg) and a low social level. The most unfavorable social and economic conditions are distinctly expressed in the region and that is a special concern for the Federal authorities.

Conclusion

The factors that affect mortality are not taken into account in studies are as follows: the general socioeconomic situation [1, 9], the working and living conditions of the population, the way of life, behavior related to health and life expectancy, ecological and sanitary-hygienic conditions. While all these factors play an important role in assessing the health status of the population, identifying unresolved health problems. At present, original research based on other methodological approaches that take into account these factors is needed [1, 18, 19].

The research data shows the need for a detailed multi-purpose study of the information content of conventional risk factors for chronic non-infectious diseases, reviewing the system of recording and diagnosing fatal diseases, and translating the principles of diagnosis of diseases in the pre-illness state through the widespread introduction of phenotyping

of chronic non-infectious diseases [12, 20, 21, 22, 24]. Therefore, in 2017 Novgorod Region is included in the international PURE study with subsequent comparison of the results with data other territories and countries.

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