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DYNAMICS OF MORTALITY FROM DISEASES OF THE CIRCULATORY ORGANS IN BULGARIA, SOUTH CENTRAL REGION AND PLOVDIV PROVINCE

Ivanka Kulevska-Gonovska[1], Emil Spasov[1], Румяна Янева[1]*

[1]Department of Health Economics, Faculty of Public Health "Prof. Tzekomir Vodenicharov, MD, DSc", Medical University – Sofia, Sofia, Bulgaria, e-mail: ikulevska@yahoo.com; dr_espassov@yahoo.com; yaneva.1968@abv.bg

Abstract: In the European Union, Bulgaria ranks first in terms of mortality and last in terms of life expectancy. According to Eurostat data for 2018 in Bulgaria, from 2011 until this moment, the coefficients of both preventable mortality with good prevention and mortality preventable with good treatment are higher than the corresponding values for the EU as a whole. There are no prospects for their improvement. The rate of preventable mortality with good prophylaxis reached 226 per 100,000 population, which is significantly higher than the value of the rate in the whole EU (160 per 100,000). On the one hand, weak primary prevention and health promotion, and on the other hand, the need to improve protocols for diagnosis and treatment of the leading causes of death can be pointed out as reasons.

The aim of the present study is to perform a comparative analysis of the dynamics of mortality from diseases of the circulatory organs for Bulgaria, its South Central Region and the Plovdiv province as part of this region.

Materials and methods: documentary analysis - based on data from the National Statistical Institute; inductive and deductive methods; comparative analysis; structural analysis; economical analysis; statistical methods - analysis of the dynamics of phenomena, tabular and graphic analyzes - to visualize the obtained results.

Results: Both for Bulgaria as a whole, as well as for its South Central region and the Plovdiv province, there is a trend of increasing mortality (per 100,000 people of the population) from diseases of the circulatory organs.

Conclusion: From the data of our study, it is clear that, in general, for the observed 10-year period, and more specifically for the last of the years under consideration - 2022, for the entire country, the highest relative share in mortality (per 100,000 population) is occupied by other diseases of the heart. For the South Central region, the mortality rate from ischemic heart disease is the highest. The situation is similar for the Plovdiv province, as part of this region, where the relative share is also the highest - a noticeable 44.0% of the mortality from IHD.

Recommendations: A comprehensive approach and addressing health inequities in all areas aimed at reducing the burden of cardiovascular disease as part of non-communicable chronic diseases is imperative. Of primary importance is the fact that health promotion and disease prevention can lead to a significant reduction in this burden.

Keywords: *mortality, circulatory system diseases, South Central region, Plovdiv province, risk factors*
Field: Medical sciences and Health

1. INTRODUCTION

In the European Union, Bulgaria ranks first in terms of mortality and last in terms of life expectancy.

According to Eurostat data for 2018 in Bulgaria, from 2011 until now, the coefficients of both preventable mortality with good prevention and mortality preventable with good treatment are higher than the corresponding values for the EU as a whole. There are no prospects for their improvement. The rate of preventable mortality with good prophylaxis reached 226 per 100,000 population, which is significantly higher than the value of the rate in the whole EU (160 per 100,000). [4,5]. On the one hand, weak primary prevention and health promotion, and on the other hand, the need to improve protocols for diagnosis and treatment of the leading causes of death can be pointed out as reasons. [4]

Ischemic heart disease (IHD) is the second leading cause of death after cerebrovascular disease. IHD accounted for 11% of all deaths, despite a sharp decline since 2000. Due to the reduction of some behavioral risk factors, and in part to improved early diagnosis and treatment, this decline has been more pronounced among women than among men (such as free annual medical examinations for cardiovascular disease and increased use of hypertension drugs). [3]

The average death rate for the EU, preventable through good treatment - 92 per 100,000 people is twice lower than that in Bulgaria, where it is 188 per 100,000 people. A total of 42% of all deaths due to

*Corresponding author: ikulevska@yahoo.com

treatable causes were premature deaths from stroke (23%) and ischemic heart disease (19%).[5]

Almost 3 times higher is the standardized mortality rate from diseases of the circulatory organs in Bulgaria - 1,115.8 per 100,000 people, while the average for the EU is 356.6 per 100,000 people. [4,5]

As is known, not only classic cardiovascular risk factors (arterial hypertension, smoking, dyslipidemias, obesity, immobility, genetic predisposition, etc.) are the reason for the development and occurrence of diseases of the circulatory organs. A number of personality problems, psychological balance, the role of the value system, socio-economic conditions and stress also have a significant impact. I.e. the risk of developing these diseases is determined to a significant extent by a number of individual and population characteristics (demographic structure of the population, income, national culture, education, customs, etc.) and the level of health care. [7,8]

The aim of the present study is to perform a comparative analysis of the dynamics of mortality from diseases of the circulatory organs for Bulgaria, its South Central region and the Plovdiv province as part of this region.

Study period - 2013-2022.

2. MATERIALS AND METHODS

For the research we used: documentary analysis - based on data from the National Statistical Institute, inductive and deductive methods, comparative analysis, structural analysis, economic analysis, statistical methods - analysis of the dynamics of phenomena, tabular and graphic analyzes - to visualize the obtained results.

3.RESULTS

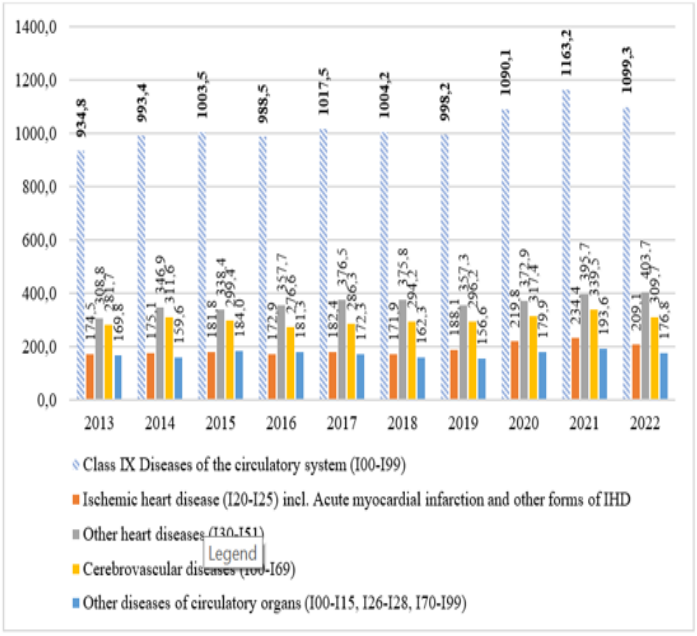

Fig 1. Mortality from diseases of the circulatory organs (per 100,000 people of the population) - total for Bulgaria

Source: National Statistical Institute
Note: Data are from the Harmonized List of 86 Reasons developed by Eurostat, used for international comparisons.

From figure 1, it is clear that the mortality rate from diseases of the circulatory organs (per 100,000 people of the population) for the considered 10-year period in general for Bulgaria shows an increasing trend by 17.6%, with the peak value being in 2021.

The highest increase values (by 30.7 percent) are characteristic of other heart diseases (I30-I51), followed by mortality per 100,000 people from ischemic heart disease (I20-I25), including . acute myocardial infarction and other forms of ischemic heart disease (by 19.8%). The increase in cerebrovascular diseases (I60-I69) was by 10 percent, and the lowest (by 4.1%) was the increase in mortality from other diseases of the circulatory organs (I00-I15, I26-I28, I70-I99).

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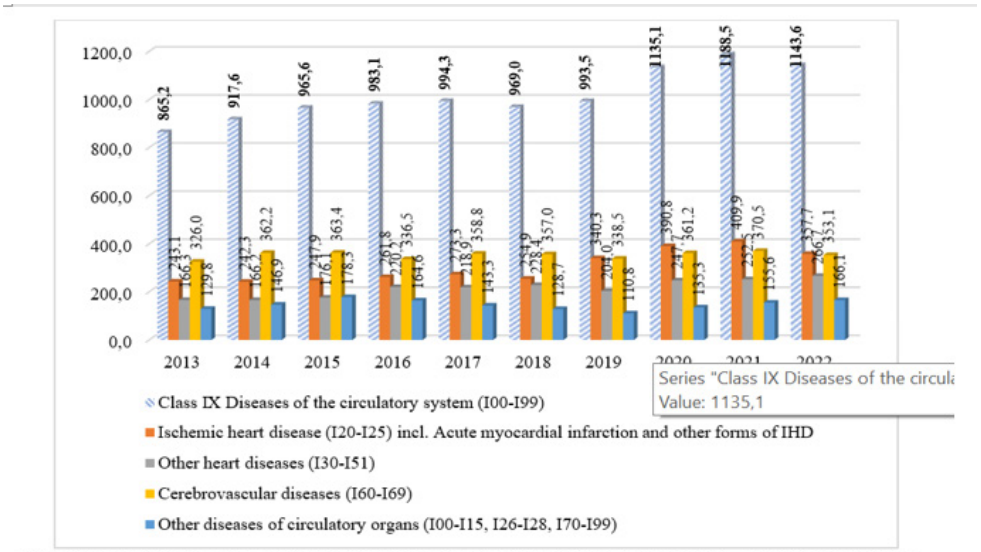

Fig. 2. Mortality from diseases of the circulatory organs (per 100,000 of the population) - South Central Region

The health care system in the South Central region is relatively well developed and covers the health care needs of the population in accordance with the standards of the country. [11] For the region, the dynamics of mortality rates from diseases of the circulatory organs (per 100,000 people of the population) is as follows:

And here the trend is on the rise. In total, for the period 2013-2022, the increase was 31.2%. There was a 60.4 percent increase in deaths per 100,000 people from other heart diseases, followed by a 47.1 percent increase in deaths from ischemic heart disease and a 28 percent increase in deaths from other diseases of the circulatory system.

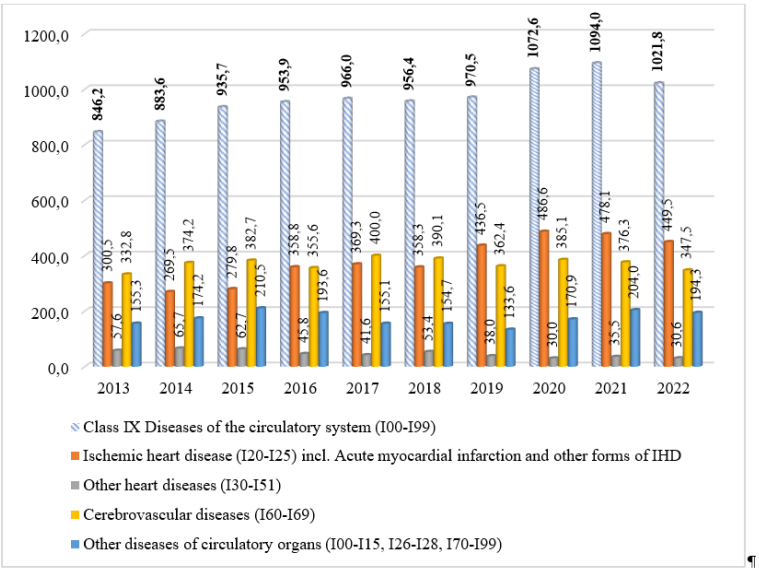

Fig. 3. Mortality from diseases of the circulatory organs (per 100,000 people of the population) - Plovdiv province
Source: National Statistical Institute

Plovdiv is one of the provinces with the largest number of doctors and hospital beds per capita. The index of accessibility to specialist doctors is significantly more favorable than the average for the country. Plovdiv is the province with the highest number of patients undergoing treatment. [2]

Figure 3 shows that in the Plovdiv province the increase was 20.8 percent for the period 2013-2022. With the largest relative share of 49.6% increase in mortality per 100,000 people in 2022 of ischemic heart disease, followed by an increase of 46.9% in other heart diseases. Other diseases of the circulatory system increased by ¼, and cerebrovascular diseases by only 4 percent

Table 1. Structure of mortality from diseases of the circulatory organs (per 100,000 people of the population) for 2022.

	Bulgaria - total	South Central Region	Plovdiv province
Class IX Diseases of the circulatory system (I00-I99)	**100.0%**	**100.0%**	**100.0%**
Ischemic heart disease (I20-I25) incl. Acute myocardial infarction and other forms of IHD	19.0%	31.3%	44.0%
Other heart diseases (I30-I51)	36.7%	23.3%	3.0%
Cerebrovascular diseases (I60-I69)	28.2%	30.9%	34.0%
Other diseases of circulatory organs (I00-I15, I26-I28, I70-I99)	16.1%	14.5%	19.0%

Source: National Statistical Institute

Table 1 presents the structure of mortality from diseases of the circulatory organs (per 100,000 people of the population) for 2022.

As it becomes clear, for the entire country, the highest relative share (36.7%) in mortality (per 100,000 population) is occupied by other heart diseases (I30-I51), followed by cerebrovascular diseases (28.2%). The arrangement is different in the South Central region, in which ischemic heart disease and cerebrovascular disease account for approximately 31.3 and 30.9 percent, respectively. The situation is similar for the Plovdiv province, where the relative share is also the highest, with a notable 44.0% of mortality from ischemic heart disease. Again, the second place is occupied by the mortality rate (per 100,000 people of the population) from cerebrovascular diseases 34.0%.

In third place (19.0%) for the entire country is the considered type of mortality from ischemic heart disease, for the South Central region (23.3 percent) are other heart diseases (I30-I51), and for the Plovdiv province (19.0%) - other diseases of the organs of blood circulation.

The lowest is the relative share of the observed indicator for Bulgaria and the South Central region of other diseases of the circulatory organs (I00-I15, I26-I28, I70-I99), respectively 16.0% and 14.5%. Against this background, it is impressive that only 3.0% of mortality (per 100,000 people of the population) from other heart diseases (I30-I51) were reported for the Plovdiv province.

4. DISCUSSION

The general conclusion reached by the scientists who carried out scientific studies examining the reasons for the reduction of mortality from cardiovascular diseases (CVD) in the USA and some European countries is that half of the effect is due to limiting the main risk factors - diet, smoking and physical activity. At the same time, the other half is due to the progress of medical science and practice, especially in recent years. Invasive and non-invasive treatment methods (highly effective new drugs and operative interventions) focused on individuals with clinically evident disease are included here. In these countries, the burden shift from CVD and other chronic diseases is at a higher level among older people. It is important to note that the active prevention of negative risk factors mainly among the young population of economic reproductive age is the essence of the effect of reducing cardiovascular mortality.

In contrast to developed countries, where prevention and treatment push the clinical manifestation of CVD to an increasingly advanced age, in developing countries, the age of target organ involvement is increasingly decreasing. Moreover, in developed countries, the social security system bears most of the burden of CVD. In developing countries, institutional social care is often lacking, long-term care is most often provided by another elderly family member. Indicators show that disability is no less a social and economic burden than premature death. CVDs cause at least 1/3 of all disability in the over 60 age group [8]

In our country, the situation is more alarming. Diseases of the circulatory system have been the leading cause of death for decades. Due to the fact that they are mainly carried out by the health system, the measures implemented at the country level at this stage do not give a significant result. Despite the enormous losses - material and human due to this type of disease, public structures and citizens do not actively behave in this direction. The future of the nation and its prosperity depends on dealing with these diseases, which is why health promotion and their prevention should become a national task. [7,8]

According to WHO data, in recent years there has been an increase in the relationship between chronic non-communicable diseases in general and cardiovascular diseases in particular and air pollution,

other environmental factors, psychological, social and economic risks. Therefore, premature mortality from chronic non-communicable diseases (Sustainable Development Goal 3.4) is an appropriate marker of how the region is performing in terms of preventing and addressing unhealthy behaviors and risk factors on the one hand, and the performance of health systems on the other. Central to determining the success of at least nine Sustainable Development Goals (SDGs) will be progress in addressing NCDs problems. [9]

5. CONCLUSIONS

In Bulgaria, diseases of the organs of blood circulation are characterized by a significantly higher level of morbidity and mortality among the population compared to the EU. In addition, they also have emerging unfavorable dynamics over time. On the one hand, a large part of people of active age are affected, and on the other hand, these diseases occupy a high share in the structure of the causes of death among the population. CVDs also occupy a high share in the structure of treatment and rehabilitation costs, they also require the intervention of highly qualified and specialized medical assistance, as well as complex treatment, in which expensive medications are used. This is also the reason why they are popularly known as "socially significant diseases", because of the cruel societal price we pay not only in financial means, but also in lost years of life and life in good health.

From the data of our study it is clear that in general for the observed 10-year period and more specifically for the last of the years under consideration - 2022 for the whole country the highest relative share (36.7%) in mortality (per 100,000 people population) occupy other diseases of the heart (I30-I51), followed by cerebrovascular diseases (28.2%). The arrangement is different in the South Central region, in which ischemic heart disease and cerebrovascular disease have approximate shares of 31.3 and 30.9 percent, respectively. Similar to the region of which it is a part is the situation for the Plovdiv province, where the relative share, with a notable 44.0%, of mortality from ischemic heart disease is also the highest. Here again, the mortality from cerebrovascular diseases ranks second, 34.0%.

6. RECOMMENDATIONS

A comprehensive approach and addressing health inequities in all areas aimed at reducing the burden of cardiovascular disease as part of chronic non-communicable diseases is imperative. Of paramount importance is the fact that health promotion and disease prevention can significantly reduce this burden. [5]

The impact of non-communicable chronic diseases goes beyond ill health and poor well-being, as they also cause huge economic losses. Diseases of the organs of blood circulation, as part of chronic non-infectious diseases, are mainly grouped in people with low socio-economic status and are an important cause of high health care costs. Increased efforts are needed in multiple sectors - effective economic instruments such as price policies and insurance. [9]

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