

NON-COMMUNICABLE DISEASES IN REPUBLIC OF SERBIA: CAUSES AND CONSEQUENCES

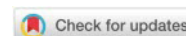
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Abstract: The growing trend of chronic non-communicable diseases, which affects both developed and developing countries, is linked to changes in diet and lifestyle. Despite numerous epidemiological pieces of evidence and recognized risk factors for the development of chronic non-communicable diseases, there are still worrying indicators of morbidity and premature mortality as a consequence of non-communicable chronic diseases. The goal of the work is to point out the urgent need to create effective and sustainable health policies that would provide answers to growing public health challenges. Additionally, the authors emphasize in the paper the key risk factors and the necessity of transforming patterns of inadequate behavior in order to mitigate, and in the future, to stop the unfavorable trend of newly diagnosed cardiovascular diseases, stroke, diabetes, and cancer, as the leading causes of disability and premature death, as well as to reduce the burden on health funds

Keywords: *non-communicable diseases, cardiovascular diseases, malignant diseases, respiratory diseases, diabetes*

Field: Medical Sciences and Health

1. INTRODUCTION

The established way of life and habits need to be changed, starting with increasing physical activity, improving eating habits, as well as reducing exposure to a large number of external harmful influences. In this sense, primary prevention plays an irreplaceable role, which means preventing the onset of disease by removing harmful effects, that is, by implementing desirable behavior. For example, a large number of malignant diseases can be prevented through primary prevention measures related to the reduction of risk factors such as smoking, inadequate nutrition, the presence of carcinogens in the workplace or living environment. (Republican expert commission for the development and implementation of guidelines in clinical practice, 2005) Although preventable, chronic non-communicable diseases are the leading causes of illness, absenteeism, disability, and premature death in the world. A key fact shows that 41 million people die each year from non-communicable diseases, which is equivalent to 74% of all deaths in the world. Additionally, every year 17 million people die from chronic non-communicable diseases before the age of 70, and even 86% of these premature deaths are recorded in low- and middle-income countries. (WHO, 2023a) The Republic of Serbia has not been spared from these negative trends: the aging of the population and the negative social and economic trends of recent decades have affected the health status of the population. The transition of the state and society led to the fact that the health potential of the nation was exhausted, resulting in negative health indicators whose improvement is slow in the time of socio-economic recovery. (Radevic et al., 2022)

Given that science does not have all the answers to how some diseases arise, significant attention must also be given to secondary prevention, that is, early detection of diseases. Education and mass preventive programs in the early detection of the disease, when the chances of cure are incomparably greater, have no alternative. The decision of the World Health Organization (WHO) to extend the Global Action Plan for the Prevention and Control of Chronic Non-Communicable Diseases 2013-2020 until 2030 should be viewed in this context. The WHO Roadmap supports actions that should accelerate progress in the prevention and control of chronic noncommunicable diseases. The goal is to reduce premature mortality by one-third by 2030. (WHO, 2023a)

Chronic non-communicable diseases have common characteristics (Hovan Somborac, 2022):

- Multicausality: they arise as a result of the unfavorable action of several factors at the same time;
- Irreversibility of tissue and organ or system damage;
- Insidiousness in the development of forms that are more difficult to access for diagnosis;
- Diseases are lifelong, although with continuous and consistent treatment, their development can be stopped or slowed down;

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- The treatment is long-term, and the results depend on the quality of the treatment;
- In the course of the development of the disease, it occasionally worsens;
- Health care must be continuous, comprehensive and long-lasting;
- Preventability, thanks to the ability to act on risk factors.

Established unhealthy eating habits, as well as a significant reduction in physical activities, result in an increase in obese people, which represents a significant health risk. Of great importance for public health is the finding that the prevalence of obesity has an exponential trend in almost all regions of the world. Morbidity associated with obesity and its complications reduces life expectancy and results in an unacceptable and unsustainable cost burden for health institutions and society as a whole. (Knežević & Jandrić Kočić, 2023) Physical activity is a fundamental tool in achieving physical and mental health, bringing more health, social, and economic benefits by reducing the risk of developing chronic non-communicable diseases. Regular physical activity in the elderly maintains functional independence, while at all ages it enhances the quality of life. (Petković Košćal et al., 2007)

Chronic non-communicable diseases cause 41 million deaths annually worldwide. Cardiovascular diseases hold the leading position, contributing to a total mortality of 17.9 million, followed by malignant diseases with 9 million deaths, chronic respiratory diseases with 3.9 million, and diabetes mellitus with a participation of 1.6 million deaths. (Lazić et al., 2020) The most common causes of death in 2022 in the Republic of Serbia belong to the following disease groups - ICD-10. (Institute of Public Health of Serbia, 2023):

- Diseases of the circulatory system: 47,3% (men 43,1% and women 51,5%);
- Tumors: 18,5% (men 20,1% and women 16,8%);
- COVID-19: 7,6% (men 8,3% and women 6,9%);
- Diseases of the respiratory system: 6,0% (men 6,8% and women 5,3%);
- Diseases of glands with internal secretion, nutrition and metabolism: 3,0% (men 2,7% and women 3,2%).

From 2013 to 2022, the overall mortality rate in the Republic of Serbia increased by 17.4%. During that period, mortality rates from diabetes increased by 18.9%, heart and blood vessel diseases by 4.6%, while fewer deaths from injuries and poisoning were registered, declining by 15.3%. Deaths from cancer increased by 1.1%, and from obstructive lung diseases by 0.3%.

2. CARDIOVASCULAR DISEASES

Cardiovascular disease is a major contributor to the global burden of disease among noncommunicable diseases. The World Health Organization attributes the majority of global deaths to cardiovascular disease (17.9 million), with the highest mortality in developing and low- and middle-income countries. (WHO, 2023a) Epidemiological research has led to the conclusion that risk factors for the development of cardiovascular diseases can be divided into changeable and non-changeable. Genetic material, sex, and age are immutable risk factors, but they are closely related to modifiable risks that include behavioral factors (diet, physical activity, alcohol and tobacco consumption), biological factors (hypertension, obesity, dyslipidemia, hyperinsulinemia), and finally social factors, which include interactions of socioeconomic, cultural, and environmental parameters. (Lazic et al., 2020)

Table 1. Number of deaths from cardiovascular diseases (Serbia), 2013-2022 (100-199)

Diseases and conditions	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Female	28.862	29.302	29.686	28.314	29.306	28.481	28.218	29.688	30.304	27.929
Male	24.505	24.691	24.690	23.788	24.362	24.182	24.112	25.617	26.306	23.696
Total	53.367	53.993	54.376	52.102	53.668	52.663	52.330	55.305	56.610	51.624

Source: Miljus, 2023.

By preventing and controlling diseases of the heart and blood vessels, it is possible to significantly improve health. Control of these diseases can be achieved through prevention at the individual and population levels, reducing inequalities in health, joint action of health and non-health sectors, early detection (screening), preventive interventions, and promotion of protective factors. (Official Gazette of

the Republic of Serbia, 2010)

The cardiovascular benefits of physical activity and exercise are multifactorial and include important systemic effects on skeletal muscles, peripheral vasculature, metabolism, neurohumoral system, as well as changes in the heart muscle itself. Certain epidemiological studies have shown that the effects of physical activity can be achieved with moderate physical activity of about 150 minutes per week, while additional health benefits are obtained with an increase in the volume or intensity of physical activity. (Jakovljević & Djordjević, 2017)

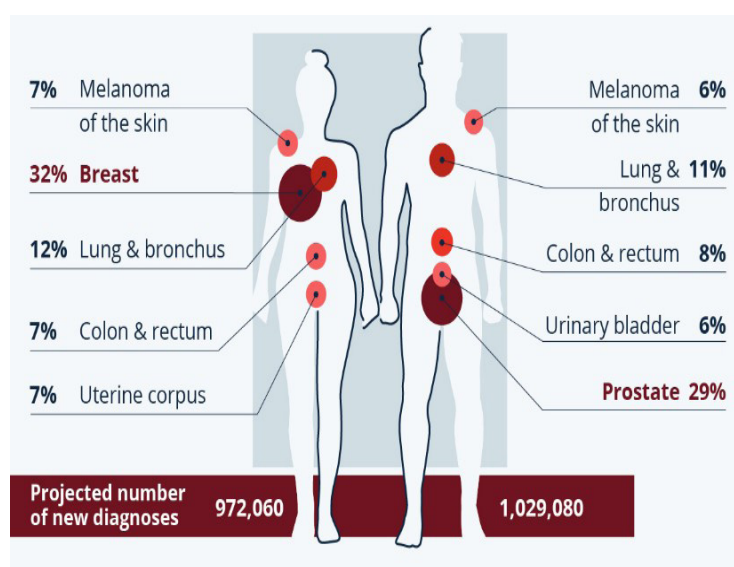
Sarčević et al. (2014) warn that excessive salt intake in the human diet results in a drastic increase in cardiovascular diseases: numerous studies confirm that to maintain metabolic processes, a daily intake of 1.5 grams is sufficient, while the American Heart Association recommends a daily intake of 8-15 grams. In populations that consumed less than 3 grams of salt per day in the 20th century, the absence of hypertension was recorded.

Pointing out that Serbia ranks first in Europe in terms of mortality from cardiovascular disorders (410/100,000 Europe: 504/100,000 Serbia), Bojić (2014) highlights insomnia and sleep disorders as significant, but still insufficiently recognized health and economic burdens and risk factors for cardiovascular and cerebrovascular diseases. The most common types of insomnia that lead to cardiovascular consequences are primary insomnia and insomnia related to breathing disorders. These forms of insomnia are independent risk factors for hypertension, coronary heart disease, and the onset and worsening of heart failure.

3. MALIGNANT DISEASES

Although cardiovascular diseases are still the leading cause of death in the world, in some developed countries cancer mortality is increasing alarmingly. According to the indicators of the World Health Organization, in 2022, 20 million new cases of cancer will be diagnosed in the world and 9.7 million will die. The estimated number of people who would survive within five years of a cancer diagnosis was 53.5 million. Approximately 1 in 5 people will get cancer during their lifetime, and 1 in 9 men and 1 in 12 women will die from the disease. (WHO, 2024) The American Cancer Society estimates that in 2024, the number of new cases in the US will exceed two million for the first time, or 5,500 cancer diagnoses per day. The main types of cancer affecting men and women will remain largely the same as in previous years: the most commonly diagnosed cancers are breast cancer in women and prostate cancer in men. (Buchholz, 2024) This trend is largely influenced by the aging and growth of the population, as well as the increase in diagnoses of six of the 10 most common cancers: breast, prostate, endometrial, pancreatic, kidney and melanoma. In 2024, more than 611,000 cancer deaths are projected in the US, which is 1,600 per day. (Collins, 2024)

Figure 1. The most Common Types of Cancer in the U.S.
Projected share of new cancer diagnoses in the U.S. in 2024, by gender



Source: American Cancer Society, 2024.

Malignant tumors in women in the Republic of Serbia are most often diagnosed in the breast, bronchus and lungs, colon and rectum, while in men the most common cancer is the bronchus and lungs, followed by colon and rectal cancer and prostate cancer. In 2020, 41,419 people suffered from malignant tumors: 22,110 men and 19,309 women. The values of the incidence rate in women were 271.6 per 100,000, and in men 328.2 per 100,000 inhabitants.

In the same year, 20,767 patients died of cancer, 11,611 men and 9,156 women. The mortality rate from cancer in women is 104.1 per 100,000 inhabitants, and in men 156.7 per 100,000 inhabitants (Mortality is the number of deaths).

Mental disorders that come in comorbidity with a tumor greatly reduce the quality of life and have an impact on the success of treatment. Early detection of mental disorders, screening, development and use of appropriate scales in disease diagnosis, as well as the selection of appropriate therapy are prerequisites for improving the quality of life and influencing a favorable prognosis. Special emphasis should be placed on psycho-oncology, a team and multidisciplinary approach that is the only one that can provide timely and quality help to cancer patients. (Vuk Pisk et al., 2017).

Research carried out in Serbia showed that a large part of the population does not recognize the risk factors that are responsible for the occurrence of the most common cancers, while a significant part of the population has two or more risk factors at the same time, such as smoking tobacco, insufficient physical activity, improper diet, obesity or excessive alcohol consumption. (Miljuš, 2021: 96)

Table 2. Number of deaths from malignant neoplasms (Serbia), 2013-2022 (C00-C97)

Diseases and conditions	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Female	8.990	9.205	8.998	9.273	9.388	9.433	9.206	9.156	9.005	8.734
Male	12.101	12.117	12.377	12.253	12.087	12.174	12.134	11.611	10.974	10.616
Total	21.091	21.322	21.375	21.526	21.475	21.607	21.340	20.767	19.979	19.350

Source: Miljus, 2023.

3. CHRONIC RESPIRATORY DISEASES

Chronic respiratory diseases (CRD) affect the airways and other lung structures, with some of the most common being chronic obstructive pulmonary disease (COPD), asthma, occupational lung diseases, and pulmonary hypertension. Risk factors include tobacco smoking, including passive smoking, air pollution in open and closed spaces, occupational exposure to gases and particles, and genetic predispositions. (Institute for Public Health of Montenegro) The World Health Organization (WHO, 2023b) indicates that smoking is still one of the leading causes of chronic obstructive disease, which kills more than three million people every year. An estimated 392 million people live with COPD, and three-quarters of them live in low- and middle-income countries.

Respiratory system diseases in the Republic of Croatia place the greatest burden on general/family medicine. In 2018, 1,719,988 diagnoses were established in general medicine offices, accounting for 17% of the total number of established diseases and conditions. Most diseases are respiratory infections, with obstructive diseases of the respiratory system responsible for 5.8% of diagnoses among respiratory diseases (99,695 visits), and it's noted that the use of primary health care for the 0-6 and 7-19 age groups is declining. (Antoljak, 2021)

Kuhajda et al. (2022) emphasize the importance of respiratory rehabilitation as the basis of non-pharmacological treatment for patients with chronic obstructive disease, citing numerous positive effects on the most significant symptoms of the disease and quality of life. Latincic et al. (2023) highlight the relevance of using pharmacological treatment, including bronchodilators, systemic steroids, and/or antibiotics. As a non-pharmacological strategy for the treatment of acute exacerbations of chronic obstructive pulmonary disease associated with acute respiratory insufficiency, they emphasize the importance of applying respiratory support in the form of oxygen therapy and non-invasive ventilation.

Table 3. Number of deaths from leading non-communicable diseases by sex (Serbia), 2013-2022 (J40-J47)
Chron. Opstr. Lung disease

Diseases and conditions	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Female	997	982	1.065	1.066	1.188	1.117	1.118	1.084	976	1.023
Male	1.590	1.517	1.658	1.603	1.731	1.591	1.603	1.483	1.382	1.366
Total	2.577	2.499	2.723	2.669	2.919	2.708	2.721	2.567	2.358	2.389

Source: Institute of Public Health of Serbia, 2023.

4. DIABETES

Diabetes mellitus, or sugar disease, is a set of metabolic disorders manifested by hyperglycemia, which occurs due to disorders in the secretion and/or action of insulin. It is a progressive, chronic disease that affected 463 million people worldwide in 2019, with an estimated number of sufferers reaching 700 million in 2045. The number of people with type 2 diabetes (T2DM) is significantly higher, with an estimate that almost half of the sufferers are over 65 years old. (Stanić Romić et al., 2023) It is estimated that around 10% of the population suffers from diabetes, with a tendency for the number of sufferers to increase, both younger and older. Such a trend is associated with obesity, less physical activity, and lifestyle. There are arguments that cigarette smoking and alcohol influence the occurrence of circulatory and inflammatory changes. (Vučetić, 2023: 35) Previous research into risk factors for type 2 diabetes mellitus indicates the possibility of preventing this disease by correcting lifestyle. Knowledge about diabetes and its complications, knowledge of risk factors for the onset of the disease, and a good personal perception of one's own risk for diabetes seem to be crucial for behavior change. (Pajić et al., 2022)

In 2019, 7.8% of the population over the age of 15 suffered from diabetes in Serbia (7.5% of men and 8.0% of women). In the age group 65+, 18.6% of the population of Serbia had diabetes, significantly more in urban areas than in rural areas. Based on the standardized mortality rate of 14.8 per 100,000 inhabitants, Serbia belongs to the group of European countries with high rates of dying from this disease. (Institute of Public Health Pančevo, 2023) Diabetes is the fifth leading cause of death in the world, and the third in Serbia, among all causes of death. Annually, approximately 3,000 people die from this disease in Serbia. An increase in deaths has been observed in the last ten years: the mortality rate from diabetes has increased from 39.1 in 2013 to 46.5 per 100,000 inhabitants in 2022. (Institute of Public Health of Serbia, 2023: 79)

Table 4. Mortality rates (per 100.000) from the most common non-communicable diseases by sex (Serbia)

Diseases and conditions	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Female	41,5	38,73	46,4	49,9	53,5	48,6	47,8	52,7	53,74	48,7
Male	36,6	31,6	38,7	39,3	45,7	42,3	40,2	45,5	44,2	44,2
Total	39,1	35,2	42,7	44,8	49,7	45,5	44,1	49,2	49,1	46,5

Source: Institute of Public Health of Serbia, 2023.

Type 1 diabetes is one of the most common diseases in children and young people. The annual incidence in children aged 0-14 years in Europe has a wide range, from 3.2/100,000 in Macedonia, 14.8/100,000 in Serbia to 64.2/100,000 in Finland. In many countries around the world, the annual increase in the frequency of this disease in childhood amounts to 3 to 5%. The disease is equally prevalent in both sexes, and its frequency increases with age, with the highest incidence registered during puberty. (Ministry of Health of Serbia, 2013:59)

Numerous studies have confirmed the positive correlation between aging and the incidence of diabetes: the frequency is particularly pronounced in the age cohort of 60 to 74 years (17.6%). Also, the micro and macrovascular level of complications of diabetes is of concern: patients with this diagnosis live 5 to 10 years shorter than the healthy generation, with cardiovascular and amputation risks that are many times higher. (Vrdoljak & Pavlov, 2014)

5. CONCLUSION

Chronic non-communicable health disorders represent a key public health problem worldwide, with clearly differentiated risk factors: hypertension, hypercholesterolemia, smoking, alcohol consumption, improper diet, obesity, and insufficient physical activity. Therefore, it is necessary to continuously ensure quality data on the leading non-communicable health disorders, modern and safe IT support with a feedback system of information, as well as more meaningful education of health workers, with a focus on primary health care programs. Respecting evidence-based medicine, the authors suggest the standardization of diagnostic-therapeutic procedures with the latest global achievements. In this sense, it is desirable to create a list of knowledge and skills necessary for activities that could contribute to strengthening public health care, as well as the creation of effective and cost-effective programs for continuous monitoring, prevention, and control of leading non-communicable health disorders. It is necessary to persevere in the establishment and full implementation of a unique protocol for diagnosing, treating, and monitoring chronic non-communicable diseases, along with continuous patient education. However, it should be noted that reducing the number of premature deaths and significantly reducing the burden, morbidity, and disability is not possible without a broader multisectoral approach to creating a new socio-economic and ecological paradigm that will catalyze the complete elimination and reduction of people's exposure to risk factors for the development of chronic non-communicable diseases.

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