Medicinska istaživanja 2024; 57(1):1-8 | DOI: 10.5937/medi57-47127

OPEN ACCESS

Medical Research | Published by Faculty of Medicine University of Belgrade

REVIEW

The concept and importance of ideal cardiovascular health

Janković Janko[1]

[1]University of Belgrade, Faculty of Medicine, Institute of Social Medicine, Belgrade, Serbia

Recived: 16 October 2023

Revised: 28 November 2023

Accepted: 25 December 2023

Check for updates

Funding information:
The authors received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interests:
The authors have declared that no competing interests exist

Correspondence to:
Janko Janković
Institute of Social Medicine
Faculty of Medicine, University of Belgrade
15, Dr Subotica Street, 11000 Belgrade, Serbia
E-mail: janko.jankovic@med.bg.ac.rs; drjankojankovic@yahoo.com

Summary

Cardiovascular diseases (CVD) are the leading cause of death worldwide. In 2019, 17.9 million people died from CVD which accounts for 32% of all deaths globally. The burden of CVD in a given population is related to the cardiovascular health (CVH) of that particular population. In 2010, The American Heart Association initiated a new concept of ideal CVH focused on two groups, health behavior components (smoking, body mass index, physical activity, and diet) and health components (total cholesterol, blood glucose, and blood pressure). Ideal CVH is defined as the simultaneous presence of seven ideal CVH components or "Life's Simple 7" (non-smoking, body mass index <25 kg/m^2, level of physical activity up to the achievement of the set goal, diet in accordance with national recommendations, blood pressure <120/80 mm Hg, total cholesterol <200 mg/dL and blood glucose level <100 mg/dL) in the absence of clinically manifested CVD. The prevalence of ideal CVH is low worldwide and is less than 1% in the USA, China and Spain, and the lowest values (0.02% and 0,1%) were recorded in the Republic of Srpska, Bosnia and Herzegovina and Serbia, respectively. The ideal CVH is inversely related to the incidence and mortality rates of CVD, as well as the overall mortality rates. People with a greater number of ideal CVH metrics (5, 6, and 7) are significantly less likely to suffer from CVD, ischemic heart disease and stroke, and have lower mortality from CVD, as well as lower total mortality compared to people without any or with only one ideal component of CVH. The status of CVH in the population is essential for predicting the risk of morbidity and mortality from CVD, which can be reduced by improving both health/biological and behavioral components of CVH.

Keywords: ideal cardiovascular health, cardiovascular diseases, components of cardiovascular health, Life's Simple 7, prevalence, mortality

Cite this article as: Jankovic J. The concept and importance of ideal cardiovascular health; Medicinska istaživanja 2024; 57(1):1-8 DOI: 10.5937/medi57-47127

INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of death globally and the main obstacle to sustainable human development (1). According to the estimates of the Global Burden of Disease Study 2015, which provides integrated data on incidence, prevalence and mortality, CVD are the main cause of years of life lost in all world areas (2).

Approximately 17.9 million people die from CVD each year, which accounts for 32% of all deaths worldwide. 85% of all deaths due to CVD are caused by heart attack and stroke (3).

In the USA, Australia and developed European countries, there has been a downward trend in CVD mortality rates in recent decades, primarily owing to positive changes in risk factors, which are responsible for about two-thirds of the decline in mortality rates, and successful evidence-based therapy accounting for one third of the drop in mortality rates (3-4). The lowest mortality rates from CVD were recorded in France, Israel, Spain, Denmark, the Netherlands, Norway, Switzerland and Great Britain, where standardized mortality rates were less than 350 per 100,000 men and less than 250 per 100,000 women (5).

However, despite the decline in CVD mortality in the developed world, CVD remains the most significant cause of death in developing countries (low- and middle-income countries), where over three quarters of all CVD deaths occur (3-4). Standardized mortality rates from CVD in European countries were highest in men in Ukraine, Belarus, Kyrgyzstan, and Russia (over 1,400 per 100,000), and in women in Kyrgyzstan, Moldova, and Ukraine (over 1,000 per 100,000) (5).

In Serbia as an upper middle income country CVD are responsible for 54% of all causes of death (6), and the standardized mortality rates from CVD in 2013 were 991 per 100,000 men and 836 per 100,000 women (5).

In addition to having the greatest contribution to mortality in the developed and developing countries, CVD also contribute significantly to the morbidity of the inhabitants of those countries. In 2015 there were approximately 422.7 million people with CVD worldwide (2).

Although CVD morbidity can be represented by several different indicators, including incidence rates, prevalence, as well as hospital discharge rates, the main limitation for the interpretation of CVD trends in European countries is precisely the lack of quality and comparable data on CVD and ischemic heart disease (IHD) morbidity (4). Hospital discharge rates for CVD show wide variation between European countries and do not reflect the same patterns as mortality rates in the same countries. They do not provide real data on the incidence of CVD, and differences between countries may arise, not only due to real differences in the CVD incidence, but also due to differences in the hospitalization regulations, the organization of health care and its efficiency, the way of coding, as well as the sudden death rates from CVD without hospitalization (7).

The extent of the CVD problem can also be expressed as the burden on the population by analyzing aggregate indicators (summary measures) like Years of Lost Life (YLL) and Disability Adjusted Life Years (DALY), i.e. the sum of years of life lost due to premature death and years lived with disability (8).

CVD are responsible for 11.8% of total DALYs; the main disease in the group is IHD (5.2%) followed by cerebrovascular disease (4.1%) (8).

In 2010, 4,282 DALYs (per 100,000) were lost due to CVD, mostly due to IHD (1,884 lost years per 100,000) and cerebrovascular disease (1,484 lost years per 100,000). IHD and cerebrovascular disease together were responsible for the premature death of 12.9 million people in 2010 (9).

The burden of CVD in a given population is related to the cardiovascular health (CVH) of that population (10). In 2010, the American Heart Association (AHA) introduced a novel concept of an ideal CVH (11) that focused on health behavior and health components of CVH in the absence of clinically manifested CVD. The goal was to improve CVH of all Americans by 20% and reduce mortality from cardiovascular diseases and stroke by 20% until 2020 (11).

The aim of the present review is to explain the concept of ideal CVH, and to present current research about the prevalence of ideal CVH, its sociodemographic inequalities and the association of ideal CVH with the incidence and mortality from CVD.

THE CONCEPT OF IDEAL CARDIOVASCULAR HEALTH

The AHA's concept of ideal CVH is focused on two groups of factors (11). The first group consists of four behavioral components of CVH (smoking, body mass index, physical activity and diet), and in the second group there are four health (biological) components of CVH (smoking, total cholesterol, blood glucose and blood pressure). Given the importance of smoking abstinence and smoking cessation for improving health, smoking is included in both lists, the list of health behavior factors and the list of health factors (11). The criteria for classifying CVH components into categories of ideal, average and poor CVH were determined and presented in **Table 1**.

Ideal CVH is defined as the simultaneous presence of seven ideal CVH components or "Life's Simple 7" (non-smoking, body mass index <25 kg/m2, level of physical activity up to the achievement of the set goal, diet in accordance with national recommendations, blood pressure <120/80 mm Hg, total cholesterol <200 mg/dL and blood glucose level <100 mg/dL) in the absence of clini-

Table 1. AHA definitions of poor, average, and ideal CVH components in adults (≥20 years) (11).

7 CVH components (Life's simple 7)	CVH categories		
	Poor	Average	Ideal
Smoking	Current	Former, quit ≤12 months	Never or quit >12 months
Body mass index	≥30 kg/m2	25-29.99 kg/m2	<25 kg/m2
Physical activity	No exercise	1-149 min of moderate exercise or 1-74 min of vigorous exercise/week	150+ min of moderate exercise or 75+ min of vigorous exercise/week
Diet (score components*)	0-1 components of a healthy diet	2-3 components of a healthy diet	4-5 components of a healthy diet
Total cholesterol	≥240 mg/dL	200–239 mg/dL or treated to goal	<200 mg/dL, untreated
Blood pressure	SBP ≥140 or DBP ≥90 mmHg	SBP 120–139 mmHg or DBP 80–89 mmHg or treated to goal	SBP/DBP <120/80 mmHg, untreated
Fasting glucose	≥126 mg/dL	100–125 mg/dL or treated to goal	<100 mg/dL, untreated

CVH: cardiovascular health
SBP: systolic blood pressure; DBP: diastolic blood pressure.
*Include: fruits and vegetables ≥4–5 servings/day; fish ≥2 servings/week; whole grains ≥3 servings/day; sodium ≤1500 mg/day; sweetened soft drinks ≤450 kcal/week.

cally manifested CVD (including IHD, stroke, heart failure, etc.) (11). Average

CVH is defined as the presence of at least one component of CVH at an average level, with no poor components, and poor CVH as the presence of at least one poor component (12).

A certain number of authors (13-15) used the total CVH score to assess CVH. Each ideal CVH component was assigned 2 points, the average component was assigned 1 point, and the poor component was assigned no points (0). The sum of the points of all 7 components of CVH gives the total score of CVH with a range from 0 (all components categorized as poor) to 14 points (all components at an ideal level). Depending on the size of the score, CVH was evaluated as ideal (10-14 points), average (5-9 points) and poor (0-4 points).

In the systematic review of the literature on the prevalence of CVH, Younus et al. (16), based on the available data of analyzed studies, assessed CVH as ideal (6–7 ideal components), average (2–5 ideal components) and poor (0–1 ideal component).

When comparing the results of different studies, it is important to keep in mind these different criteria in evaluating ideal, average, and poor CVH.

In early 2022, AHA introduced an enhanced CVH assessment tool named "Life's Essential 8" (17). It included all components of "Life's Simple 7" (revised diet, nicotine exposure, blood glucose, and lipids), with the addition of sleep health. The foundational context of mentioned approach is the advanced social-ecological model that integrates a variety of structural and socioeconomic determinants of health, providing the framework that investigates the ability to optimize CVH on individual and community levels. Sleep has a multidimensional association with all seven CVH metrics, indirectly affecting CVH and there is an evidence on sleep hygiene effects on coronary heart disease (CHD) with poor sleep hygiene having adverse effects on CHD (17-19).

PREVALENCE OF CARDIOVASCULAR HEALTH CATEGORIES

The prevalence of ideal adult CVH (all 7 components with ideal values) is low worldwide and is less than 1% in the USA (12), China (20) and Spain (21), and the lowest values (0.02% and 0.1%) were recorded in the Republic of Srpska, Bosnia and Herzgovina (22-23) and Serbia (24), respectively.

If the assessment of the prevalence of ideal CVH is based on a milder criterion (a simultaneous presence of six and seven components at the ideal level), the values are higher. A systematic review and meta-analysis by Jankovic et al. (25) showed a low prevalence of ideal CVH in all analyzed countries (ranged from 0.5% in the USA to 15% in China). The majority of studies reported ideal CVH prevalence below 5% (like 4.1% in Serbia). The prevalence of average CVH ranged from 70% in the USA to 93% in Serbia, while the lowest and highest prevalence of poor CVH were 1% (in Korea) and 29% (in the USA), respectively. Another systematic literature review (16) that included fifty studies published between 2010 and 2015 reported a low prevalence of people with six and seven ideal components of CVH. The lowest prevalence of ideal CVH was found in Iran (0.3%), whereas the highest was found in China (15%). Also, numerous studies have been conducted in the USA, and the prevalence of ideal CVD ranged from 0.5% among African Americans to 12% among health care workers in South Florida (16). Differences in CVH categories' prevalence in several studies based on a milder criterion are presented in **Figure 1**.

The prevalence of participants who achieved all four ideal health behaviors was lower compared to those with all four biological metrics (25). For example, in a Serbian study (24) only 0.4% of the population had all four ideal behavioral factors compared to 9.1% of the population with all four ideal biological factors, and this pattern was more prevalent among women than among men in both CVH component groups.

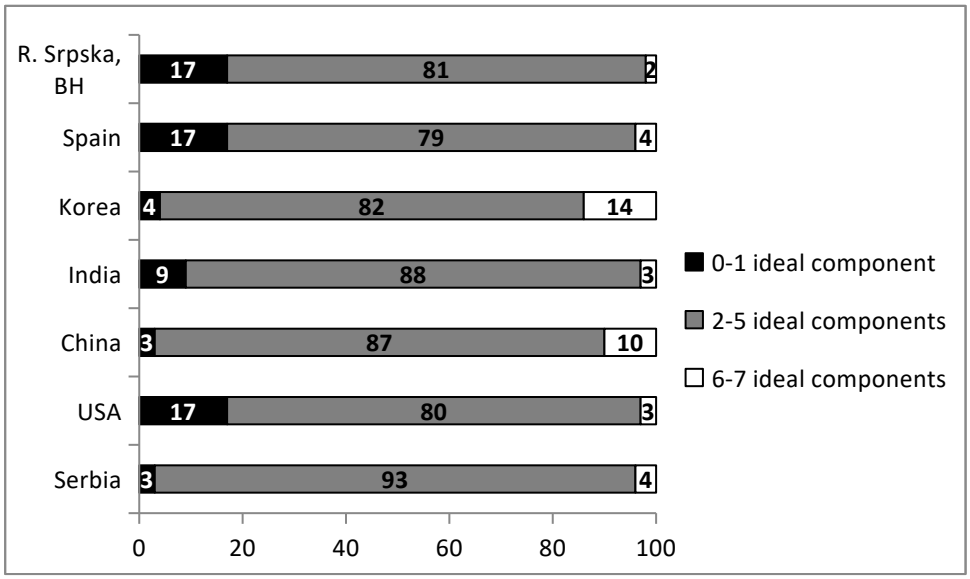

Figure 1. Prevalence (%) of ideal, average and poor CVH* in different countries

*modified by Younus et al., 2016.
poor CVH: 0-1; average CVH: 2-5; ideal CVH: 6-7 ideal CVH component

Regarding all seven ideal CVH metrics independently, a healthy diet was in most cases the least represented component, despite different assessment criteria, and almost all studies showed that more than 50% of the population had an ideal smoking status (i.e., no smoking for at least one year), which is most likely the result of successful smoking prevention at the global level (16). The results by Jankovic et al. (24) showed that the least prevalent ideal CVH component was an ideal diet (2.4%), and the most prevalent ideal glucose, i.e., absence of diabetes (92.2%). 86.4% of respondents had ideal cholesterol (absence of elevated cholesterol values), 63.8% non-smoking status, 52.7% ideal physical activity, 40.4% ideal BMI and ideal blood pressure was found in 17.5% of individuals. Similarly, Stojisavljevic et al. (26) found that poor diet (59.6%) was the most prevalent CVH component followed by poor physical activity (40.0%), while the least prevalent was poor fasting blood glucose (6.9%).

SOCIODEMOGRAPHIC INEQUALITIES IN CARDIOVASCULAR HEALTH

Findings from numerous studies conducted in developed and developing countries (middle- and low-income) and assessing CVH in an adult population showed that women had better ideal CVH compared to men, greater number of ideal CVH components, ideal behavioral and health factors (22, 27-29). Jankovic et al. (24) demonstrated that women had almost four times higher ideal CVH (simultaneous presence of 6 and 7 components at an ideal level) prevalence than men (6.2%:1.6%). Compared to men, women also had a higher prevalence of ideal smoking status, ideal diet, ideal BMI, and ideal blood pressure, and a lower prevalence of ideal physical activity, ideal cholesterol, and ideal glucose (21,23-24).

Over the past decade and a half, significant progress has been made in the field of cardiovascular risk factors in people of both sexes. Although the classic risk factors are the same for men and women, the findings of many studies indicate that their impact in women cannot be equated with that in men (30-31). Consequently, CVD prevention strategies should be different for individuals of different sexes.

The concept of CVH can be used in the future as a tool for easier understanding of gender differences in cardiovascular risk factors. Findings about gender inequalities in the prevalence and number of ideal CVH components should be used to develop appropriate CVH prevention policies adapted to the needs of both sexes.

Regarding age inequalities in ideal CVH, the highest prevalence of the ideal CVH (6 and 7 ideal components) was observed among the youngest (20-22,28-29,32). Also, in a Serbian study (24) the youngest age group (20-39 years) had the ideal CVH most frequently (9.0%), which is almost four times higher in people from the middle age group (2.3%) and nine times higher (1.0%) in people over 65 years old.

A similar gradient was observed in the values of ideal health index (all four ideal health factors) of CVH (18.8%: 5.6% :2.7%). When it comes to ideal behavioral index (all four ideal health behaviors), it was the best among the oldest participants (0.7%) compared to the youngest (0.4%) and middle-aged participants (0.3%) (24). The percentage of subjects who had four, five, and six ideal components of CVH decreased with age and was the lowest in the oldest age group (20-22, 28-29).

There is scarce literature on the inequalities in CVH between urban and rural areas. Del Brutto et al. (33) reported better CVH of the rural population of Ecuador than the CVH of the urban population of the USA and concluded that these differences were associated with

a healthier lifestyle in a rural environment. Despite the better behavioral index of the population of rural areas of the Republic of Srpska, Janković et al. (22) found that CVH was better among the residents of urban areas. The results of another study (24) showed that there was no significant difference in ideal CVH regarding the type of settlement.

Ideal CVH was more common in individuals living without a partner (single, divorced, widows) compared to individuals living with a partner (married or cohabiting). In literature, living without a partner is inconsistently associated with cardiovascular risk, although there is significant epidemiological evidence that social isolation can affect emotional stress mediated by neurohormones, health behaviors, and access to health care, resulting in an association with cardiovascular risk (34-37). In a large international cohort of middle-aged outpatients, living without a partner was independently associated with an increased risk of total and CVD mortality (38). In a study in the Republic of Srpska, living without a partner was associated with a greater number of ideal CVH components and ideal biological components, but not with ideal behavioral components (22). On the contrary, in China (39) those who were married or lived with a partner had two times better CVH compared to those living without a partner.

Concerning socioeconomic inequalities in CVH numerous studies (21,24,39-40) showed that ideal CVH was positively related to education. Respondents with high education had better CVH (ideal CVH, ideal behavioral index and ideal health index) than those with lower educational attainment. In two cross-sectional studies conducted in the USA (32,41), ideal CVH was highest in the most educated individuals. Graziani et al. (21) showed in Spain that the least educated people had the worst CVH and compared to them only the oldest Spaniards had worse CVH. Data from six cross-sectional studies conducted in Denmark from 1978 to 2006 showed a greater upward trend in ideal CVD among persons with a high educational level (42). However, the Danish authors did not use the AHA criteria to define CVH. In a Serbian study (24) people with higher education were more prone to higher prevalence of ideal BMI, ideal diet, and ideal blood pressure. The mentioned educational inequalities in CVH can be attributed to the fact that education provides access to important health-related resources (43), which makes more educated individuals more skilled in dealing with everyday issues relevant to their health (within the family, social and work environment).

Positive gradient was also observed between socioeconomic status measured by the wealth index and ideal CVH (24). The prevalence of ideal CVH, ideal health index, ideal healthy diet, and ideal blood pressure increased in rich residents compared to poor residents. However, no relationship was found between CVH and the wealth index in the Republic of Srpska, Bosnia and Herzegovina (15). In a study conducted in China, higher socio-economic status was independently associated with a higher prevalence of five or more ideal CVH components but only in women (44). A possible explanation is that the most vulnerable groups of residents have insufficient material and social resources needed to improve living conditions. Another explanation could be the epidemiological transition from "diseases of the rich" to "diseases of the poor" (45).

ASSOCIATION OF CARDIOVASCULAR HEALTH WITH THE INCIDENCE AND MORTALITY FROM CARDIOVASCULAR DISEASES

The results of a meta-analysis of nine cohort studies that included 12.878 subjects (46), as well as a systematic review of the literature (16), showed that ideal CVH was inversely related to the incidence and mortality rates of CVD, as well as overall mortality rates. People with the presence of a greater number of ideal CVH metrics, (5, 6, and 7 ideal components of CVH) are significantly less likely to suffer from CVD, IHD and stroke and have lower mortality from CVD, as well as total mortality compared to people with no or only one ideal component of CVH (12, 47-51). Ideal CVH is a predictor of a lower risk of myocardial infarction (MI), stroke and fatal cardiovascular outcomes among whites, blacks, and Hispanics (52).

Recent data have demonstrated a significantly lower risk when comparing ideal to poor CVH (51,53). Radovanovic et al. (53) showed in their systematic review and meta-analysis of prospective studies that there was a lower risk of developing composite CVD, CHD, MI, and stroke of 76%, 78%, 82%, and 62%, respectively. Similarly, Ramírez-Vélez et al. (51) reported a lower risk for developing composite CVD, CHD, MI, and stroke of 77%, 79%, 76%, and 67%, respectively.

The status of the CVH in the population is essential for predicting the risk of getting sick and dying from CVD, which can be reduced by improving both health, i.e. biological factors of CVH (blood pressure, total cholesterol, blood glucose), and behavioral factors of CVH (smoking, diet, obesity and physical activity).

CONCLUSION

Assessment of CVH is a relatively new approach that encourages the population to achieve the set goals (normal blood pressure, normal blood cholesterol level, the absence of diabetes, normal weight) and to adopt a healthy lifestyle (non-smoking, adequate physical activity, healthy diet), which contributes to the CVH improvement. This approach emphasizes the importance of preventing risk factors responsible for the development of CVD.

In order to help individuals and populations to improve their CVH, it is necessary to create comprehensive and specifically tailored strategies and interventions at the individual and population level. It is possible to improve the CVH of the population by reducing the prevalence of poor and increasing the prevalence of ideal behavioral and health components of CVH, which can be achieved with a healthy lifestyle and adequate therapy. The methods and techniques used in health education in order to improve people's lifestyle and adherence to prescribed therapy have proven to be not only effective, but also economically profitable.

REFERENCES

1. Clark H. NCDs: a challenge to sustainable human development. Lancet. 2013;381:510-1. doi: 10.1016/S0140-6736(13)60058-6.
2. Roth GA, Johnson C, Abajobir A, Abd-Allah F, Abera SF, Abyu G, et al. Global, Regional, and National Burden of Cardiovascular Diseases for 10 Causes, 1990 to 2015. J Am Coll Cardiol. 2017;70(1):1-25. doi: 10.1016/j.jacc.2017.04.052.
3. WHO. Cardiovascular diseases. Key facts. 2021. Available at: https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds) (accessed 14 August 2023).
4. Nichols M, Townsend N, Scarborough P, Rayner M. Cardiovascular disease in Europe: epidemiological update. Eur Heart J. 2013;34(39):3028–34. doi: 10.1093/eurheartj/eht356.
5. Townsend N, Nichols M, Scarborough P, Rayner M. Cardiovascular disease in Europe-epidemiological update 2015. Eur Heart J. 2015;36(40):2696–705. doi: 10.1093/eurheartj/ehv428.
6. WHO. Noncommunicable Diseases Country Profiles. Geneva: World Helth Organization; 2018. Available at: https://apps.who.int/iris/handle/10665/274512 (accessed 14 August 2023).
7. WHO. European Health for All Database (HFA-DB). Copenhagen: World Health Organization. Regional Office for Europe; 2016. Available at: https://gateway.euro.who.int/en/datasets/european-health-for-all-database/ (accessed 8 October 2023).
8. Murray CJL. Rethinking DALYs. In: Murray CJL, Lopez AD, editors. The global burden of disease. Cambridge: Harvard University Press on behalf of the World Bank and the World Health Organization; 1996.
9. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380(9859):2095-128. doi: 10.1016/S0140-6736(12)61728-0.
10. Sacco RL. Achieving ideal cardiovascular and brain health: opportunity amid crisis. Presidential address at the American Heart Association, scientific sessions. Circulation. 2010;123(22):2653-7. doi: 10.1161/CIR.0b013e318220dec1.
11. Lloyd-Jones DM, Hong Y, Labarthe D, Mozaffarian D, Appel LJ, Van Horn L, et al. American Heart Association strategic planning task force and statistics committee. Defining and setting national goals for cardiovascular health promotion. The American Heart Association's strategic impact goal through 2020 and beyond. Circulation. 2010;121(4):586–613. doi: 10.1161/CIRCULATIONAHA.109.192703.
12. Folsom AR, Yatsuya H, Nettleton JA, Lutsey PL, Cushman M, Rosamond WD. ARIC Study Investigators. Community prevalence of ideal cardiovascular health, by the American Heart Association definition, and relationship with cardiovascular disease incidence. J Am Coll Cardiol. 2011;57(16):1690-6. doi: 10.1016/j.jacc.2010.11.041.
13. Kulshreshtha A, Goyal A, Veledar E, McClellan W, Judd S, Eufinger SC, et al. Association between ideal cardiovascular health and carotid intima-media thickness: a twin study. J Am Heart Assoc. 2014;3(1): e000282. doi: 10.1161/JAHA.113.000282.
14. Folsom AR, Olson NC, Lutsey PL, Roetker NS, Cushman M. American Heart Association's Life's Simple 7 and incidence of venous thromboembolism. Am J Hematol. 2015;90(5):E92. doi: 10.1002/ajh.
15. Janković J, Erić M, Stojisavljević D, Marinković J, Janković S. Socio-Economic Differences in Cardiovascular Health: Findings from a Cross-Sectional Study in a Middle-Income Country. PLoS One. 2015;10(10):e0141731. doi: 10.1371/journal.pone.0141731.
16. Younus A, Aneni EC, Spatz ES, Osondu CU, Roberson L, Ogunmoroti O, et al. A Systematic Review of the Prevalence and Outcomes of Ideal Cardiovascular Health in US and Non-US Populations. Mayo Clin Proc. 2016;91(5):649–70. doi: 10.1016/j.mayocp.2016.01.019.
17. Lloyd-Jones DM, Allen NB, Anderson CAM, Black T, Brewer LC, Foraker RE, et al. Life's Essential 8: Updating and Enhancing the American Heart Association's Construct of Cardiovascular Health: A Presidential Advisory From the American Heart Association. Circulation. 2022;146(5):e18-e43. doi: 10.1161/CIR.0000000000001078.
18. Yang X, Chen H, Li S, Pan L, Jia C. Association of Sleep Duration with the Morbidity and Mortality of Coronary Artery Disease: A Meta-analysis of Prospective Studies. Heart Lung Circ. 2015;24(12):1180-90. doi: 10.1016/j.hlc.2015.08.005.
19. Itani O, Jike M, Watanabe N, Kaneita Y. Short sleep duration and health outcomes: a systematic review, meta-analysis, and meta-regression. Sleep Med. 2017;32:246-56. doi: 10.1016/j.sleep.2016.08.006.
20. Zeng Q, Dong SY, Song ZY, Zheng YS, Wu HY, Mao LN. Ideal cardiovascular health in Chinese urban population. Int J Cardiol. 2013;167(5):2311-7. doi: 10.1016/j.ijcard.2012.06.022.
21. Graciani A, León-Muñoz LM, Guallar-Castillón P, Rodríguez-Artalejo F, Banegas JR. Cardiovascular health in a southern Mediterranean European country: a nationwide population-based study. Circ Cardiovasc Qual Outcomes. 2013;6(1):90–8. doi: 10.1161/CIRCOUTCOMES.112.967893.
22. Janković S, Stojisavljević D, Janković J, Erić M, Marinković J. Status of cardiovascular health in a transition European country: findings from a population-based cross-sectional study. Int J Public Health. 2014;59(5):769-78. doi: 10.1007/s00038-014-0579-1.
23. Janković J, Marinković J, Stojisavljević D, Erić M, Vasiljević N, Janković S. Sex inequalities in cardiovascular health: a cross-sectional study. Eur J Public Health. 2016;26(1):152-8. doi: 10.1093/eurpub/ckv161.
24. Janković J, Davidović M, Bjegović-Mikanović V, Janković S. Status of cardiovascular health in the Republic of Serbia: Results from the National Health Survey. PLoS One. 2019;14(3):e0214505. doi: 10.1371/journal.pone.0214505.
25. Janković J, Mandić-Rajčević S, Davidović M, Janković S. Demographic and socioeconomic inequalities in ideal cardiovascular health: A systematic review and meta-analysis. PLoS One. 2021;16(8):e0255959. doi: 10.1371/journal.pone.0255959.
26. Stojisavljević D, Janković J, Erić M, Marinković J, Janković S. Cardiovascular Health Status and Metabolic Syndrome in Adults Living in a Transition European Country: Findings from a Population-Based Study. J Stroke Cerebrovasc Dis. 2018;27(3):568-74. doi: 10.1016/j.jstrokecerebrovasdis.2017.09.046.
27. Velasquez-Melendez G, Felisbino-Mendes MS, Matozinhos FP, Claro R, Gomes CS, Malta DC. Ideal cardiovascular health prevalence in the Brazilian population - National Health Survey (2013). Rev Bras Epidemiol. 2015;18 Suppl 2:97–108. doi: 10.1590/1980-5497201500060009.
28. Wu HY, Sun ZH, Cao DP, Wu LX, Zeng Q. Cardiovascular health status in Chinese adults in urban areas: Analysis of the Chinese Health Examination Database 2010. Int J Cardiol. 2013;168(2):760–4. doi: 10.1016/j.ijcard.2012.09.235.
29. Shay CM, Ning H, Allen NB, Carnethon MR, Chiuve SE, Greenlund KJ, et al. Status of cardiovascular health in US adults: prevalence estimates from the National Health and Nutrition Examination Sur-

veys (NHANES) 2003-2008. Circulation. 2012;125(1):45–56. doi: 10.1161/CIRCULATIONAHA.111.035733.

30. Maas AH, Appelman YE. Gender differences in coronary heart disease. Neth Heart J. 2010;18(12):598–602. doi: 10.1007/s12471-010-0841-y.
31. Appelman Y, van Rijn BB, Ten Haaf ME, Boersma E, Peters SA. Sex differences in cardiovascular risk factors and disease prevention. Atherosclerosis. 2015;241(1):211-8. doi: 10.1016/j.atherosclerosis.2015.01.027.
32. Fang J, Yang Q, Hong Y, Loustalot F. Status of cardiovascular health among adult Americans in the 50 States and the District of Columbia, 2009. J Am Heart Assoc. 2012;1(6):e005371. doi: 10.1161/JAHA.112.005371.
33. Del Brutto OH, Dong C, Rundek T, Elkind MS, Del Brutto VJ, Sacco RL. Cardiovascular health status among Caribbean Hispanics living in Northern Manhattan and Ecuadorian natives/mestizos in rural coastal Ecuador: a comparative study. J Community Health. 2013;38(4):634-41. doi: 10.1007/s10900-013-9658-0.
34. Rozanski A, Blumenthal JA, Davidson KW, Saab PG, Kubzansky L. The epidemiology, pathophysiology, and management of psychosocial risk factors in cardiac practice: the emerging field of behavioral cardiology. J Am Coll Cardiol. 2005;45(5):637–51. doi: 10.1016/j.jacc.2004.12.005.
35. Kop WJ, Berman DS, Gransar H, Wong ND, Miranda-Peats R, White MD, et al. Social network and coronary artery calcification in asymptomatic individuals. Psychosom Med. 2005;67(3):343–52. doi: 10.1097/01.psy.0000161201.45643.8d.
36. Atzema CL, Austin PC, Huynh T, Hassan A, Chiu M, Wang JT, et al. Effect of marriage on duration of chest pain associated with acute myocardial infarction before seeking care. CMAJ. 2011;183(13):1482–91. doi: 10.1503/cmaj.110170.
37. Mittleman MA, Mostofsky E. Physical, psychological and chemical triggers of acute cardiovascular events: preventive strategies. Circulation. 2011;124(3):346–54. doi: 10.1161/CIRCULATIONAHA.110.968776.
38. Udell JA, Steg PG, Scirica BM, Smith SC Jr, Ohman EM, Eagle KA, et al. Living alone and cardiovascular risk in outpatients at risk of or with atherothrombosis. Arch Intern Med. 2012;172(14):1086–95. doi: 10.1001/archinternmed.2012.2782.
39. Chang Y, Guo X, Chen Y, Guo L, Li Z, Yu S, et al. Prevalence and Metrics Distribution of Ideal Cardiovascular Health: A Population-based, Cross-sectional Study in Rural China. Heart Lung Circ. 2016;25(10):982–92. doi: 10.1016/j.hlc.2016.02.007.
40. Janković S, Stojisavljević D, Janković J, Erić M, Marinković J. Association of socioeconomic status measured by education, and cardiovascular health: a population-based cross-sectional study. BMJ Open. 2014;4(7):e005222. doi: 10.1136/bmjopen-2014-005222.
41. Bostean G, Roberts CK, Crespi CM, Prelip M, Peters A, Belin TR, et al. Cardiovascular health: associations with race-ethnicity, nativity, and education in a diverse, population-based sample of Californians. Ann Epidemiol. 2013;23(7):388–94. doi: 10.1016/j.annepidem.2013.04.012.
42. Olsen GS, Holm AS, Jørgensen T, Borglykke A. Distribution of ideal cardiovascular health by educational levels from 1978 to 2006: a time trend study from the capital region of Denmark. Eur J Prev Cardiol. 2014;21(9):1145-52. doi: 10.1177/2047487313485513.
43. Braveman P, Egerter S, Williams DR. The social determinants of health: coming of age. Annu Rev Public Health. 2011;32:381–98. doi: 10.1146/annurev-publhealth-031210-101218.
44. Ren J, Guo XL, Lu ZL, Zhang JY, Tang JL, Chen X, et al. Ideal cardiovascular health status and its association with socioeconomic factors in Chinese adults in Shandong, China. BMC Public Health. 2016;16(1):942. doi: 10.1186/s12889-016-3632-6.
45. Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases: part I: general considerations, the epidemiologic transition, risk factors, and impact of urbanization. Circulation. 2001;104(22):2746–53. doi: 10.1161/hc4601.099487.
46. Fang N, Jiang M, Fan Y. Ideal cardiovascular health metrics and risk of cardiovascular disease or mortality: A meta-analysis. Int J Cardiol. 2016;214:279–83. doi: 10.1016/j.ijcard.2016.03.210.
47. Ford ES, Greenlund KJ, HongY. Ideal cardiovascular health and mortality from all causes and diseases of the circulatory system among adults in the United States. Circulation. 2012;125(8):987–95. doi: 10.1161/CIRCULATIONAHA.111.049122.
48. Yang Q, Cogswell ME, Flanders WD, Hong Y, Zhang Z, Loustalot F, et al. Trends in cardiovascular health metrics and associations with all-cause and CVD mortality among US adults. JAMA. 2012;307(12):1273–83. doi: 10.1001/jama.2012.339.
49. Yang X, Wang A, Liu X, An S, Chen S, Wang Y, et al. Positive changes in ideal CVH metrics reduce the incidence of stroke. Sci Rep. 2016;6:19673. doi: 10.1038/srep19673.
50. Guo L, Zhang S. Association between ideal cardiovascular health metrics and risk of cardiovascular events or mortality: A meta-analysis of prospective studies. Clin Cardiol. 2017;40(12):1339-46. doi: 10.1002/clc.22836.
51. Ramírez-Vélez R, Saavedra JM, Lobelo F, Celis-Morales CA, Pozo-Cruz BD, García-Hermoso A. Ideal Cardiovascular Health and Incident Cardiovascular Disease Among Adults: A Systematic Review and Meta-analysis. Mayo Clin Proc. 2018;93(11):1589-99. doi: 10.1016/j.mayocp.2018.05.035.
52. Dong C, Rundek T, Wright CB, Anwar Z, Elkind, MS, Sacco RL. Ideal cardiovascular health predicts lower risks of myocardial infarction, stroke, and vascular death across whites, blacks, and hispanics: the northern Manhattan study. Circulation. 2012;125(24):2975–84. doi: 10.1161/CIRCULATIONAHA.111.081083.
53. Radovanovic M, Jankovic J, Mandic-Rajcevic S, Dumic I, Hanna RD, Nordstrom CW. Ideal Cardiovascular Health and Risk of Cardiovascular Events or Mortality: A Systematic Review and Meta-Analysis of Prospective Studies. J Clin Med. 2023;12(13):4417. doi: 10.3390/jcm12134417.

KONCEPT I ZNAČAJ IDEALNOG KARDIOVASKULARNOG ZDRAVLJA

Janković Janko[1]

Sažetak

Kardiovaskularne bolesti (KVB) su vodeći uzrok smrti širom sveta. U 2019. godini, 17,9 miliona ljudi je umrlo od KVB, što čini 32% svih smrtnih slučajeva globalno. Opterećenje KVB u datoj populaciji je povezano sa kardiovaskularnim zdravljem (KVZ) te populacije. Američka asocijacija za srce je 2010. godine osmislila novi koncept idealnog KVZ koji se fokusira na dve grupe, bihejvioralne komponente (pušenje, indeks telesne mase, fizička aktivnost i ishrana) i zdravstvene komponente (ukupni holesterol, glukoza u krvi i krvni pritisak). Idealno KVZ je definisano kao istovremeno prisustvo sledećih sedam idealnih komponenti KVZ ili „Life's Simple 7" (nepušenje, indeks telesne mase <25 kg/m^2, nivo fizičke aktivnosti do ostvarenja postavljenog cilja, ishrana u skladu sa nacionalnim preporukama, krvni pritisak <120/80 mm Hg, ukupan holesterol <200 mg/dL i nivo glikoze u krvi <100 mg/dL) u odsustvu klinički ispoljene KVB. Prevalencija idealnog KVZ je niska u svetu i manja je od 1% u SAD, Kini i Španiji, a najniže vrednosti zabeležene su u Republici Srpskoj, BiH (0,02%) i Srbiji (0,1%). Idealno KVZ je obrnuto povezano sa stopama incidencije i mortaliteta od KVB, kao i sa stopama ukupnog mortaliteta. Osobe sa većim brojem idealnih komponenti KVZ (5, 6, i 7) značajno ređe boluju od ishemijske bolesti srca i šloga i imaju niži mortalitet od KVB, kao i ukupni mortalitet u poređenju sa osobama bez ijedne ili sa samo jednom idealnom komponentom KVZ. Status KVZ u populaciji je od suštinskog značaja za predviđanje rizika oboljevanja i umiranja od KVB, koji se može smanjiti poboljšanjem zdravstvenih/bioloških, kao i bihejvioralnih komponenti KVZ.

Ključne reči: idealno kardiovaskularno zdravlje, kardiovaskularne bolesti, komponente kardiovaskularnog zdravlja, Life's Simple 7, prevalencija, smrtnost

Primljen: 16.10.2023. I **Revizija:** 28.11.2023. I **Prihvaćen:** 25.12. 2023

Medicinska istaživanja 2024; 57(1):1-8