



Editorial

Multifactorial challenges in cardiometabolic disease management: patient, healthcare system, and environmental barriers

Ade Meidian Ambari^{1,2*}

¹ Department of Cardiovascular Prevention and Rehabilitation, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia

² Department of Cardiology and Vascular Medicine, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia

ARTICLE INFO

Keyword :

Cardiometabolic;
Cardiovascular Disease;
Environmental Exposure
Health Policy;
Risk Factors.

ABSTRACT

Cardiometabolic disease is a complicated issue characterized by various contributing factors. The patients typically have multiple comorbidities with mostly modifiable risk factors. Regarding cardiovascular risk factors, patients' long-term dedication, bad diets, sedentary lifestyles, and psychological problems should be closely monitored. In addition to the patient's internal characteristics, environmental factors such as air pollution have also been linked to cardiovascular-related morbidity and death. Improved public health policy and therapeutic resource fulfillment are crucial to reducing the disease burden and ensuring better patient outcomes. The Government should improve the system and encourage the implementation of guidelines-based cardiovascular disease management.

1. Introduction

Cardiometabolic disease (CMD), a global health crisis encompassing hypertension, type 2 diabetes, heart failure, coronary artery disease, and stroke, is a pressing issue that demands collective action.¹ The complexity of CMD has been increasingly known, showing many interrelated multifactors.^{1,2} The patients generally have more than one disease condition (cardiometabolic multimorbidity).³ Patients with coronary heart disease can also suffer from type 2 diabetes and hypertension and are often found to have poor physical activities, sedentary lifestyles, and unhealthy diets. These cardiovascular risk factors are generally not single-factor and can mostly be modified.^{3,4} However, long-term commitment to controlling the risks becomes another issue in modifying it. Not infrequently, this problem is triggered by the patient's burnout because of a weight loss program, blood sugar, or blood pressure control that is slowly progressing or even stuck despite their struggling lifestyle changes or adhering to frustrating long-term treatment, called the burden of treatment.⁵

Psychological issues are a matter in CMD patients, leading to low adherence to treatment even if it has been tailor-made. Moreover, mental distress, depression, loneliness, social isolation, and other severe mental illnesses have been linked to cardiometabolic pathological processes.⁵⁻⁸ Terms like distress and lack of positive psychological resources refer to psychosocial risk factors that impact the prognosis of ischemic heart disease and seriously lower patients' health-related quality of life.⁹ Psychological consultation is thus incorporated into cardiac rehabilitation as one of the psychosocial interventions to support the patient and improve quality of life because different social support categories are positively correlated with improved quality of life and patient compliance with therapy.⁷

A report from an INTERASPIRE study reveals recent evidence of long-lasting unhealthy lifestyles and uncontrolled comorbidities. The study measures recommendations for secondary prevention and cardiac rehabilitation implementation in six different WHO regions among coronary heart disease patients. Presenting endless active smoking behavior, central obesity, physical inactivity, hyperglycemia, dyslipidemia, uncontrolled blood pressure, and low participation in cardiac rehabilitation, the study concluded unachieved risk factor control demonstrated inadequate widespread implementation of the established standards for secondary prevention.¹⁰

Suboptimal dose titration in specific CMD treatments and limited health insurance coverage related to drug combination regimens are healthcare system hurdles that the Government should address as the health policymaker. Due to these problems, physician decisions might not be aligned with the new guidelines.¹⁰ The authority role is beneficial and essential in generating certain regulations for allocating and distributing recommended drugs, especially in low-middle-income countries still fighting these obstacles.

Not yet finished with the persistent challenge of managing traditional modifiable risk factors, another problem that has recently received attention is related to air pollution. For the past few years, many studies have been conducted concerning the impact of air pollution on cardiovascular diseases. The World Heart Federation recently stated that air pollution contributed to 4.8 million CVD deaths in 2021.¹¹ Regarding air pollution, fine particulate matter (PM_{2.5}) is reported to be associated with cardiovascular-related morbidity and mortality.^{6,12}

The pollutant is reported to increase the risk of coronary events significantly.^{13,14} The study points out that environmental toxins and pollutants can trigger systemic inflammation.^{6,14}, leading to a higher risk of

* Corresponding author at: Department of Cardiovascular Prevention and Rehabilitation, National Cardiovascular Center Harapan Kita, Jakarta, Indonesia;
Department of Cardiology and Vascular Medicine, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia
E-mail address: ade.ambari@inaprevent.org (A.M. Ambari).

endothelial dysfunction and atherosclerosis, core mechanisms in ischemic heart disease.^{15,16} Addressing air pollution is not just a new focus in cardiovascular case management but an urgent need. Immediate changes in policies related to public health and the environment, in addition to supporting efforts to reduce emissions, are crucial to mitigating the impact of air pollution on cardiovascular health. The urgency of this matter cannot be overstated, and swift action is required to prevent further damage to cardiovascular health.

Referring to non-traditional cardiovascular risk factors, many parameters, such as lipoprotein(a), apolipoprotein B, high-sensitivity Troponin I, high-sensitivity C-reactive protein, or coronary artery calcium score, have been reported to be used as risk enhancers to improve the prediction of cardiovascular events, offering a promising future for cardiovascular risk assessment.¹⁷⁻¹⁹ The potential of these risk enhancers to revolutionize the risk prediction model is significant, providing hope for better treatment and outcomes in the future.¹⁷ Their successful application, however, requires provision from health policymakers, primarily associated with health insurance coverage assistance.

CMD management involves complex and interconnected challenges, including managing patient-related factors, applying improved risk assessment using novel risk modifiers, providing recommended therapies, and managing emerging cardiovascular risk factors such as pollution and psychological issues. All these aspects need collaborative efforts to bridge the gap between standard strategies and real-world execution.

Conflict of Interest

There is no conflict of interest.

References

- Mensah GA, Habtegiorgis Abate Y, Abbasian M, Abd-Allah F, Abdollahi A, Abdollahi M, et al. Global Burden of Cardiovascular Diseases and Risks, 1990-2022. *J Am Coll Cardiol*. 2023;82(25):2350-473.
- Cosentino F, Verma S, Ambery P, Treppendahl MB, Van Eickels M, Anker SD, et al. Cardiometabolic risk management: insights from a European Society of Cardiology Cardiovascular Round Table. *Eur Heart J* [Internet]. 2023;44(39):4141-56. Available from: <https://doi.org/10.1093/eurheartj/ehad445>
- Collaboration TERF. Association of Cardiometabolic Multimorbidity With Mortality. *JAMA* [Internet]. 2015 Jul 7;314(1):52-60. Available from: <https://doi.org/10.1001/jama.2015.7008>
- Bays HE, Taub PR, Epstein E, Michos ED, Ferraro RA, Bailey AL, et al. Ten things to know about ten cardiovascular disease risk factors. *Am J Prev Cardiol* [Internet]. 2021;5(November 2020):100149. Available from: <http://dx.doi.org/10.1016/j.ajpc.2021.100149>
- Nordfonn OK, Morken IM, Bru LE, Larsen AI, Husebø AML. Burden of treatment in patients with chronic heart failure – A cross-sectional study. *Hear Lung* [Internet]. 2021;50(3):369-74. Available from: <https://doi.org/10.1016/j.hrtlng.2021.02.003>
- Montone RA, Camilli M, Calvieri C, Magnani G, Bonanni A, Bhatt DL, et al. Exposome in ischaemic heart disease: Beyond traditional risk factors. *Eur Heart J*. 2024;45(6):419-38
- Wenn P, Meshoyrer D, Barber M, Ghaffar A, Razka M, Jose S, et al. Perceived Social Support and its Effects on Treatment Compliance and Quality of Life in Cardiac Patients. *J Patient Exp*. 2022;9:1-7
- McCurley JL, Penedo F, Roesch SC, Isasi CR, Carnethon M, Sotres-Alvarez D, et al. Psychosocial Factors in the Relationship between Socioeconomic Status and Cardiometabolic Risk: the HCHS/SOL Sociocultural Ancillary Study. *Ann Behav Med*. 2017;51(4):477-88.
- Mesa-Vieira C, Grolimund J, von Känel R, Franco OH, Saner H. Psychosocial risk factors in cardiac rehabilitation: Time to screen beyond anxiety and depression. *Glob Heart*. 2021;16(1):1-12
- McEvoy JW, Jennings C, Kotseva K, De Bacquer D, De Backer G, Erlund I, et al. Variation in Secondary Prevention of Coronary Heart Disease: The INTERASPIRE Study. *Eur Heart J* [Internet]. 2024;00(0):1-13. Available from: <https://doi.org/10.1093/eurheartj/ehae55>
- Cesare MD, Bixby H, Gaziano T, Hadeed L, Kabudula C, McGhie D V, et al. World Heart Report 2023: Confronting the World's Number One Killer. *World Hear Fed* [Internet]. 2023;1-52. Available from: <https://world-heart-federation.org/wp-content/uploads/World-Heart-Report-2023.pdf>
- Basith S, Manavalan B, Shin TH, Park CB, Lee WS, Kim J, et al. The Impact of Fine Particulate Matter 2.5 on the Cardiovascular System: A Review of the Invisible Killer. *Nanomaterials*. 2022;12(15)
- Tabaghi S, Sheibani M, Khareshi I, Miri R, Haji Aghajani M, Safi M, et al. Associations between short-term exposure to fine particulate matter and acute myocardial infarction: A case-crossover study. *Clin Cardiol*. 2023;(July):1319-25
- Desperak P, Desperak A, Szygula-Jurkiewicz B, Rozentryt P, Lekston A, Gąsior M. The Impact of Short-Term Outdoor Air Pollution on Clinical Status and Prognosis of Hospitalized Patients with Coronary Artery Disease Treated with Percutaneous Coronary Intervention. *J Clin Med*. 2022;11(3)
- Gavriilaki E, Anyfanti P, Gavriilaki M, Lazaridis A, Douma S, Gkaliagkousi E. Endothelial Dysfunction in COVID-19: Lessons Learned from Coronaviruses. *Curr Hypertens Rep* [Internet]. 2020 Sep 1 [cited 2021 Nov 17];22(9):1-12. Available from: <https://link.springer.com/article/10.1007/s11906-020-01078-6>
- Kumar A, Ansari MR, Mustafa C, Ansari R. Endothelial dysfunction complications and current status. *Pharma Innov J* [Internet]. 2019;8(9):25-33. Available from: www.thepharmajournal.com
- Auer J, Lamm G. Flexible addition of risk modifiers on top of SCORE2 to improve long-term risk prediction in healthy individuals. Vol. 30, *European Journal of Preventive Cardiology*. Oxford University Press US; 2023. p. 1702-4
- Sigurdardottir FD, Lyngbakken MN, Holmen OL, Dalen H, Hveem K, Røsjø H, et al. Relative Prognostic Value of Cardiac Troponin I and C-Reactive Protein in the General Population (from the Nord-Trøndelag Health [HUNT] Study). *Am J Cardiol* [Internet]. 2018;121(8):949-55. Available from: <https://www.sciencedirect.com/science/article/pii/S0002914918300973>
- Haq A, Veerati T, Walser-Kuntz E, Aldujeli A, Tang M, Miedema M. Coronary artery calcium and the risk of cardiovascular events and mortality in younger adults: a meta-analysis. *Eur J Prev Cardiol* [Internet]. 2024;31(9):1061-9. Available from: <https://doi.org/10.1093/eurjpc/zwad399>