



# Pandemics extend beyond infectious diseases: the emerging threat of non-communicable diseases

Moojun Kim and Chan Joo Lee

Division of Cardiology, Department of Internal Medicine, Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

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Throughout history, humanity has faced numerous infectious diseases. Among modern medicine's most remarkable achievements, the development of vaccines and antibiotics has instilled confidence in our ability to combat outbreaks effectively. However, the COVID-19 pandemic, which emerged in the early 2020s, triggered an unprecedented global crisis. Its high transmissibility and mortality rates led to widespread illness, straining healthcare systems worldwide [1,2].

To mitigate the spread, human interaction was severely restricted, and strict social distancing measures became the norm. These disruptions had far-reaching consequences, many of which persisted even after the pandemic waned [3].

COVID-19 is a disease caused by a coronavirus that primarily damages the respiratory system, but it is known to be particularly lethal in individuals with pre-existing cardiovascular disease [4]. Those with multiple cardiovascular risk factors or established cardiovascular disease face a significantly higher risk of requiring ventilatory support, extracorporeal membrane oxygenation, or intensive care unit admission, as well as an increased risk of mortality. Additionally, the high thrombogenic potential and pro-inflammatory nature of COVID-19 can lead to severe complications, such as myocardial infarction and myocarditis, further exacerbating cardiovascular morbidity and mortality [5].

Beyond the direct cardiovascular risks associated with COVID-19, pandemic-related lifestyle changes have likely contributed to a rise in cardiovascular risk factors. Chun et al. [6] analyzed data from the Korean National Health and Nutrition Examination Survey (KNHANES) before and during

the COVID-19 pandemic to assess changes in the prevalence of metabolic syndrome—a well-established predictor of cardiovascular disease—and its individual components. Their findings revealed a significant increase in metabolic syndrome prevalence, primarily driven by higher rates of abdominal obesity and elevated fasting glucose levels.

This trend reflected the broader social context of South Korea during the COVID-19 pandemic. Government-enforced social distancing measures led to reduced outdoor activities and decreased participation in regular exercise [7]. Similarly, a study in Japan found that a decline in leisure-time physical activity during the pandemic worsened glycemic control and contributed to weight gain [8]. Additionally, increased snack consumption has been associated with both weight gain and poor glycemic control [9]. These changes may stem not only from altered dietary and exercise patterns but also from heightened mental stress [10].

Chun et al. [6] further explored the relationship between physical activity and metabolic syndrome, demonstrating an inverse association regardless of sex or the presence of the COVID-19 pandemic. Their findings highlight the critical role of regular physical activity in preventing metabolic syndrome while reinforcing that pandemic-induced reductions in physical activity significantly contributed to its increased prevalence.

Additionally, Chun et al. [6] examined sex differences in the impact of the COVID-19 pandemic on metabolic syndrome development. While their study underscored the importance of targeted interventions based on sex-specific factors, a closer analysis of their results suggests that the fundamental risk factors for metabolic syndrome remained largely consistent across sexes, regardless of the pandemic. Although age-related variations were noted, both men and women experienced increased abdominal obesity and ele-

vated fasting glucose levels.

Ultimately, the findings indicate that pandemic-related lifestyle changes heightened the risk of developing metabolic syndrome in both men and women.

Infectious diseases not traditionally associated with cardiovascular or metabolic disorders, such as COVID-19, have profoundly impacted lifestyle behaviors, ultimately increasing the risk of metabolic syndrome in the modern world. Even as the pandemic recedes, its lasting effects, including a heightened burden of cardiovascular disease due to the rising prevalence of metabolic syndrome, will persist.

Since infectious diseases will always pose a threat, proactive strategies for lifestyle management are essential. These strategies should account for sex-specific differences to mitigate the risk of metabolic syndrome, enhance resilience against future pandemics, and reduce the likelihood of recurrence.

## REFERENCES

- Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395:497-506.
- Baud D, Qi X, Nielsen-Saines K, Musso D, Pomar L, Favre G. Real estimates of mortality following COVID-19 infection. *Lancet Infect Dis* 2020;20:773.
- Zhao Z, Li L, Sang Y. The COVID-19 pandemic increased poor lifestyles and worsen mental health: a systematic review. *Am J Transl Res* 2023;15:3060-3066.
- Sritharan HP, Bhatia KS, van Gaal W, Kritharides L, Chow CK, Bhindi R. Association between pre-existing cardiovascular disease, mortality and cardiovascular outcomes in hospitalised patients with COVID-19. *Front Cardiovasc Med* 2023;10:1224886.
- Del Prete A, Conway F, Della Rocca DG, et al. COVID-19, acute myocardial injury, and infarction. *Card Electrophysiol Clin* 2022;14:29-39.
- Chun KH, Kim HJ, Kang DR, et al. Sex-specific impact of the COVID-19 outbreak on the incidence of metabolic syndrome: a comparative study of 2018–2019 and 2020–2021. *Korean J Intern Med* 2025;40:262-274.
- Yoo KJ, Kwon S, Choi Y, Bishai DM. Systematic assessment of South Korea's capabilities to control COVID-19. *Health Policy* 2021;125:568-576.
- Takahara M, Watanabe H, Shiraiwa T, et al. Lifestyle changes and their impact on glycemic control and weight control in patients with diabetes during the coronavirus disease 2019 pandemic in Japan. *J Diabetes Investig* 2022;13:375-385.
- Munekawa C, Hosomi Y, Hashimoto Y, et al. Effect of coronavirus disease 2019 pandemic on the lifestyle and glycemic control in patients with type 2 diabetes: a cross-section and retrospective cohort study. *Endocr J* 2021;68:201-210.
- Endo K, Miki T, Itoh T, et al. Impact of the COVID-19 pandemic on glycemic control and blood pressure control in patients with diabetes in Japan. *Intern Med* 2022;61:37-48.

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Received : February 12, 2025

Accepted : February 13, 2025

### Correspondence to

Chan Joo Lee, M.D., Ph.D.

Division of Cardiology, Department of Internal Medicine, Severance Hospital, Yonsei University College of Medicine, 50-1 Yonsei-ro, Seodaemun-gu, Seoul 03722, Korea

Tel: +82-2-2228-8469, Fax: +82-2-2227-7732

E-mail: zanzu@yuhs.ac

<https://orcid.org/0000-0002-8756-409X>

### Conflicts of interest

The authors disclose no conflicts.

### Funding

None