



## Letter to the Editor

# Non-communicable Diseases' Contribution to the COVID-19 Mortality: A Global Warning on the Emerging Syndemics

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## Dear Editor,

The COVID-19 pandemic has already caused an incidence of millions, and the attributed mortality is about to reach one and a half million globally.<sup>1</sup> Meanwhile, non-communicable diseases (NCDs) have proven to be a significant risk factor of severe infection and a contributor to higher mortality of the condition.<sup>2,3</sup> Countries in developing and low- and middle-income regions, like Iran, have shown a high prevalence of NCDs during the last decades due to transition of health status from communicable diseases (CDs) to NCDs, and at the same time, a high prevalence of the epidemic lately due to crucial shortages in health resources and wrong public health policies.<sup>4,5</sup> This concurrency leads to unfavorable events in the pandemic era.

To highlight the impact of NCDs in the burden of the epidemic, we investigated the COVID-19 mortality attributable to NCDs. We utilized the COVID-19 national registry of Iran provided by the Ministry of Health and Medical Education. This registry encompasses the demographic and clinical features of registered confirmed cases of the disease. We applied the population attributable fraction (PAF) to investigate the notion. PAF is an epidemiologic method that measures fraction of a disease or outcome attributable to a specific exposure or cause.<sup>6</sup> NCD categories included in this survey were cardiovascular disease (CVD), chronic pulmonary disease (CPD), diabetes mellitus (DM), cancer, chronic liver disease (CLD), and chronic kidney disease (CKD). Among 26,746 reported deaths due to COVID-19, 8882 (33.2%) of deaths were attributable to NCDs, including 3713 to CVD, 2247 to DM, 1302 to CPD, 770 to CKD, 666 to cancer, and 184 to CLD. Our findings showed a significant proportion of nearly one-third of COVID-19 mortality attributable to NCDs and the three leading causes were CVD, DM, and CPD.

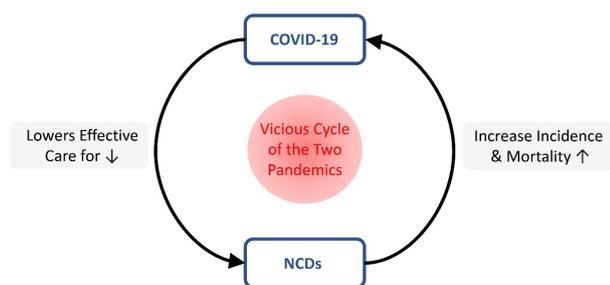
The term "triple burden of disease" has been used to refer to the companionship of CDs, the outgrowing epidemic of NCDs, and the emerging globalization-related health

conditions like pandemics.<sup>7</sup> This phenomenon has been always more prominent in developing countries due to afflicted health systems and less resources to handle the transition of diseases and populations properly.<sup>7,8</sup> At this point in history, maybe it is the most remarkable chance to call a tremendous global triple burden of disease alarm, as this time, all three contributors are robust and hard to defeat. This synergism will undoubtedly place a major obstacle against sustainable development goal 3.4 planning to reduce NCDs by one third before 2030, while many developed and developing countries were in trouble achieving the goal even before the COVID-19 pandemic.<sup>9</sup>

The most eminent clue essential for restraining these two pandemics is the bilateral interaction of COVID-19 and NCDs, leading to a synergistic combination called "syndemic".<sup>10</sup> Multiple clinical and epidemiological investigations have demonstrated that patients with NCDs are more susceptible to severe infection and higher fatalities.<sup>3,11</sup> On the other hand, COVID-19 has compromised the effective and vital care for NCDs. For instance, allocating resources to infectious diseases sections and lockdowns keeping patients at home entirely changed access to the required services and medications for the vast number of people with NCDs.<sup>12,13</sup> As the two mentioned pandemics have an adverse impact on each other and each worsens the other, this situation resembles a vicious cycle that needs to be broken if health, economic, and political authorities intend to save the lives and assets of nations. (Figure 1).

The findings of this survey emphasize an additional focus on NCDs' care both during the pandemic and in the post-pandemic period, as this lethal category of diseases leads to such deleterious results. It is necessary to consider that the primary step in reaching this target is prioritizing requirements and supplies and making alterations to health policy systems for the upcoming waves of the disease.<sup>14,15</sup> Global and regional guidelines have been prepared for this notion, mainly focusing on providing more accessible primary healthcare services, promoting telemedicine

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**Figure 1.** The Vicious Cycle of the COVID-19 and Non-Communicable Diseases (NCDs) During Both Ongoing Pandemics, Leading to a Syndemic.

tools, and expanding population-based NCD care and management.<sup>2,16</sup> Policy-makers and authorities of health systems all around the world, especially in developing countries, should notice this global warning on syndemics and try to provide the proper policies and resources to curb the heavy burden of NCDs on COVID-19 and vice versa, and console the horrifying condition against the health systems.

#### Authors' Contribution

FF conceptualized the idea of letter. EG and SSM did the statistical analysis. SA, NR, and FF interpreted the findings and SA prepared the first manuscript. All authors commented on the primary manuscript and revised the final manuscript. FF was the principal investigator of this paper.

#### Conflict of Interest Disclosures

The authors declare that they have no conflict of interest.

#### Ethical Statement

This study was approved in the ethics committee of National Institute for Medical Research Development (NIMAD) of Iran by the approval ID: IR.NIMAD.REC.1399.185.

#### Acknowledgements

The authors would like to thank the National Institute for Medical Research Development (NIMAD) for funding this project by grant No.995531.

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Received: January 23, 2021, Accepted: February 27, 2021, ePublished: May 1, 2021

**Cite this article as:** Azadnajafabad S, Ghasemi E, Saeedi Moghaddam S, Rezaei N, Farzadfar F. Non-communicable diseases' contribution to the COVID-19 mortality: a global warning on the emerging syndemics. *Arch Iran Med*. *Arch Iran Med*. 2021;24(5):445-446. doi: 10.34172/aim.2021.63

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