



# Advantages of Disability-Adjusted Life Years to Measure the Burden of COVID-19

Saied Bokaie <sup>1</sup>, Alireza Bahonar<sup>1</sup>, Ali Akbar Haghdoost <sup>2</sup>, Salman Daneshi <sup>3,\*</sup> and Eshagh Barfar <sup>4</sup>

<sup>1</sup>Department of Food Hygiene and Quality Control, Division of Epidemiology and Zoonoses, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

<sup>2</sup>Research Center for Modeling in Health, Institute for Future Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

<sup>3</sup>Department of Public Health, School of Health, Jiroft University of Medical Sciences, Jiroft, Iran

<sup>4</sup>Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran

\*Corresponding author: Instructor of Epidemiology, Department of Public Health, School of Health, Jiroft University of Medical Sciences, Jiroft, Iran. Email: salmandaneshi008@gmail.com

Received 2022 July 15; Revised 2022 August 14; Accepted 2022 August 27.

**Keywords:** Disability-Adjusted Life Years, DALY, Burden, COVID-19

## Dear Editor,

In December 2019, pneumonia of unknown origin was reported in Wuhan, China. Scientists later identified it as SARS-CoV-2, and the new name nCoV-2019 provided information about it (1), causing many symptoms in affected people (2). The rapid spread of the virus and the lack of definitive treatment caused countries to face large numbers of infected people and created social, economic, and health challenges (3, 4). The form of the epidemic has not been the same in different countries (5). Quantifying the impact of COVID-19 relative to other causes of disease and injury is essential in every country, and understanding and quantifying the combined impact of mortality and morbidity from a disease is a key step in standardizing comparisons across countries (6).

In this regard, disability-adjusted life years (DALY) is the best health measure to determine the effectiveness of social and systematic interventions. It is introduced by the World Bank and the World Health Organization to quantify the burden of diseases and injuries in studying the global burden of disease. This index, which is a combination of years of life with disability and years lost due to premature death, shows the severity of the disease on a scale of 0 (complete health) to 1 (death) (7). It is widely used to calculate the economic effects of alternative interventions in the health sector. Many international studies have shown the cost of averting disease or injury each year using a variety of interventions. Health managers can determine how many DALY will be averted by reducing health problems in their community with current resources (7).

As of now, COVID-19 has not been included in the global

burden of disease (GBD) study (8), but some studies have estimated DALY attributable to COVID-19 (9-11). The DALY estimate for epidemics such as COVID-19 provides policy-makers with comprehensive and comparable information regarding direct and indirect consequences to make informed decisions. Since the DALY is a concise index and shows health problems from a macro perspective for societies, it is imperative and popular among other indicators. It is one of the few indicators to measure the size of health problems that cover disease, death, and recovery. The basis of this feature and reputation is that the index reduces the community's health problems and provides the ability to sort them. It transforms all the diverse and heterogeneous health problems into one unit, that is, lost time, and provides the ability to compare them all with each other and with cost, profit, and economic loss.

Mortality from COVID-19 occurs in different age groups. On the other hand, in many cases, COVID-19 patients have long-term health complications and show more morbidity than non-COVID-19 patients. Thus, DALY provides a more comprehensive picture of the COVID-19 burden and the effects of interventions such as mass vaccination in communities than other tools. Therefore, this estimate has potential implications for understanding resource allocation priorities for health interventions (11). It can be said that calculating the burden of diseases such as COVID-19 with DALY provides areas for prioritization, effective investments, quantifying various dimensions of social development, determining current and future intervention strategies for prevention, treatment, and rehabilitation for researchers, policymakers, and commu-

nity health managers.

## Footnotes

**Authors' Contribution:** The authors contributed equally.

**Conflict of Interests:** The authors declare no conflict of interests.

**Funding/Support:** None is reported.

## References

- Phelan AL, Katz R, Gostin LO. The Novel Coronavirus Originating in Wuhan, China: Challenges for Global Health Governance. *JAMA*. 2020;**323**(8):709-10. [PubMed ID: 31999307]. <https://doi.org/10.1001/jama.2020.1097>.
- Rezabeigi-Davarani E, Bokaie S, Mashayekhi V, Sharifi L, Faryabi R, Alian Samakkhah S, et al. Epidemiological and Clinical Characteristics of COVID-19 Patients Studied by Jiroft University of Medical Sciences: Southeast of Iran. *J Adv Med Biomed Res*. 2021;**29**(136):302-8. <https://doi.org/10.30699/jambs.29.136.302>.
- Hashemi-Shahri SM, Barfar E, Ansari-Moghaddam A, Khammarnia M, Setoodehzadeh F, Okati-Aliabad H. Economic Consequences of COVID-19 in the Middle East and North Africa Region Countries. *J Adv Med Biomed Res*. 2020;**28**(131):304-6. <https://doi.org/10.30699/jambs.28.131.304>.
- Yusefi AR, Barfar E, Daneshi S, Bayati M, Mehralian G, Bastani P. Health literacy and health promoting behaviors among inpatient women during COVID-19 pandemic. *BMC Womens Health*. 2022;**22**(1):77. [PubMed ID: 35300684]. [PubMed Central ID: PMC8929241]. <https://doi.org/10.1186/s12905-022-01652-x>.
- Wyper GMA, Assuncao RMA, Colzani E, Grant I, Haagsma JA, Lagerweij G, et al. Burden of Disease Methods: A Guide to Calculate COVID-19 Disability-Adjusted Life Years. *Int J Public Health*. 2021;**66**:619011. [PubMed ID: 34744580]. [PubMed Central ID: PMC8565264]. <https://doi.org/10.3389/ijph.2021.619011>.
- Murray C, Lopez AD; World Health Organization. *The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020: summary*. Geneva, Switzerland: World Health Organization; 1996.
- G. B. D. Viewpoint Collaborators. Five insights from the Global Burden of Disease Study 2019. *Lancet*. 2020;**396**(10258):1135-59. [PubMed ID: 33069324]. [PubMed Central ID: PMC716361]. [https://doi.org/10.1016/S0140-6736\(20\)31404-5](https://doi.org/10.1016/S0140-6736(20)31404-5).
- G. B. D. Diseases; Injuries Collaborators. Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;**396**(10258):1204-22. [PubMed ID: 33069326]. [PubMed Central ID: PMC7567026]. [https://doi.org/10.1016/S0140-6736\(20\)30925-9](https://doi.org/10.1016/S0140-6736(20)30925-9).
- Salje H, Tran Kiem C, Lefrancq N, Courtejoie N, Bosetti P, Paireau J, et al. Estimating the burden of SARS-CoV-2 in France. *Science*. 2020;**369**(6500):208-11. [PubMed ID: 32404476]. [PubMed Central ID: PMC7223792]. <https://doi.org/10.1126/science.abc3517>.
- Singh BB, Devleesschauwer B, Khatkar MS, Lowerison M, Singh B, Dhand NK, et al. Disability-adjusted life years (DALYs) due to the direct health impact of COVID-19 in India, 2020. *Sci Rep*. 2022;**12**(1):2454. [PubMed ID: 35165362]. [PubMed Central ID: PMC8844028]. <https://doi.org/10.1038/s41598-022-06505-z>.
- Douglas M, Katikireddi SV, Taulbut M, McKee M, McCartney G. Mitigating the wider health effects of covid-19 pandemic response. *BMJ*. 2020;**369**:m1557. [PubMed ID: 32341002]. [PubMed Central ID: PMC7184317]. <https://doi.org/10.1136/bmj.m1557>.