Letter to Editor

The Need to Use Mortality, and Not Case-Fatality, to Compare COVID-19 Deaths Worldwide

Dear Editor,

COVID-19, the disease caused by the SARS-CoV-2 virus spread fast globally, with the number of confirmed cases exceeding 8 million. In a short period of time, scientists are working around the clock trying to understand the various aspects of COVID-19. In epidemiology, the definition of case-fatality rate is *"the proportion of cases of a specific condition that are fatal within a specified time"*. Case-fatality is an indicator of the capacity of a disease to cause mortality, but there are concerns about its use as an appropriate epidemiological indicator for COVID-19.

Testing policies in each country, which are highly dependent on test availability, can lead to severe underreporting on the number of cases, the proper denominator of case-fatality. Given that the level of underreporting is lower for hospitalisation cases and for deaths, it is arguable that the degree of underreporting for COVID-19-related deaths is much lower than the underreporting of cases.[1]

The use of an appropriate death indicator is relevant for the World Health Organization, other international organizations, policymakers, and political leaders. Such indicator would help support adequate public health and economic strategies. However, the most frequently used indicator so far is the case fatality rate,[2,3] which we argue is not an appropriate indicator to report COVID-19 mortality due to massive underreporting of its denominator. The absolute number of deaths per day is also not a good approach, since it does not consider the size of the population. Therefore, many indicators highly cited by the media are biased.[1,4]

The question is: what could be used to better estimate the deaths due to COVID-19, to adequately allow cross-country comparisons, time trends and other epidemiological statistics with a minimal level of bias to reflect the real scenario? Based on the above reasons and on Table 1 data, we recommend the use of deaths per million inhabitants as an alternative to allow comparisons between and within countries. Deaths per million is not affected by underreporting of cases, as well as properly adjusts for the size of the population. Furthermore, this indicator can also be used for subgroups of the population (e.g., older adults).

COVID-19 is a great challenge and there are many scientific gaps that need to be addressed.[5] In summary, there is a clear and urgent need to improve COVID-19 statistics, particularly to engage the public in prevention strategies. The use of a more reliable mortality data will help countries to better understand the problem, ensure appropriate strategies to re-organize their health-systems,

Table 1: Countries with over one thousand COVID-19 deaths by June 17 2020: comparison between case-fatality and deaths per million

Country	Case-fatality rate	Deaths per millions
Belgium	16.06	833.76
France	15.15	451.01
Italy	14.48	568.47
United Kingdom	14.03	619.47
Netherlands	12.35	355.35
Mexico	11.69	136.35
Spain	11.10	580.38
Sweden	9.26	489.04
Canada	8.28	218.01
China	5.49	3.22
USA	5.48	351.21
Brazil	4.94	206.81
Iran	4.71	107.92
Germany	4.68	105.22
Peru	2.94	208.05
India	2.88	7.173
Turkey	2.68	57.21
Russia	1.33	49.84

Source: Deaths - Johns Hopkins website, Population - Worldometer

increase intensive care units capacity, number of ventilators and, finally, establish effective measures to reduce deaths. The coronavirus pandemic is one the biggest challenges faced by the scientific community globally in many fronts, including new approaches in Epidemiology. Comparing trends and monitoring the situation using deaths per million inhabitants will be a more adequate approach and, ultimately, a better indicator to reduce COVID-19 mortality.

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Conflicts of interest

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Erika A. Silveira[1,2], Matias Noll[1,3], Pedro C. Hallal[4], Cesar de Oliveira[2]

[1]*University Federal de Goiás, Medicine Faculty, Brazil,* [3]*Instituto Federal Goiano, Brazil,* [4]*Federal University of Pelotas, Brazil,* [2]*Department of Epidemiology and Public Health, Institute of Epidemiology, and Health Care, University College London, UK*

Address for correspondence:
Prof. Erika A. Silveira,
University Federal de Goiás, Medicine Faculty, Brazil,
Affiliate Academic, Department of Epidemiology and Public Health,
University College London, UK.
E-mail: erikasil@terra.com.br

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