



Potential years of life lost by COVID-19 in the state of Espírito Santo and proportional mortality by age.

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TO THE EDITOR,

Since the World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern (PHEIC) and categorized the situation as a severe pandemic,⁽¹⁾ the cumulative number of deaths worldwide up to November 23, 2021, reached 5,158,211.⁽¹⁾

Premature mortality is understood as the expression of the social value of death. When death occurs at a stage when life is potentially productive, it affects not only the individual and the group where they are inserted, but also collectivity as a whole since they are deprived of their economic and intellectual potential and the future they would have had in society.⁽²⁾

Potential years of life lost (PYLL) is an indicator used to estimate how long a person would have lived if they had not died prematurely. The measure of potential years of life lost emphasizes the specific causes of death that affect younger age groups, resulting in a different ordering of such causes.

The present data analysis used the information available in the COVID-19 public dashboard of the state of Espírito Santo⁽³⁾ with the purpose of calculating the PYLL due to COVID-19. All deaths that occurred in the state of Espírito Santo up to July 22, 2021 in people under 79 years of age were analyzed, totaling 9,073 deaths, considering the average life expectancy of 79.1 years for the state of Espírito Santo in 2019.⁽⁴⁾

The absolute value of PYLL in each age group was calculated by multiplying the number of the remaining years of life by the number of deaths in the same age group; the total PYLL was obtained by the sum of the PYLL in each age group according to the following formula: $PYLL = \sum a_i \times d_i$, where: a_i represents the difference between the age limit and the age midpoint in each age group, assuming a uniform distribution of deaths in each group, and d_i is equal to the number of COVID-19-related deaths within the same age group.

In order to calculate the mean number of PYLL per 1,000 inhabitants, we used the ratio obtained by the sum of the PYLL per age group divided by the total number of inhabitants of the same age group multiplied by 1,000.

The first case of COVID-19 recorded in the state of Espírito Santo was on March 5th, 2020. More than 530,000 cases and 11,786 deaths were confirmed up to July 22nd, 2021, denoting a 2.2% lethality rate.

Regarding age, more than 60% of the deaths occurred in individuals aged 60 years or older.

The number of PYLL by age group is shown in Table 1. Due to the nature of this estimate, deaths in younger people resulted in a higher number of PYLL compared to older age groups. Deaths occurring in the 0–4-year age group had a number of PYLL equal to 77.1 years; however, since COVID-19-related deaths are infrequent in younger age groups (0.15% of deaths up to 79 years), they have little impact on the global PYLL estimate. The lowest number of PYLL per 1,000 inhabitants was observed in the 5–9-year age group, with a loss of life of 1.1 years, while the highest impact on PYLL was observed in the 60–69-year age group, with a loss of 121 years of life per 1,000 inhabitants.

Overall, the 11,786 COVID-19-related deaths in the state of Espírito Santo totaled 154,843.3 years of life lost, with a mean of 38.5 years of life lost per 1,000 inhabitants and a mean of 17.06 PYLL per deceased individual.

Our results were consistent with those found in a study in Colombia, which reported 19,364 COVID-19-related deaths, totaling 346,148 PYLL by August 30, 2020. On average, each of the deceased men lost 17.4 years, while each woman lost 18.7 years.⁽⁵⁾

Meanwhile, in the United Kingdom, the number of PYLL was estimated at 14 for men and 12 for women. Such discrepancy in the number of PYLL for women may be due to the fact that in the UK, the affected population is older, whereas in Brazil, the general population is younger and presents comorbidities and chronic diseases, characteristics that are more similar to those in Colombia and other low and middle-income countries.⁽⁶⁾

PYLL data on COVID-19-related deaths, along with other indicators, reveal a decrease in life expectancy and losses regarding the economically active population. In addition to the reduction in birth rates, such scenario may impose an economic crisis that will require ample assistance from international organizations to developing countries after the pandemic. Should this not take place, we will have to deal with several illnesses, given the social determination of the health-disease process.⁽⁷⁾

Despite the low impact of the number of PYLL on the death of the elderly, in everyday life, many Brazilian families depend entirely on elderly pension income to survive. Although several families received emergency financial assistance provided by the government, many

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Table 1. Potential years of life lost (PYLL) by age group and per 1,000 inhabitants in the state of Espírito Santo, 2021.

Age Group	No. of deaths	PYLL*	Total PYLL**	PYLL/1,000	Percentage distribution of deaths by COVID-19 by age group
0-4	14	77.1	1,079.4	4.2	0.15
5-9	4	72.1	288.4	1.1	0.04
10-19	24	64.1	1,538.4	2.5	0.26
20-29	121	54.1	6,546.1	9.8	1.33
30-39	432	44.1	19,051.2	27.6	4.76
40-49	944	34.1	32,190.4	55.1	10.40
50-59	1,710	24.1	41,211	86.7	18.85
60-69	2,906	14.1	40,974.6	121.0	32.03
70-79	2,918	4.1	11,963.8	74.6	32.16
Total	9,073	17.06***	154,843.3	38.5	100.00

*Per individual. **Per age group. ***Mean per person.

of them lost revenue due to the reduction in informal service activities, which contributed to a decline in household income.^(8,9)

Considering birth rate, instead of the expected “baby boom”, the concern regarding the future spread of the new coronavirus has caused a “baby bust”, *i.e.*, a significant drop in birth rates almost everywhere. In parallel, the worldwide mortality rate has increased significantly, and the combination of several factors has made 2020/2021 a demographically atypical year, which will have intangible economic and social impacts.⁽¹⁰⁾

It is well known that the death of large numbers of people during a pandemic brings severe social, emotional, and economic consequences to the population

and, therefore, should not be underestimated. In addition, urgent measures addressed to contain the spread of the disease must be quickly implemented, such as the rapid vaccination of the population, assessments concerning the need for booster vaccinations, and social protection in vulnerable groups, thus preventing further increases in this large number of deaths in the future.

AUTHOR CONTRIBUTIONS

KCM: study design and planning, data analyses, writing of the manuscript, and approval of the final version. PSSF, HJSM, ACBCV, and ELNM: study design and planning, writing of the manuscript, and approval of the final version.

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