



THE RELATION BETWEEN VACCINATION AGAINST COVID-19 AND MORTALITY IN BRAZIL

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INTRODUCTION

The disease caused by the Sars-Cov-2, which emerged in late 2019, had its epicenter in Hubei province, China, later spreading across the globe¹. On January 30th, 2020, the WHO Emergency Committee declared the disease as a global health emergency, and in March 2020 classified it as a pandemic¹. Since then, mass vaccination has been considered the greatest strategy for combating the coronavirus, in view of the exponential increase in contamination rates worldwide^{1,2}. In 2020, Brazil was one of the five nations with the most confirmed cases of Covid-19, reaching an average of 30,000 notified cases every 7 days³. The vaccines used in Brazil so far are: Oxford/Astrazeneca and Pfizer/Biontech, which are definitely registered, while Johnson & Johnson, CoronaVac, and Moderna are authorized for emergency use, and Sputnik V and Covaxin are for exceptional import only⁴. Currently, around 80 million Brazilians are fully vaccinated against Covid-19 and around 65 million are partially vaccinated⁵. With the start of mass vaccination, it was believed that mortality would reduce its rates in the country immediately, but with the emergence of new variants, such as Delta, and the inefficiency of social isolation, the effectiveness of this process was reduced in the Brazilian scenario⁶. Therefore, this study seeks to demonstrate the relation between mortality rate and vaccination against Covid-19.

Over time with the advance of vaccination, there was a great reduction in the number of daily deaths, reaching 2.6 per million people in September, with 31.05% of the population being partially vaccinated and 37.08% fully vaccinated, totaling 68.13% of vaccinated individuals. Studies show that the first dose alone of any Covid-19 immunizer can significantly reduce the risk of passing the infection from one person to another, thus also reducing the associated mortality⁷. Most vaccines used to fight the pandemic are given in two doses^{7,8}. The second dose works as a “prime-boosting”, since it maximizes immune protection and memory⁷. When the Pfizer, Moderna and Astrazeneca vaccines were first being tested, it was shown that the first dose caused an immune weak response, with a lower number of antibodies, compared to a very effective response after the “prime-boosting” dose was administered^{7,8}. Another study shows that the immune response after the second dose of the Pfizer vaccine also increases protection against Alpha and Delta variants⁹. It is necessary to take into account the time of seroconversion, that is, the real time of immunization, which occurs 14 days after the vaccine application^{8,9}. Thus, when analyzing the graph, one should consider that people are only effectively immunized two weeks after the last dose, causing a delay on how the vaccination data impacts on the mortality rate.

METHODS

This is an original research that investigated the relation between mass vaccination against Covid-19 and mortality in Brazil. The data during the period 06-02-2021 to 19-09-2021, was extracted from the Our World in Data (<https://ourworldindata.org/>) dataset with recent official numbers. To support the theoretical framework, a narrative literature review was carried out. A search was performed in the Virtual Health Library database, using the following keywords: “Vacinação”, “Eficácia”, “Mortalidade”, “Coronavírus”. To assist in the searches, the following Boolean operator was used: AND. The inclusion criteria was all bibliographic productions published between 2020 and 2021, in English, Portuguese and Spanish. Three independent authors performed a non-systematic analysis of the results found.

CONCLUSIONS

The Covid-19 pandemic is a serious public health problem that has caused the death of millions of people worldwide, with Brazil being one of the most affected countries. Thus, a relentless search for the discovery of an immunizing agent capable of reversing this scenario began. However, after the vaccination of the population had started, the mortality rate didn't drop as expected. Only in mid-April, with the expansion of the distribution of immunizing agents, was it possible to observe the beginning of the decrease in numbers, which continues until the month of September. Although mortality rates have reduced considerably in the country, we cannot minimize the number of deaths, which to date, surpass the mark of 500 deaths per day. Thus, it is necessary to maintain protective measures of social distancing, wearing masks, and that people complete their vaccination schedule so that the pandemic can come to an end.

RESULTS AND DISCUSSION

Graph 1 shows the correlation between the three variables considered in this study: the number of deaths per million people, the percentage of partially vaccinated individuals, and the percentage of fully vaccinated individuals in Brazil. An exponential increase in mortality values was registered between February and April 2021, with a peak, in this last month, of 12.86 deaths per million people. During this period vaccination had already started in the country, but only 6.32% of the population was partially vaccinated and 2.49% fully vaccinated. The increase in mortality rate after the vaccination had already started can be explained by relaxation of social isolation measures and the emergence of new variants of the coronavirus^{6,7}. From June onwards, the Covid-19 mortality rate began to decline. This fact is related to the significant increase in partially vaccinated individuals, going from 12.11% at the beginning of June to 18.56% at the end of this month.

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