Effects of Mass Vaccination against COVID-19 in Brazil

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Abstract. This study investigated the effects of mass vaccination against the aggressive COVID-19 pandemic. The first case of this disease in Brazil occurred in February 2020, but vaccination campaigns only started in January 2021. Even with vaccination started almost a year after the beginning of the pandemic, they were efficient, reducing deaths by 74% in five months.

Keywords. Brazil, Vaccine, Immunization, COVID-19, SARS-CoV-2.

1. Introduction

In December 2019, in Wuhan, China, an outbreak of pneumonia began, with no known cause. Months later, a new virus was identified, called SARs-CoV-2, which in a short time was responsible for thousands of deaths between 2020 and 2022.

In Brazil, the first case was confirmed in February 2020, and in a few months Brazil became one of the countries with the highest number of deaths from COVID-19, surpassing the barrier of a thousand deaths per day.

Mass vaccination campaigns against the virus began about a year after the first infection, in January 2021. However, due to the capillarity of the Brazilian health system, vaccination campaigns were effective in immunizing the population, which contributed to reduction in the number of deaths.

2. Methodology

2.1 Getting the data

To measure the effects of mass vaccination, in this study, a database was used, available at https://datahub.io/, at https://covid19datahub.io/. The choice of this supplier was strategic to ensure the reliability and completeness of the analyzed data.
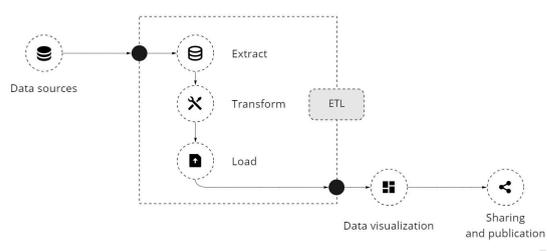
For this study, data from January 17, 2021 to April 2, 2022 were evaluated.

2.2 ETL and Data transformation

Thus, the ETL process was started, which concerns the Extraction, Transformation and Loading of data.

2.3 Data visualization

The next step was to analyze the data collected, for this, a report was created that could facilitate our analysis.


Fig. 1 - Illustrative image of the report development process.

3. Results

3.1 Percentage of vaccinated people

According to the data analyzed, in Brazil there are about 204 million people, and about 86% of these people were vaccinated against COVID-19 throughout 2021 and 2022.

75.93% of these people have already been fully vaccinated, that is, you have already taken at least the second dose of the vaccine.
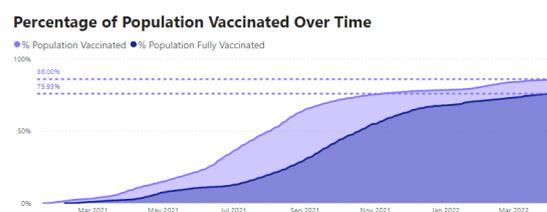
Fig. 2 - Percentage of Population Vaccinated

3.2 States with better vaccination

Some Brazilian states stood out, reaching high vaccination rates.

Tab. 1 - States with better vaccination.

State	% Population Vaccinated
Piauí	95%
São Paulo	93%
Santa Catarina	89%
Mato Grosso do Sul	88%

Heatmap by percentage of population vaccinated

Fig. 3 - Heatmap by percentage of population vaccinated

3.3 Reduction of deaths

After almost 50% of the population was vaccinated, the deaths decreased by 74%. In short, from August 1, 2021 to March 31, 2022 there were 99,289 deaths, against 382,594 from November 01, 2020 to July 31, 2021.

4. Conclusion

In conclusion, it was noticed that even started the vaccination process one year after the first infection, in January 2021, the vaccination campaigns were efficient, as in a few months, 86% of the Brazilian population was already vaccinated and almost 74% of them were already fully vaccinated.

Furthermore, we noticed a drastic reduction in the number of deaths, almost 74%, after 50% of the population were vaccinated.

In addition, note that some states stood out in vaccination campaigns, reaching high rates of the vaccinated population.

5. Discussion

One of the difficulties encountered during the study was that we did not obtain data from the states of Espírito Santo and Paraíba, for our analysis.

Despite this, we had several results that were already expected, this was important because it showed that were assertive in choosing the supplier of data sources and in the treatment of our data.

6. References

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[4] *https://covid19datahub.io/*