

Quantitative Analysis of the Relationship between COVID-19 Mortality Rate and Socioeconomic Factors

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Introduction

The disastrous effects that a highly contagious disease can have on the world have been strongly illustrated by the COVID-19 pandemic. Millions of people have passed away as a consequence of the pandemic and also impacted the lives of billions of people around the world. Current state of affairs has brought to light the necessity for research on factor and tactics to effectively combat pandemics in the future.

It's critical to comprehend the variables affecting COVID-19 mortality as the pandemic spreads further. The goal of this study is to look at the correlations between a nation's COVID-19 mortality rate and its population density, median age, GDP per-capita, prevalence of diabetes, hospital beds per 1,000 people, and human development index.

In this project I'm aiming to research To what extent do these socioeconomic factors contribute to the variation in COVID-19 mortality rate across the world and derive the relationship of COVID-19 mortality rate with population density,median age, GDP per capita, diabetes prevalence, hospital beds per thousand people and human development index

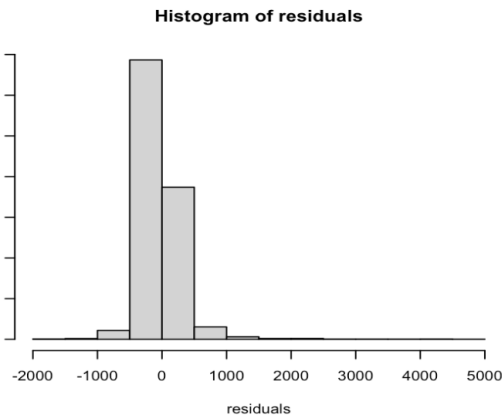
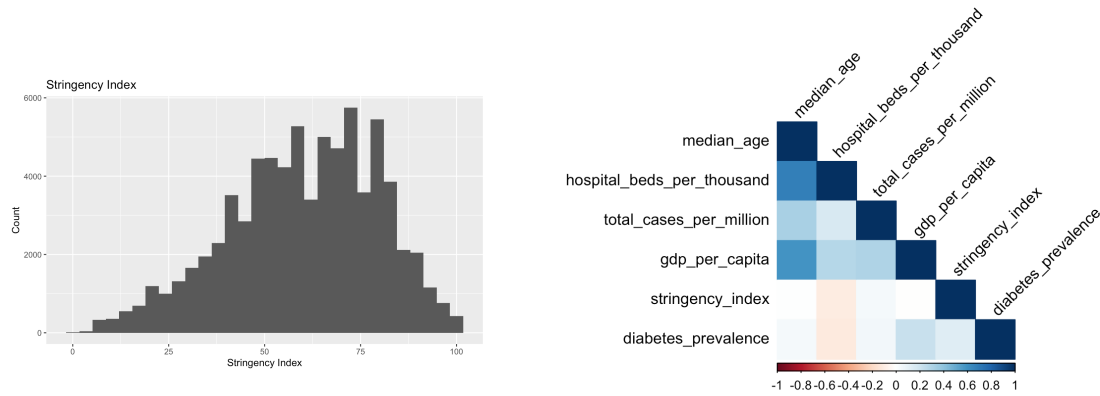
Research Question:

- What factors did mainly influence the covid mortality rate?
- Did economic factors completely influence covid mortality?:

DataSet

The data set contains time series data of around 193 countries around the world. There are around 84,000 records for daily data of the countries over the period of time since 2020-03 to 2021-06 which is around 465 records per country.

Exploratory Analysis



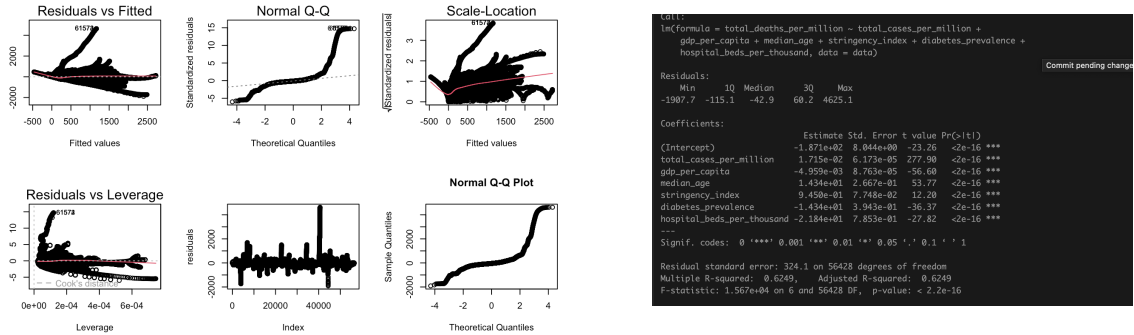
the collinearity matrix, suggests that the variables are important. Looking at the matrix, we can see a strongest positive correlations with total deaths per million are observed for median age and total cases per million, indicating that countries with higher median age and higher total cases per million tend to have higher total deaths per million.

On the other hand, it is evident that there is a strongest negative correlations for hospital beds per thousand, indicating that countries with higher hospital beds per thousand tend to have lower total deaths per million.

Also there's some moderate positive correlations for certain predictor variables, such as gdp per capita, diabetic prevalence and stringency index.

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Hypothesis Testing



The coefficient estimates for these variables are all statistically significant, which means that we can reject the null hypothesis and conclude that the variables have a significant impact on the dependent variable.

The coefficient estimate for total cases per million is the largest, which means that this variable has the greatest impact on the dependent variable. This is to be expected, as the number of total cases per million is a direct measure of the number of people who have been infected with the virus.

The coefficient estimate for GDP per capita is also significant, which means that countries with a higher GDP per capita have a lower number of total deaths per million. This is likely due to the fact that countries with a higher GDP per capita have better healthcare systems, which are able to provide better care for people who are infected with the virus.

The coefficient estimate for median age is also significant, which means that countries with an older population have a higher number of total deaths per million. This is likely due to the fact that older people are more likely to die from complications of the virus.

The coefficient estimate for stringency index is also significant, which means that countries with stricter lockdown measures have a lower number of total deaths per million. This is likely due to the fact that stricter lockdown measures help to slow the spread of the virus, which reduces the number of people who are infected.

The coefficient estimate for diabetes prevalence is also significant, which means that countries with a higher prevalence of diabetes have a higher number of total deaths per million. This is likely due to the fact that people with diabetes are more likely to die from complications of the virus.

The coefficient estimate for hospital beds per thousand is also significant, which means that countries with more hospital beds per thousand have a lower number of total deaths per million. This is likely due to the fact that countries with more hospital beds per thousand are able to provide better care for people who are infected with the virus.

Overall, the model above shows that the number of total deaths per million is significantly affected by a number of factors, including the number of total cases per million, GDP per capita, median age, stringency index, diabetes prevalence, and hospital beds per thousand. These factors can be used to develop policies that help to reduce the number of deaths from the virus.

Conclusion

The results showed that all these variables had a significant impact on the COVID-19 mortality rate. Total cases per million which is obvious is the most deciding variable and followed by GDP per capita and median age had bigger influence. Diabetes prevalence and hospital beds per thousand had a comparatively lesser effect. As per our results The stringency index, which measures the strictness of measures taken by governments to control the spread of the virus, had least effect on mortality rates.

Overall, the results suggest that the COVID-19 mortality rate has been affected by a combination of factors, including the majorly by the economic and infrastructure condition of a country (measured by GDP per capita and Hospital beds per thousand), and the age distribution of the population as well as diabetic prevalence. Governments may need to take into account these factors when formulating policies and measures to contain the virus and reduce mortality rates. It is also essential to continue monitoring other factors and analyze the data to understand the impact of different variables on the pandemic impact and mortality rates which will help us be prepared for any future pandemic.