Why Did Russia Fare So Poorly during COVID: An Analysis of Why One of the Best Prepared Countries Could Not Control Excess Deaths*

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February 12, 2024

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*Code and data are available at: https://github.com/Ary4m3n/covid-effect-russia.git; Replication on Social Science Reproduction platform available at:

1 Introduction

The COVID-19 pandemic has led to an enormous loss of life over the world and has presented an unprecedented challenge to public health, foreign policy and has additionally had an adverse effect on countries' economies around the world, over the past 5 years (Chriscaden 2020). There have been over 774 million reported confirmed cases of the virus being contract and the outbreak has caused over 7 million deaths, which are claimed to be "under counted" and "under reported", suggesting that the actual number is even higher around 18.2 - 33.5 million based on the excess mortality estimates (Wikipedia 2024). This excessively high number of deaths has alerted the world to assess how countries assumed to be well-prepared to tackle such outbreaks were affected to this extent.

There were a subset of countries, namely India, the United States of America, Brazil, Russia and Mexico which were impacted the most in terms of having the highest cumulative total deaths (Pašović et al. 2021). According to the global data, Russia's COVID-19 related deaths since the start of the pandemic have been over 230,000. Russia also holds the highest mortality rate in Europe and the second-highest rate in Asia (Stronski 2021). For these reasons and more, Russia and its residents have suffered a lot over the past few years, wherein the adverse impact of the outbreak has lead to a plethora of impacts on the country's economy and standard of living.

This paper will follow a reproduction of Jennifer B. Nuzzo and Jorge R. Ledesma's paper (Nuzzo and Ledesma 2023) and findings and apply a Russian-facing lens to discuss the impact of the COVID-19 outbreak on Russia and what could have been done better and can be improved for the future in order for the impact of any upcoming pandemics can be lessened. Our paper aims to replicate their claim of how well-prepared countries did so poorly during the COVID-19 outbreak, where the Nuzzo and Ledesma have concentrated solely on the United States but in this paper we look at Russia with the same regards and analyse the impact of the pandemic on the death toll, and finally provide for ways to improve the laws, regulations and plans to tackle such outbreaks in the future. Our reproduction found out that how ever well prepared Russia seemed to be, it experienced an unprecedented rise in the death rate compared to other countries, and its excess death rate was one of the highest amongst all countries. This leads us to make an important judgement that better planning and regulations can help reduce the impact of such outbreaks in the future, which will be studied in this paper.

This paper is structured using the following sections: Data, Results and Discussion. In the Data (Section 2) section, the data source of the datasets from the paper being replicated (Nuzzo and Ledesma 2023) is discussed and the measurement and data cleaning process is outlined. In the Results (Section 3) section, the paper summarizes the data findings and presents relevant maps and plots in order to study the trends. The paper ends with the Discussion (Section 4) section, where the findings of the paper have been analysed and delved deeper into by studying the measures that can be taken to prevent the country from experiencing such an extensive effect of future pandemics. Additionally, the limitations and a further scope for the paper has been discussed here.

2 Data

As mentioned above, the data analysed in this paper is from the reproduction package of the paper by Nuzzo and Ledesma (Nuzzo and Ledesma 2023). The data was cleaned and analysed using the open source `R` programming language (R Core Team 2023). R libraries and packages such as `tidyverse` (Wickham et al. 2019), `janitor` (Firke 2023), `ggplot2` (Wickham 2016), `knitr` (Xie 2023), `readr` (Wickham, Hester, and Bryan 2023), `dplyr` (Wickham et al. 2023), `rnaturalearth` (Massicotte and South 2023) and `sf` (Pebesma 2018). In the following sections, we will discuss the raw data in (Section 2.1), the data cleaning process in (Section 2.2) and then move on to discussing the measurement in (Section 2.3).

2.1 Raw Data

This paper will replicate the data that was obtained from the replication package of the paper (Nuzzo and Ledesma 2023). Specifically, in the paper we use 3 datasets that will help us analyse the claim of Russia not being able to control the wave of the COVID-19 pandemic well. In general, there is a lot of data available on the effect of COVID-19 on countries, however, all the data we needed for this paper was included in the paper by Nuzzo and Ledesma.

The first raw dataset includes data on the Global Health Security index for all countries. The GHS index is an indicator of how well prepared or "secure" a country is against epidemics or pandemics like the COVID-19 outbreak. This dataset has a plethora of data on indices that are not relevant to us for this paper. Additionally, the dataset contains data for years 2019 and 2021. For our analysis, we only require data for the GHS index of countries for 2021.

The second raw dataset includes data on all cause death rates for all countries from 1960-2021. This dataset has loads of information that was mainly unnecessary to us for this paper, mainly the data from 1960-2010 which is not required as we are only interested in looking at the effect of COVID-19 which is mainly data from 2020-2021. However, in order to study the trend, we will use data for all cause death rates for countries around the world from 2010-2021.

The third raw dataset is from the Institute of Health Metrics and Evaluation (IHME) which presents data on the COVID death rate, excess deaths, excess death rate and ratio of excess death rate over COVID death rate for all countries in the world. Again, this dataset too contained unnecessary information that was of no need to us which the cleaned data process outlined in Section 2.2.

In the next section (Section 2.2), we will outline the data-cleaning process and also show the structure of the cleaned data.

2.2 Cleaned Data

As stated above in Section 2.1, we start with the first dataset on GHS indices for all countries in the world. Table 1 shows the first 6 countries and their GHS indices. Here we only have 2 variables, namely the Country Name and the respective GHS index. We cleaned this dataset by selecting only the two columns for the respective variables and filtering the data for the year of 2021.

Table 1: Cleaned Data showing GHS indices for first 6 countries

Country Name	GHS Index
Afghanistan	28.8
Albania	45.0
Algeria	26.2
Andorra	34.7
Angola	29.1
Antigua and Barbuda	30.0

Second, we have a raw dataset on all cause death rates for all countries from 1960-2021. We cleaned this dataset by selecting a subset of countries that helped us analyse how Russia fared against other countries in death ratesover the years. Table 2 shows the structure of the cleaned data after we filtered it for the time period of 2010-2021 for India, South Korea, Russia and the United States.

Table 2: Cleaned Data showing all cause death rates for 4 countries

Country Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
India	7.385	7.267	7.118	6.960	6.790	6.67	6.603	6.593	6.644	6.71	7.35	9.448
South Korea	5.100	5.100	5.300	5.300	5.300	5.40	5.500	5.600	5.800	5.70	5.90	6.200
Russia	14.200	13.500	13.300	13.000	13.100	13.00	12.900	12.400	12.500	12.30	14.60	16.700

Country Name	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
United States	7.995	8.073	8.102	8.215	8.237	8.44	8.493	8.638	8.678	8.70	10.30	10.400

The final raw dataset, as mentioned in Section 2.1, that we have is the IHME data on the COVID death rate, excess deaths, excess death rate and ratio of excess death rate over COVID death rate for all countries in the world. In this paper we only needed the two variables excess death rate and the country name, however for better analysis of Russia's ability to control the pandemic's effect, we combined this data with the respective GHS index as shown in Table 3. Hence, there are three variables, the country name, and the respective excess death rate and GHS index.

Table 3: Cleaned Data showing Excess Death Rate and GHS index for first 6 chosen countries

Country Name	Excess Death Rate	GHS Index
Australia	-37.6	71.1
Austria	107.5	56.9
Brazil	186.9	51.2
Canada	60.5	69.8
Denmark	94.1	64.4
France	124.2	61.9

Now that we have cleaned our raw datasets and have generated clean tables for analysis, we will go on to the Results Section (Section 3) and delve deeper into studying the effect of the COVID-19 pandemic on Russia and if it was impacted significantly more than other countries.

2.3 Measurement

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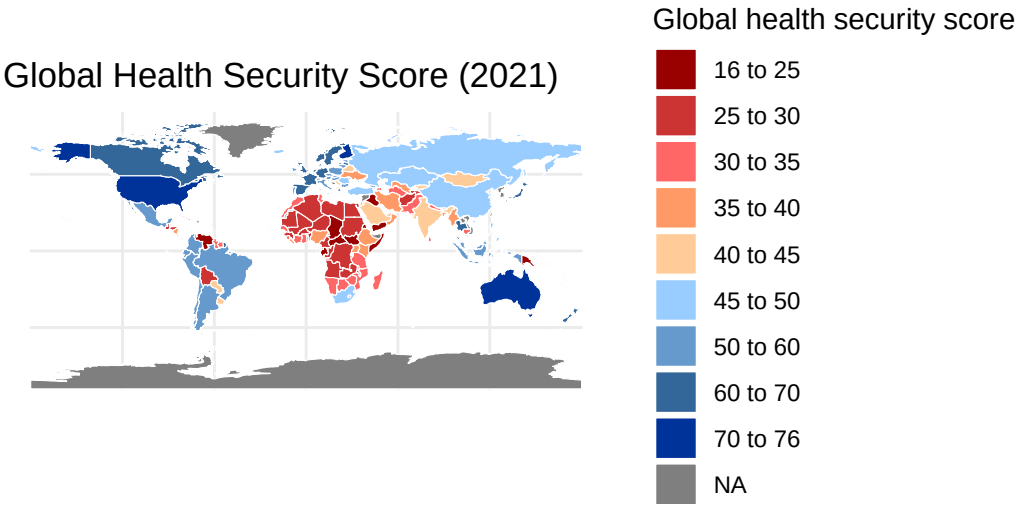
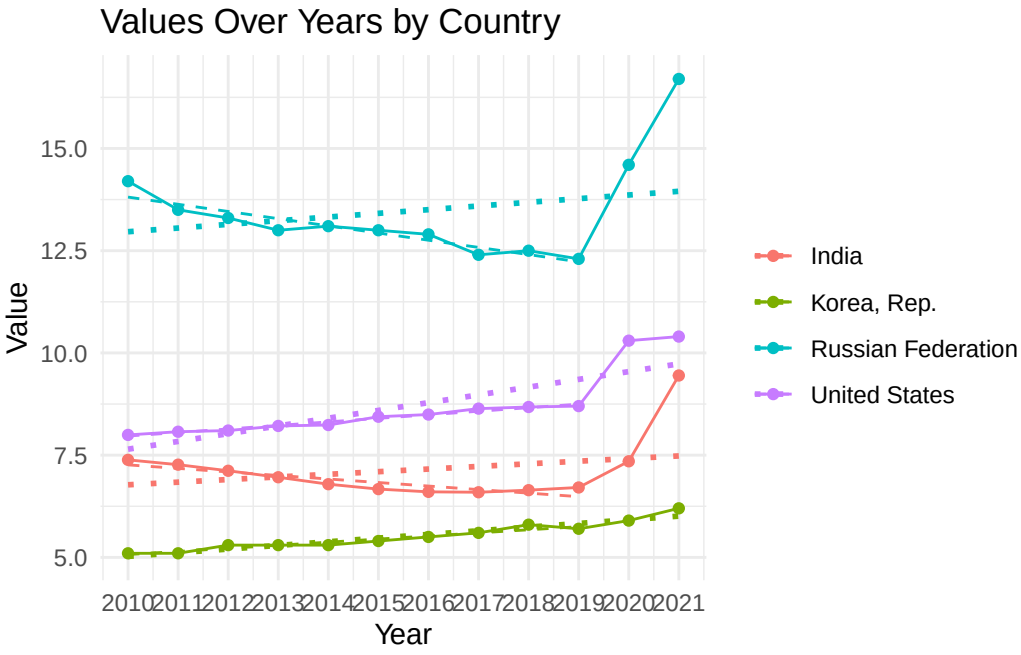
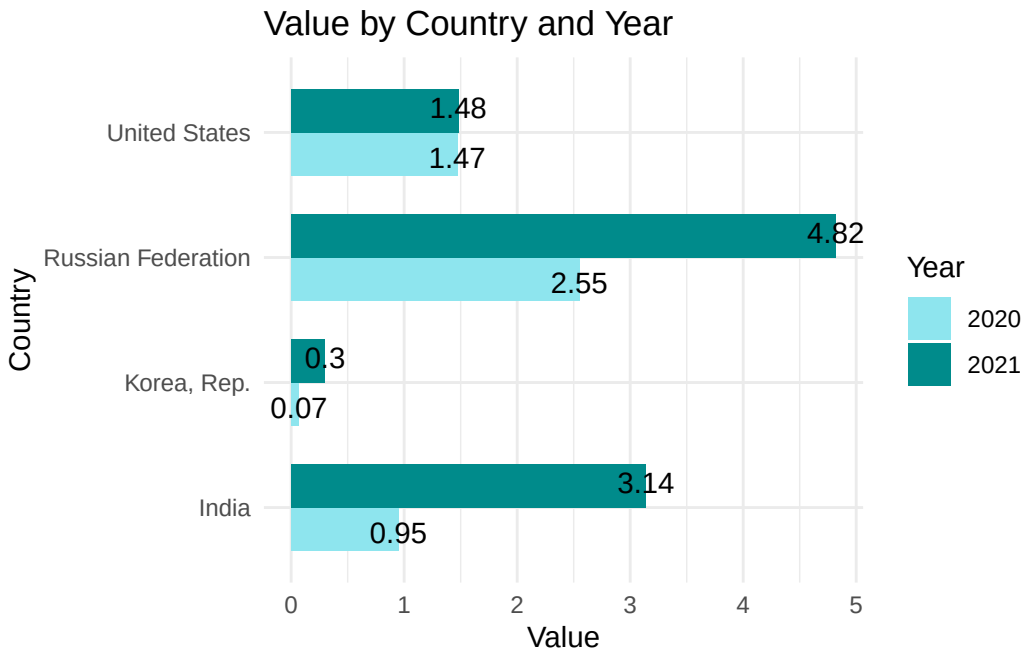
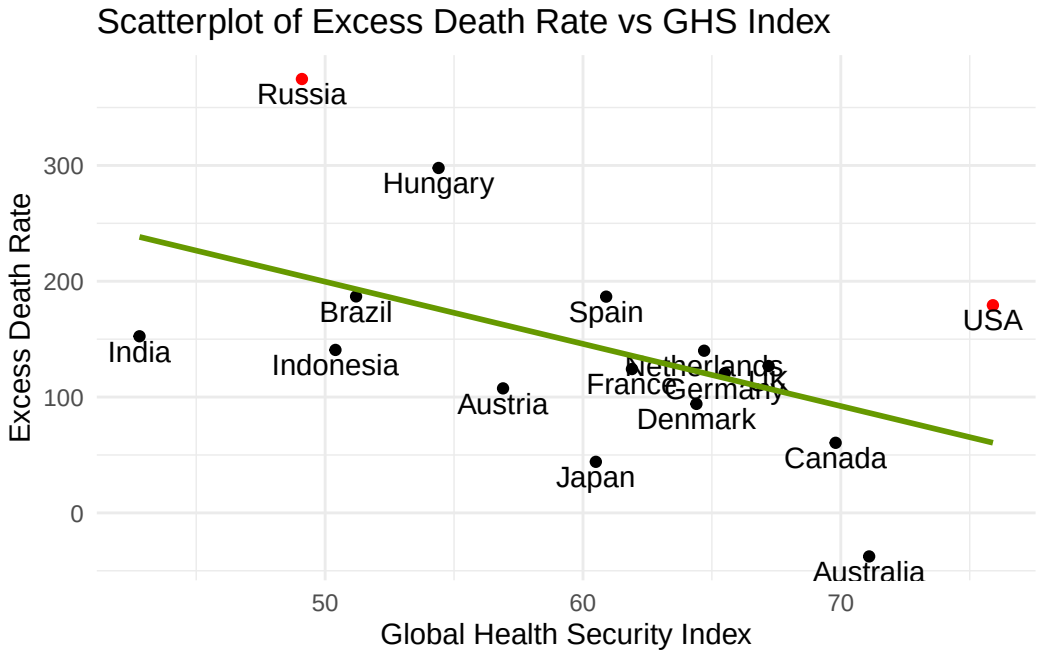
3 Results


Global Health Security Score (2021)
Global health security score
16 to 25
25 to 30
30 to 35
35 to 40
40 to 45
45 to 50
50 to 60
60 to 70
70 to 76
NA


Values Over Years by Country
Value
15.0
12.5
10.0
7.5
5.0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year
India
Korea, Rep.
Russian Federation
United States


Value by Country and Year
United States
Russian Federation
Korea, Rep.
India
Country
1.48
1.47
4.82
2.55
0.3
0.07
3.14
0.95
0
1
2
3
4
5
Value
Year
2020
2021


Scatterplot of Excess Death Rate vs GHS Index
Russia
Hungary
Brazil
Spain
USA
India
Indonesia
Austria
France
Germany
Denmark
Canada
Japan
Australia
300
200
100
0
Excess Death Rate
50
60
70
Global Health Security Index

4 Discussion

4.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

4.2 Second discussion point

4.3 Third discussion point

4.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional data details

B Model details

B.1 Posterior predictive check

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