

Original Article

## Low-income countries are more immune to COVID-19: A misconception

Soumya Roy

Department of Paediatrics, North 24 Parganas District Hospital (Barasat Hospital), Kolkata, West Bengal, India



**\*Corresponding author:**

Soumya Roy,  
Department of Paediatrics,  
North 24 Parganas District  
Hospital (Barasat Hospital),  
Kolkata - 700115, West Bengal,  
India.

[dr.roy85@gmail.com](mailto:dr.roy85@gmail.com)

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### ABSTRACT

**Objective:** The COVID-19 pandemic has hit countries such as Italy, Spain, France, UK, and the USA with great force, whereas the number of cases in countries such as India and most parts of Africa is comparatively lower. Such observation has made many people believe that the low-income countries may be more immune to COVID-19. Theories such as warm climate, weaker strain of the virus, and cross-protection by malaria have been popularly put forward. One such interesting theory is that since the general people of the low-income countries are mostly habituated to dwell in lesser hygienic condition and with lesser medical attention throughout their lifetime; hence, they have naturally acquired better immunity and more resilience against many infective diseases.

**Materials and Methods:** We sought to investigate the above claim by comparing the case fatality rate (CFR) as well as number of cases per million population versus the gross domestic product at purchasing power parity per capita of different countries.

**Results:** We found that while the number of cases showed a slight decline in the lower-income countries, the CFR was independent of the financial condition of the country.

**Conclusion:** We conclude that the theory of better immunity in economically poor countries is a misconception. We suggest that people must come out of these misconceptions and resort to strict home isolation.

**Keywords:** Novel coronavirus, COVID-19, Low income, Case fatality rate

### INTRODUCTION

Novel coronavirus disease (COVID-19) has become a pandemic, infecting 6,57,434 cases and killing 30,419 people worldwide.<sup>[1]</sup> Governments all over the world have been forced to declare lock-down, compelling billions of people to stay at home. Many people, being both idle as well as bored, have resorted to social networking as a form of time pass. In a time of crisis and desperation, it is a common psychology that man will tend to believe what he prefers to believe. Hence, false rumors are running wild through social media, and even many elite people are in partial belief with these rumors. A common perception in social media (at least in India) is that, unlike the high-income countries such as Italy, UK, France, and the USA, the economically poor countries such as India and many African countries will be somewhat less affected by COVID-19. The statistics showing 92,472 cases (with 10,023 deaths) in Italy and 1,23,776 cases (with 2229 deaths) in the USA versus only 987 cases (25 deaths) in India and 454 cases (29 deaths) in Algeria have strengthened their belief. As such many people in India are unwilling

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to maintain strict isolation at home. However, these people missed the fact that the case fatality rate (CFR) in the USA is 1.80%, while that of India is 2.5%. Various reasons have been put forward in support of such a claim. Hot humid weather conditions, cross-protection from malaria, mutation in the virus making it weaker, etc., were some of the reasons cited. One such interesting reason raised is that the common people living in low-income countries are commonly exposed to lesser hygienic conditions and receive lesser medical attention throughout their lifetime than the people living in high-income countries. As such, these people from economically poor countries, such as India and the African countries, have inherently acquired a stronger immunity and higher resistance against different diseases. We sought to find out the truth behind such claim and whether the people with low-income conditions really do have something that can make them better immune against COVID-19?

## MATERIALS AND METHODS

As of now, 46 countries around the world have seen the death of ten or more people from COVID-19. We included only these countries in the study. Any country with a total death of <10 was excluded from the study. Data were collected from an online source, and CFR from COVID-19 versus the gross domestic product at purchasing power parity per capita (GDP PPP per capita) was calculated for each country. Similarly, the number of cases infected with COVID-19 virus per one million population of these countries was compared against the GDP (PPP) per capita of these respective countries.<sup>[1,2]</sup>

### Statistical analysis

The data were copied on a Microsoft Excel Spreadsheet and the statistical functions given therein were used to calculate the results. An online software was used to create the bar charts (available at <https://www.meta-chart.com/>).

## RESULTS

From the bar charts [Figure 1a and b], it was seen that the CFR of the various countries did not show any relation with the GDP (PPP) per capita, whereas a total number of COVID-19 infection cases per million population showed a mild negative correlation with the GDP (PPP) per capita of the countries [Tables 1 and 2].

## DISCUSSION

The higher-income group countries showed a slightly higher number of cases per million population which is more likely due to the better availability of testing facilities in the high-income countries. Besides, the high-income countries have often been the business and tourism centers all over the world

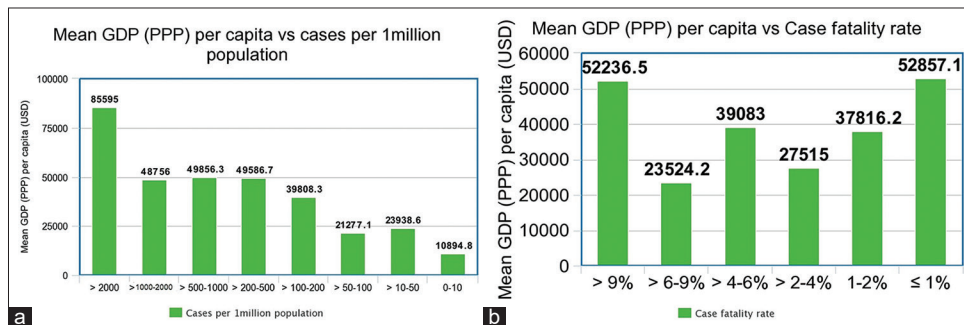
**Table 1:** Comparison of the number of cases of COVID-19 versus the GDP (PPP) per capita of different countries.

Case fatality rate (%)	GDP (PPP) per capita (USD)		
	Mean	Standard deviation	Median
>9	52,236.5	15,998.3	52,236.5
>6–9	23,524.2	16,021.4	16,842.0
>4–6	39,083.0	14,543.8	39,083.0
>2–4	27,515.0	17,642.2	20,829.0
>1–2	37,816.2	19,168.9	29,924.0
≤1	52,857.1	30,379.3	52,556.0

**Table 2:** Comparison of the case fatality rate the GDP (PPP) per capita of different countries.

Cases per 1 million population	GDP (PPP) per capita (USD)		
	Mean	Standard deviation	Median
>2000	85,595.0	31,177.8	85,595.0
>1000–2000	48,756.0	15,228.9	40,924.0
>500–1000	49,856.3	9396.7	52,556.0
>200–500	49,586.7	17,469.1	51,405.0
>100–200	39,808.3	11,122.9	42,667.0
>50–100	21,277.1	7607.2	21,751.0
>10–50	23,938.6	10,221.4	20,829.0
0–10	10,894.8	4443.8	9984.5

and as such, they receive much more frequent travels from people all around the world. Frequent international travel to these countries might also contribute to the higher number of cases. According to the WHO, the CFR is a measure of the severity of a disease and is defined as the proportion of reported cases of a specified disease or condition which is fatal within a specified time.<sup>[3]</sup> In fact, the CFR is much more important than the absolute number of infected persons because maximum infections are asymptomatic or mildly symptomatic, and it is the mortality that we are more concerned about. The high-income countries have much better health-care facilities, higher living standards, better options for home isolation, and improved facilities for viral testing and contact tracing. Still, it is a matter of enigma that the CFR of COVID-19 was not found to be affected by the income levels at all [Figure 1b]. For example, whereas >9% CFR was seen in few countries (such as Italy and San Marino) with a mean GDP (PPP) per capita of >50,000 USD, a CFR of <1% was seen in few other countries (such as Germany, Austria, Norway, Australia, and Luxembourg) with the same income. Similarly, whereas a CFR as high as 6–9% was seen in a few countries (such as Indonesia, Algeria, and the Philippines) with a much lower mean GDP (PPP) per capita, a CFR as low as 2–4% was seen in certain other countries (such as Ecuador, Brazil, Argentina, and India) with similarly lower income [Table 2].



**Figure 1:** (a) Comparison of the number of cases of COVID-19 versus the GDP (PPP) per capita of different countries. (b) Comparison of the case fatality rate the GDP (PPP) per capita of different countries.

## CONCLUSION

As various countries may be in different stages of the pandemic at present; hence, the CFR is a more significant index than the total number of cases per million population. We found that the CFR is not affected by the income level of the respective countries. Hence, the idea of the poor countries being partly immune to COVID-19 is a misconception and it should be publicized widely so that the people from these countries give up their false sense of security and instead resort to strict home isolation as advised by the WHO.

## Limitations

The CFR may also depend on various other factors such as the age profile of the population, the presence of comorbidities, and the health budgets of the countries. The interpretation of data would have been even more vivid with some more sophisticated statistical tools.

## Declaration of patient consent

Patient's consent not required as there are no patients in this study.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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