

Letter to the Editor

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Keywords:

COVID-19; emerging infection disease; public health

Abbreviations:

GDPPC, gross domestic product per capita; HAQ, Healthcare Access and Quality (Index)

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Since the spread of coronavirus disease (COVID-19), the globe has endured tremendous loss. As a pandemic, its spread is heavily influenced by various non-medical factors, such as the political environment and economic level.¹ To investigate how the economy affects the spread of COVID-19, the gross domestic product per capita (GDPPC), which is regarded as a significant indicator of regional wealth,² was utilized to evaluate the economic level. Additionally, infection rate and mortality were used to quantify the extent of COVID-19 prevalence. We used data from different entities in the International Monetary Fund³ and the World-O-Meter online data repository⁴ to develop our study.

Discussion

To remove the vast disparity in data values while preserving the overall trend, we excluded samples with a small sample size and many missing values. All the data were ranked in ascending order and a regression analysis was conducted on that basis. Results were found to be of interest.

Figure 1a included 177 entities and depicted a considerable positive correlation between infection rates and GDPPC ($P < 0.0001$). This counterintuitive result can be attributed to local case detection rates: In general, poor areas lack the necessary medical resources to adequately detect COVID-19 infections. Even though these areas may include a large number of COVID-19 cases, the number of reported cases is quite low due to low detection rates. The infection rates in these areas do not objectively reflect the total number of infected cases. To confirm our view, we also introduced the HAQ Index,⁵ which represents the quality of care and accessibility of health care services. We performed a correlation analysis between the HAQ Index and GDPPC. As shown in Figure 1b, we verified the lower quality of care and accessibility in economically disadvantaged areas. Figure 1a showed the effect of insufficient detection cases on the infection rate, indicating that there may be many undiagnosed cases in poor areas.

Figure 1c shows similar results: Data from 177 districts showed a negative correlation between mortality and GDPPC ($P < 0.0001$). These findings are consistent with Figure 1a and suggest that the poor quality of care and accessibility in economically disadvantaged areas make it difficult to provide early treatment. This allows the disease to develop before treatment is available, which increases the severity of the disease and the risk of death. Despite the lack of detection, it is worth noting that poverty is usually accompanied by a lack of medical resources, which can also lead to a high risk of death.

Conclusion

In conclusion, as the economic level increased, the infection rate went up while the mortality decreased. The counterintuitive correlation between infection rate and GDPPC might stem from the low detection rate caused by poverty. In conjunction with the lack of medical resources, the low detection rate contributed to the high rate of death. During the COVID-19 pandemic, economically disadvantaged areas may be subjected to greater medical strain. Governments and international aid organizations should take measures to increase COVID-19 control in poor places based on a comprehensive assessment of the situation.

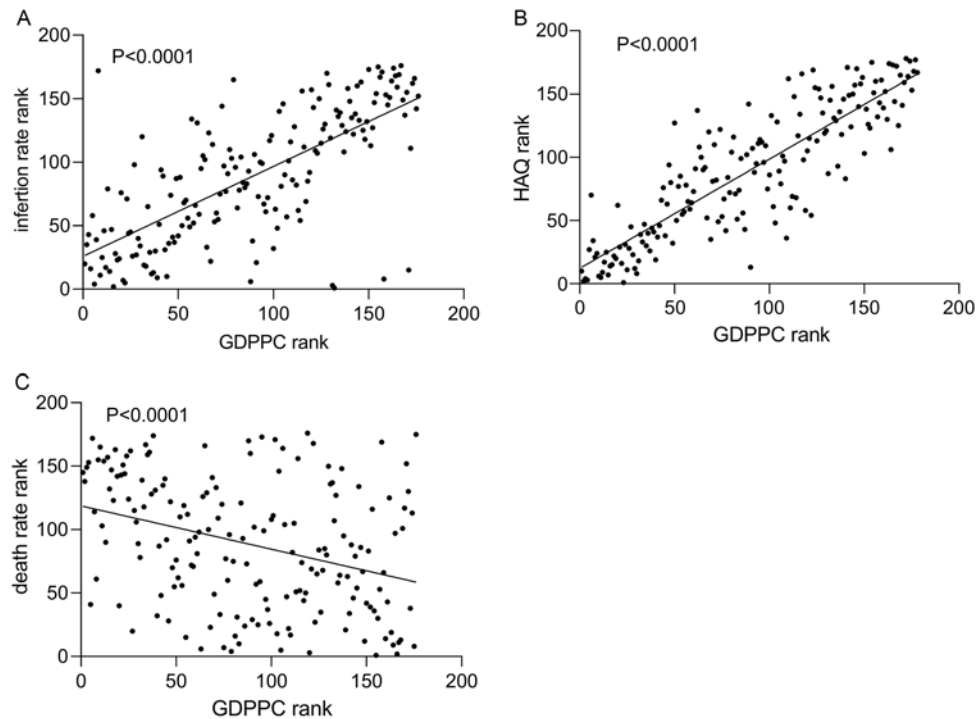


Figure 1. A. Correlation between infection rate rank and GDPPC rank. B. Correlation between HAQ Index rank and GDPPC rank. C. Correlation between death rate rank and GDPPC rank.

Data availability statement. The detailed data of this study are available from the International Monetary Fund and the World-O-Meter online data repository.

Author contributions. Yanpei Mai: conceptualization, visualization, project administration, data curation, formal analysis, methodology, writing – original draft, writing – review & editing.

Competing interests. None.

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