To Test, Or Not To Test –
The COVID-19 Question

Research Objectives

Drs Ibarra-Armenta and Alarcon-Osuna outline the need for more research on the impact of the Covid-19 pandemic on low- and middle-income countries.

Detail

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Bio
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Personal Response

What do you think is the most significant factor affecting COVID outcome today, globally?

The administration of COVID tests to track infections and control spreads regionally. Namely, due to lack of health infrastructure, countries ended up attending mainly very ill people, and did not control the spread. In fact, European countries, which have been hard hit by the economic crisis, realised that they ought to find a way to contain the virus while keeping economic activities open as much as possible because the spread will not be controlled in the short term. Hence, testing is the key to critically assess the infected during the first days of infection, track regions with higher infections and implement specific measures.

References


In late 2019, reports of a novel coronavirus, SARS-CoV-2, came from Wuhan, China. On the 11th of January 2020, the first COVID-associated death was reported, and over the next few months the virus spread globally – first through Asia and the Middle East, and then onto Western Europe. The current coronavirus outbreak has now reached every corner of the globe, resulting in 114 million cases and 2.5 million deaths worldwide as of March 2nd, 2021.

Measures taken against the virus have primarily revolved around short-term strategies aimed at reducing transmission. Many governing bodies have established coronavirus regulations, focusing on hand washing, use of face masks, and social distancing. Some governments have also implemented periodic regional ‘lockdowns’, in which citizens are prevented from socialising, visiting hospitality venues, or, in some cases, leaving their homes. The WHO has also recommended continuous tracking of the virus through track-and-trace systems, which enable governments to employ more adaptive stringency measures. The central pillar of track-and-trace systems is mass testing – testing a population allows viral transmission to be tracked, and infected persons isolated, preventing further spread of the disease.

Data from the Organisation for Economic Cooperation and Development (OECD) has shown that reduced infection rates are observed in countries with a higher number of tests per million inhabitants. Testing not only contributes to virus containment, but also provides essential information on viral mutations, population immunity, and patterns of asymptomatic transmission. In high-income countries (HICs) such as Germany, Iceland and South Korea, track-and-trace systems have been readily employed and widely hailed as successful.

A DEVELOPING DICHOTOMY

While data on infections and deaths is readily available for HICs, the picture for LMICs is far from complete. LMICs make up around 50% of the global population, but, as of May 2020, accounted for only 2% of the global coronavirus death toll. Just five HICs (the US, UK, Italy, Spain, and France) accounted for 70% of all global deaths.

The dichotomy between LMICs and HICs death tolls is surprising. A multitude of factors such as household size, sanitation access, increased prevalence of vulnerable groups, and the difficulty of enforcing social distancing policies in dense, informal living situations such refugee camps or favelas, should all push the LMICs death toll higher than those observed in HICs.

The current coronavirus statistics are, however, likely a huge underrepresentation of the true disaster occurring in LMICs. Better quality data, as well as information on the implementation and knock-on impacts of stringency methods is urgently required to capture the severity of the ongoing crisis in LMICs.

Countries also differ in the way they record deaths. In the UK, until recently, the Department of Health counted all deaths in which patients had tested positive, regardless of what actually killed them. Timing is also paramount; once an individual is infected, it can take up to two weeks for symptoms to appear. When patients are hospitalised and receive intensive medical care, it could take weeks or months for fatality to occur, which can warp daily data.

In their recent study, Dr Ibarra-Armenta and Dr Alarcon-Osuna sought to assess the true case fatality rates (CFR) across LMICs and HICs in order to shed light on socioeconomic drivers behind the COVID-19 death toll. The CFR is defined as the total number of deaths divided by the total number of infections in the time period specified (the beginning of the pandemic to May 7th, 2020). There are some acknowledged limitations to the use of CFR, however.

One limitation is that different countries have different criteria for test administration. For example, in the UK, tests are administered only to those with suspected exposure, who display COVID symptoms, or who are hospitalised for COVID-associated complications. By contrast, in Iceland, mass testing of the whole population has been employed. The total number of documented coronavirus cases (the denominator in the CFR calculation) will therefore be an underestimation. There is no current agreement on the size of this underestimation – it has been postulated to be anywhere from 5% to 80%.

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The Ordinal Probit model was used to reveal causal relationships between dependent and independent variables. The model, based on international data, ranked countries according to their COVID-19 case fatality rate (CFR). This ranking allowed for the identification of countries that had higher CFRs, indicating that testing and healthcare expenditure were contributing factors. The model was estimated using Stata software, and the findings supported the use of testing and healthcare expenditure as indicators of effective measures against COVID-19.

The Cross-Section model was estimated using the Probit model and used ordinary least squares (OLS) linear regression analysis to assess the relationship between CFR and independent variables, such as testing, healthcare expenditure, and SI policies. This model was used to reveal causal relationships between variables and to support the results shown by the ordinal Probit model.

The Panel Fixed Effects model was estimated to link average country CFR and other independent variables, and to reveal causal relationships between CFR and variables such as testing and healthcare expenditure. The model was used to reveal causal relationships between variables and to support the findings of the Cross-Section model.

Finally, the results showed that the more money countries invested in testing and hospital care, the fewer fatalities. Countries that lack such systems are unable to provide a true dataset due to a lack of funding and a subsequent lack of tests. These results indicate that testing is a significant factor in decreasing the COVID-associated CFR and, in accordance with WHO guidelines, should be deployed in the form of mass track-and-trace testing campaigns across the globe. The authors concluded that while stringent containment methods, such as lockdowns, are effective for reducing daily deaths over a short interval, it is unclear if they are effective at reducing CFR over more substantial time frames. These results indicate that testing is a significant factor in decreasing the COVID-associated CFR and, in accordance with WHO guidelines, should be deployed in the form of mass track-and-trace testing campaigns across the globe. The authors concluded that while stringent containment methods, such as lockdowns, are effective for reducing daily deaths over a short interval, it is unclear if they are effective at reducing CFR over more substantial time frames.