



Credibility and evidence in the handling of SARS-CoV-2

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Abstract This short paper aims to present some philosophical considerations about the relationship between credibility and the uses of evidence. The point of view regarding evidence and scientific and political decisions in this paper focuses on the current world situation of the COVID-19.

Keywords SARS-CoV-2 · Evidence · Data

1 Context

The population has learned concepts such as evidence, peak, epidemiological fence, “flatten the curve”, rate, and data in the last year. Scientists use these concepts for problem-solving and to suggest policies. For instance, a scientific committee based on data collecting and interpretation suggest to political leaders implement lockdowns to prepare the health system to mitigate or suppress the peak of infection during a pandemic. Other scientists suggest that the population should use a mask and that the governments should have promoted massive testing and isolate only to infected people preventing generalized lockdown that may increase the health

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problems of its population and destabilize its economic system. Indeed, the World Bank (2020) argued that SARS-CoV-2 will “push an additional 88 million to 115 million people into extreme poverty this year”. Of course, the political decisions based on scientific research are unequal in their distribution or enactment, mostly within authoritarian, late-capitalist, or neoliberal governments. In countries such as Colombia, the poverty index is worrisome. “In 2019, monetary poverty was 35.7%, and extreme monetary poverty was 9.6% in the national total” (Departamento Administrativo Nacional de Estadística, 2020b). These data in Colombia, even without a pandemic, reflect a upsetting situation for 2020 and 2021. In fact, “for August 2020, the unemployment rate of the national total was 16.8%, which meant an increase of 6.0 percentage points compared to the same month of the previous year (10.8%)” (Departamento Administrativo Nacional de Estadística, 2020a).

The economic scenario contrasts with the public health measures in Colombia. As it has been usual in other countries, Colombia has implemented lockdowns, curfews, and the hotel and catering closure. Nevertheless, the population and some scientists have observed that these measures do not have the expected outcome. Indeed, if we observe the data reported from the *Instituto Nacional de Salud* (INS),¹ the infection rate is different in each region and at different temporal time but those measures are applied without distinctions. In some cities such as Medellín political leaders implemented measures like the 4 × 3, which consists of opening the city on Monday, Tuesday, Wednesday, Thursday; and closing it in a very stringent manner on Friday, Saturday, and Sunday. The problem is that there is no evidence of its effectiveness, and by contrast, it may increase infection by locking up for three days sick and healthy people who get sick at work and public transportation. After one year of pandemic, these measures appear to be ineffective, and people also feel their ineffectiveness as well as the economic and mental problems they cause (Trejos et al., 2020), which is reflected in recent citizen protests and in repressive responses of a government that uses the pandemic to justify repressive measures such as curfews and the militarization of cities. In this sense, both the worrying poverty index and the public health measures in Colombia trigger a credibility problem about scientific practices in data and evidence management and subsequent public policies.

First, I present some aspects about credibility and evidence in the handling of SARS-CoV-2 by considering two philosophical approaches in epidemiology. Secondly, I propose a contextual use of evidence and data applied to scientific and political decisions connected with the role of the subjects and institutions in handling data in unevenly wealthy places like Colombia. Finally, I point out as a recommendation to improve the data handling in Colombia the necessity of open data access based on a contextual approach.

¹ Cf. <https://www.ins.gov.co/Noticias/Paginas/coronavirus-casos.aspx>.

2 Credibility and evidence in SARS-CoV-2: a scientific debate

The SARS-CoV-2 is a good case study for the evaluation of evidence and credibility in contemporary scientific research. I understand the credibility as the study about the institutional conditions related to the accepted statements and practices by scientific communities for the knowledge of phenomena (Bloor, 1991; Orozco, 2014). Likewise, I associate evidence not only with the high quality of the data but with the characteristics of the population, geographic areas, the methods, and artifacts for data collection, the identity of the scientists, the funding, and the infrastructure of the research centers. Precisely, the features on COVID-19 behavior in each country allow us to evaluate from a philosophical approach the kind of evidence to make a scientific and political decision. Let us look at a discussion of data and evidence on COVID-19 handling between two scientists. This debate and the underlying analyses could help us to understand the situation regarding covid-data management and to rethink our concepts of evidence, data, and credibility.

The debate started when Ioannidis (2020c) argued that we have non-evidence-based measures that can affect the world economic system and, in other cases, contribute to the stabilization of repressive regimes. One of the results of this research was that the “infection fatality rate of COVID-19 can vary substantially across different locations and, this may reflect differences in population age structure and case-mix of infected and deceased patients and other factors” (Ioannidis, 2020a). In this study, the fatality rates are very low in Asian countries due to previous immunity to other coronaviruses and other variables. Also, the fatality rate is low in Africa, specifically in low-income countries. However, comorbidities, poverty, feeding habits may increase the infection fatality rate. On the other hand, in countries such as Italy and the United States, the reasons for the high number of deaths were the sending of COVID-19 patients to nursing homes and the unnecessary mechanical ventilation. Likewise, the high levels of congestion in busy public transport systems were factors that exposed people to high infectious loads and, therefore, triggering the more severe disease. As a result, an important variable is the infection fatality rate, which can be very high among disadvantaged populations and settings with a combination of factors.

The issues about the lack of evidence on COVID-19 data raised by Ioannidis lead us, from a philosophical approach, to incorporate an analysis of a wide range of factors differentiated both geographically and institutionally. These factors, as will be obvious below, have to do with understanding and data analysis as per a contextual approach that can be incorporated in clinical epidemiology and public health epidemiology. This distinction between theoretical understandings about how to act contrasted deeply with the real-life imperatives to act immediately, according to Lipsitch (2020).

In an essay titled “*We know enough now to act decisively against Covid-19*” published by Lipsitch (2020), there is an interesting statement to analyze the credibility and the evidence in the science: “We know enough to act; indeed, there is an imperative to act strongly and swiftly” (p. 1). There are two points in order to justify that “we know enough” which can be understood as a robust explanation. (1) The

number of severe cases. The infection spread is very dangerous, such as happened in Wuhan and Italy; therefore, it is necessary to act before the crisis hits to prevent the collapse of our healthcare systems. (2) Control measures. These measures are necessary because the number of cases could increase exponentially due to some scientists have estimated that the basic reproductive number of this virus is around 2 (Lipsitch, 2020). Here, we could find a traditional concept of evidence from evidence-based medicine (EBM) which focuses on quality of data, and is implemented in clinical epidemiology regularly with universal criteria of rationality without considering the institutional and local features (Canali, 2020b). I do not mean that the evidence concept from EBM is not adequate. By contrast, I want to emphasize that evidence and data depend on the context, population characteristics, and previously control measures to contain the virus.

The Lipsitch and Ioannidis points of view have to do with the reliability and the credibility that we place on the evidence. The credibility in science is related to the popularity of scientific networks and institutions, the research funding, the role of the subjects in scientific communities, and the infrastructure available for research and its capacity for dissemination. In this light, the results of the scientific decisions and their configuration in public health policies could affect the credibility of the science; therefore, how can we analyze the evidence and credibility of the science in the current SARS-CoV-2 situation?

3 Evidence and data: an alternative interpretation

We can observe two philosophical approaches in clinical and public health epidemiology: one focused on high-data quality and the other one on practical contexts. The evidence concept is different in both epidemiological approaches. In clinical epidemiology, the clinical trials generate evidence with a reduction of systematic bias; namely, it allows us to reduce one mistake with artifacts, people selection, and measures. By contrast, the evidence in public health epidemiology is a result of analyses that involved multiples data, studies, and multiples ways of modeling applied it to different demographical and geographical contexts, which allow making projections (Fuller, 2020b).

Cartwright and Hardie (2012) proposed that good evidence is no substitute for good judgment because even with the best evidence, we must use our deliberative skills to identify the more relevant information. For instance, usually, the epidemiologist focuses on the mortality rate because with it the reliable information about the risks of disease for the population is obtained. Nevertheless, a central aspect of the measures is that it depends on factors that are not associated with the disease, and for this reason, its use should incorporate the contexts and other rates (Canali, 2020a). This means that good evidence is not focused on high-data quality, but on how the subjects select the best information to apply it to problem-solving. In fact, the scientific decisions are integrated for political components which affect the objectivity of the science, scientific theories, and research process as well as the dissemination of results (Carrier et al., 2008). Here, we take as an example the financial muscle of private foundations and its focus on

supporting the development of the SARS-CoV-2 vaccine as their main goal. I do not want to suggest that this is an inappropriate aim. By contrast, I think that these initiatives should be supported. However, according to the Sociology of Scientific Knowledge (SSK) approach, these initiatives are constituted by interests which we should clarify by considering the available evidence. Therefore, how might this funding affect other research that does not focus on vaccine development but randomized clinical trials with existing drugs or other possible treatments? Currently, we must correct some problems in the development of vaccines and their accessibility to the entire population, but we must also improve the detection of infections and lower hospitalization thresholds because high occupancy can trigger mortality from other serious diseases for which hospital care is effective (Ioannidis, 2020c). Furthermore, the infection rates depend on political and scientific context and the counting practices; for instance, we know that the virus spreads quickly and that it is not lethal in most people, except in nursing homes, hospitals, and in multigenerational and overcrowded homes as happens in Colombia (Canali, 2020a; Ioannidis, 2020a, b). Of course, this is a situation that we must improve by implementing non-restrictive practices that are leading people to suffer and develop other diseases as well as increasing poverty. In this light, I would like to say that the evidence should not only be applied to the number of infected people but also to the evaluation of the success of prolonged lockdowns.

A suggestion from the philosophy of science field that we can use to analyze this situation is to identify local rules of the scientific practice, which need a historical approach under the idea of scientific pluralism, namely, we have different rules corresponding to different practices (Martinez & Huang, 2015). For instance, in the analysis regarding the COVID-19, we could incorporate public handling of data to help to disseminate, mobilize and visualize it (Leonelli, 2019) by considering that in each country, there are different conditions of infrastructure and database access that can enable different interpretation to increase our knowledge. These suggestions apply to the philosophy of epidemiology could help us to understand that the fatality rates may vary (del Rio & Malani, 2020) according to the political and scientific contexts due to the count practice and policy generation can be confusing. The reason is that the data are not relevant per se but for the way we interpreted it. Indeed, the evidence and data do not have a predetermined structure, but it is based on different choices, behaviors, and ways of phenomena perception. These choices are made up of the political and economic interests that affect the credibility of the institutions and their statements (Leonelli, 2016). For example, what are the criteria for choosing a mathematic model that helps us to explain COVID-19 behavior? Here, I would like to present the idea of the nondeterministic algorithm to respond to the last question. From a practical point of view, a nondeterministic algorithm depends on a set of conditions regarding the kind of problem by considering its emergency context. A nondeterministic algorithm does not have a unique structure and its result can be random. Likewise, our analyses regarding the COVID-19 could incorporate this thinking way, thinking that, as I pointed out above in the COVID-19 situation, has to do with infrastructure, data collection, their interpretations, and their access.

In this light, the data analyses about the COVID-19 should not focus only on the traditional idea of the quality of data, which for EBM is the result of clinical trials. By contrast, we may think about the quality of data according to its relations with artifacts, methods, and institutional conditions. This means that to understand data we need to incorporate a contextual approach to evaluate the evidence and its credibility (Fuller, 2020b; Leonelli, 2017). As a result, incorporating a joint work with the approaches of clinical epidemiology and public health epidemiology should be a priority to understand our scientific practices on the COVID-19. Likewise, it is important to handle a contextual concept of evidence—including, I would stress, evidence from other disciplines such as psychology and science of education—that not only allows us to evaluate mortality and fatality rates, but also the damage that prolonged lockdown can cause to the population, especially to people's mental health and to students' learning.

4 Subjects and institutions in handling data in unevenly wealthy places

As we can see, credibility, evidence, and data handling are concepts and practices in which we should work in unevenly wealthy places like Colombia. For instance, the data to analyze the percentage of people vaccinated with one or two doses has not been clearly published by the *Ministerio Nacional de Salud de Colombia*. Likewise, although we observe that the rate of infection decreases when the number of vaccinated people increases, the media, and epidemiologists in political positions insist on spreading the idea that vaccination is not synonymous with immunity. In the same sense, economic aid from the Colombian government is not focusing on the people who need it, which means that, in an informal economy, people must move to jobs. Accordingly, public health decisions in Colombia cannot imitate decisions in other countries, according to my proposal of a contextual analysis on data and contextual evidence. On the contrary, the *Ministerio Nacional de Salud* could release data on the *National Vaccination Plan* to evaluate, for example, whether its distribution is targeting the most vulnerable groups. Currently, neither citizens nor scientists have clarity on data of the vaccine second dose, nor is there clarity on data in rural contexts.

Consequently, intellectual honesty in the handling of COVID-19 data, its interpretation, and the transparency by Governments with pharmaceutical contracts and access to information should be a priority. For instance, we need open access to data on the behavior of the virus in Colombia's rural areas and about the distribution of vaccines in areas of difficult access. Likewise, based on the elements presented in this short paper, we could consider that evidence does not only involve models and high-quality data; but also the social component that is constitutive of knowledge. These models lose sight of many variables, such as social discontent, adherence to measures according to cultural aspects, and social unrest like is currently happening in Colombia, which may worsen the epidemiological public health situation. As

I pointed out above, the data are not relevant per se. By contrast, it depends on the way we interpreted it. This means that we need to consider not only the infection rate and the number of deaths as is usual in Colombia which is presented in infographics²; but also particular characteristics of the population such as sociopolitical status, educational level, eating habits, and geographical variations (Fuller, 2020a; Ioannidis, 2020a; Leonelli, 2019). Thus, selecting a good policy does not depend only on the model but also on the practices and values that make up scientific activity. Specifically, I propose that the same rigorousness that we demand of modeling in science should be applied to political decisions. As a result, the public handling of data and transparent political decisions should be contributing to the good handling of resources for scientific research and public policy generation regarding the COVID-19 pandemic.

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² Cf. <https://www.ins.gov.co/Noticias/Paginas/Coronavirus.aspx>.

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