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Perspective

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Looking for the right balance between human and economic costs during COVID-19 outbreak

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Abstract

Since the beginning of Coronavirus 2019 (COVID-19) disease outbreak, there has been a heated debate about public health measures, as they can presumably reduce human costs in the short term but can negatively impact economies and well-being over a longer period.

Materials and methods: To study the relationship between health and economic impact of COVID-19, we conducted a secondary research on Italian regions, combining official data (mortality due to COVID-19 and contractions in value added of production for a month of lockdown). Then, we added the tertiles of the number of people tested for COVID-19 and those of health aids to evaluate the correspondence with the outcome measures.

Results: Five regions out of 20, the most industrialized northern regions, which were affected both earlier and more severely by the outbreak, registered both mortality and economic value loss above the overall medians. The southern regions, which were affected later and less severely, had low mortality and less economic impact.

Conclusions: Our analysis shows that considering health and economic outcomes in the assessment of response to pandemics offers a bigger picture perspective of the outbreak and could allow policymakers and health managers to choose systemic, 'personalized' strategies, in case of a feared second epidemic wave.

Key words: COVID-19 health and economic impact, public health measures, policymaker and health-care manager strategies

Introduction

Since the beginning of COVID-19 outbreak, there is an ongoing debate on the benefit/risk ratio of the prevention and containment measures [1]. In general, two different strategies have been adopted by countries to contain the novel coronavirus pandemic: some countries have chosen mitigating spread measures, and others instead have adopted more aggressive control strategies [2].

Nonetheless, regardless of measures taken, countries had to face the dramatic choice between human and economic costs. Indeed, both the lockdown and huge health-care investments presumably reduce human costs (less deaths) at least in the short term but can negatively impact population psychological well-being and economies, leading to a country impoverishment with long-term consequences on people's quality of life.

In terms of public health, one can argue that the best results were obtained in those countries where the epidemic curve had a very rapid evolution toward its peak and a rapid descent, with greater pandemic containment and subsequently a faster economy recovery [3, 4]. For example, in Italy, a study comparing five regions in terms of the different regional health system responses to COVID-19 showed

that the Veneto Region, one of Italy's early coronavirus hotspots, achieved good results from the point-of-view epidemic containment. It implemented an earlier and large-scale testing and tracing policy with a consequent lower number of infections and deaths [5]. A Chinese study plotted mortality against the incidence of COVID-19 (cumulative number of confirmed cases since the start of the outbreak, per 10 000 population) showing a significant positive correlation of mortality with resources availability [6], thereby suggesting that mortality is correlated with health-care burden. Such potential association could be a useful element to broaden the horizon of analysis and to plan more appropriate decisions.

In our opinion, an assessment based on the prevention measures effects in terms of death and serious illness only might determine health policies that will not be completely fit for purpose. Therefore, health system response to the coronavirus pandemic should be analyzed not only in terms of public health impact but also in terms of the major economic consequences that may result. Indeed, it is still too early to make a final and complete assessment of the full impact of the pandemic, but it is evident that COVID-19 crisis is perceived as an impending global 'economic pain,' especially for low-income and lower middle-income countries and their potential need for assistance [7]. A recent study, conducted in low-income and lower middle-income countries, shows that if routine health care is disrupted and access to food is decreased (as a result of unavoidable shocks, health system collapse or intentional choices made in responding to the pandemic), the increase in child and maternal deaths will be devastating [8].

Objective

A reflection regarding the potential association between COVID-19 mortality and economic losses among Italian regions was necessary, especially during a crucial epidemic phase in which policymakers faced the hard choice between continuing the national lockdown that would have contained the outbreak but also caused lasting economic damage, and interrupting the lockdown thus leading to a potential increase in infections while allowing economic and social activity to resume [9]. The need to evaluate and monitor these both human and economic costs at the same time emerged clearly. In this context, starting from official available data, we explored the combined effect of COVID-19 on economy and health in Italy, which is characterized by a regionally based National Health Service, where regions have broad autonomy in planning, organizing and financing health-care services in their own territory. Furthermore, the recent literature on this issue deals predominantly with the economic costs of pandemic in certain productive sectors but without references to the consequences of economic crisis on mortality [10, 11].

Methods

More specifically, we plotted the cumulative number of reported COVID-19 deaths per 100 000 population from 24 February 2020 to 14 May 2020 [12] against the contractions in value added of production for a month of lockdown across the different regions [13]. We then created a 2D map that allowed us to classify the performance of each of the 20 Italian regions into 4 groups corresponding to the 4 quadrants of the obtained plot by dividing the 2 axes at their median values as follows:

(i) high human and low economic costs;
(ii) high human and high economic costs;
(iii) high economic and low human costs and
(iv) low human and low economic costs.

Moreover, we added a third dimension by coloring the regions according to the tertiles of the number of tested people for COVID-19 per 10 000 residents (Figure 1). The same map was replicated with regions colored according to the tertiles of health aid (including PPEs,

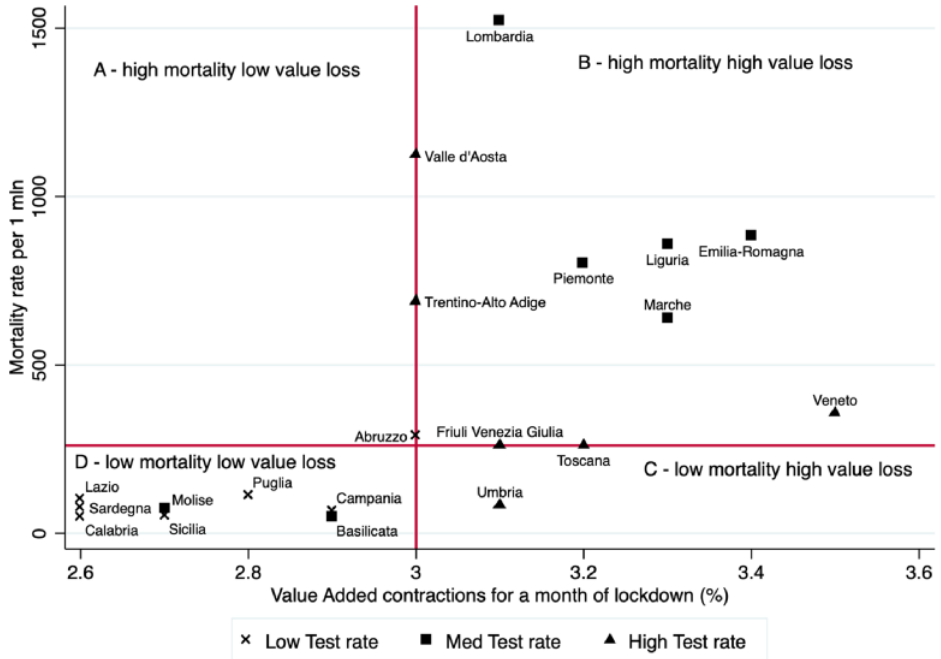

Figure 1 Italian regions' performance based on mortality and economic value loss and tertiles of test rate.

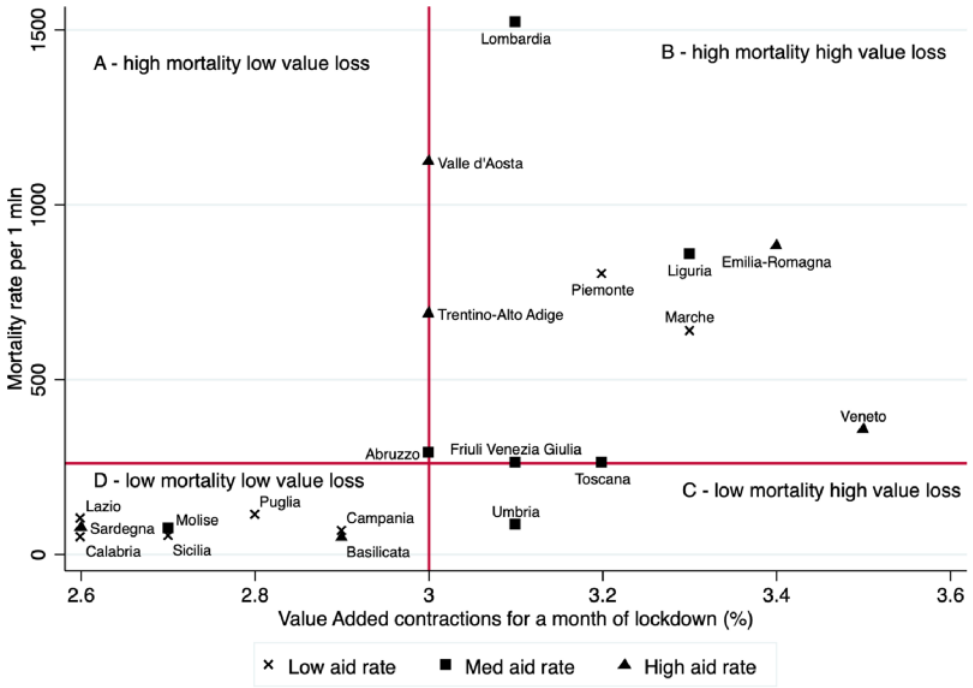

Figure 2 Italian regions' performance based on mortality and economic value loss and tertiles of distributed health aid.

tests, emergency medical devices) per 10 000 residents on 14th May, which have been distributed by the national government to each region [14] (Figure 2).

Results

As expected, the map shows geographic variation among regions in how both their economies and health were impacted by the outbreak. Five regions out of 20 registered both mortality and economic value loss above the overall medians (Figure 1, Quadrant B). These regions are the industrialized northern regions with international commercial activities and therefore were affected earlier and more severely by the outbreak. Lombardy (very high mortality) and Veneto (very high economic loss but lower mortality compared with its counterparts) were the most affected. The southern regions were affected later and less severely and therefore had lower mortality possibly due to the early application of prevention and control measures with consequently less health services overload; furthermore, they reported less economic impact, as a result of the different mix of production activities. This applies also to excess mortality due to other causes as compared to the previous years.

According to the other variables considered, such as test rate (region's color in Figure 1), it seems that, contrary to what expected from the literature, more intensive testing does not necessarily correspond to a better prevention strategy. Nevertheless, available literature often evaluates these strategies in relation only to health outcomes (mortality, hospitalizations, etc.) and not to economic ones, as in our analysis.

Furthermore, one could argue that better outcomes depend on the time at which measures have been adopted. For instance, in selected Italian regions, daily data [12] show a delay between the distribution of the swabs and the epidemiological situation. For example, the number of swabs taken for COVID-19 doubled in April to May as compared to the previous month (327 373 vs. 177 732). Similarly, the distribution of health aids to regions from the national government does not seem to be positively related to the regional performance (region's color in Figure 2), probably due to a delayed distribution strategy. For example, the peak materials distributed to the regions (11 885 591) was reached on 31st March.

Limitations

With regard to health data, we were not able to be able to distinguish between deaths where COVID-19 was a contributory cause from those where COVID-19 was the underlying cause of death. Moreover, due to the lack of publicly available information, we could not take into consideration any data on morbidity and late mortality data due to delayed/omitted diagnosis or treatments of non-COVID-19 patients.

Discussion and conclusions

This analysis offers a starting point to assess the response to pandemics through the combined lenses of health and economics. We hope that complete and comparable country data will be made available so that this kind of analysis could be replicated at an international level. This will allow policymakers and health-care managers to have bigger picture perspective of the outbreak and to be able to choose 'personalized,' system-based and long-term strategies, in the event of a second epidemic wave. In our opinion, such analysis is applicable to any health system.

For example, small countries that concentrate their economic strength in some regions, as in the case of Italy, are much more susceptible to the economic crisis than a 'giant' like China where even if a region is in crisis, the economic loss can be compensated for from other economic centers.

The urgency of the situation has led to choices, such as building new intensive care facilities that have remained largely unused

and without the necessary staff. At the same time, the primary care that could have represented a successful investment to combat COVID-19 did not receive adequate support. Ultimately, a 'health-only' approach may be less effective and paradoxically less secure for guiding choices during a pandemic.

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