Heterogeneity of COVID-19 outbreak in Italy

An outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) started in December 2019 in China and was declared a pandemic on 11.03.2020 by WHO[1].

Italy is one of the most afflicted Country by this epidemic with 136,110 confirmed cases and 16,654 deaths[2] on 9.04.2020 (at the same date, the Ministry of Health was reporting 143,626 cases). Among the total cases, 14,066 (10.3%) were healthcare workers. Among the 96,877 currently positive according to the Ministry of Health, 3,605 (3.7%) were in intensive care units (ICU), 28,399 (29.3%) were hospitalized and the remaining 64,873 (67%) were isolated at home.

In Italy, from 21 February 2020 , most of the cases were declared in Lombardia region and in the surrounding Regions Veneto, Piemonte, Emilia-Romagna and the distant Marche. According to molecular data and estimation from the outbreak curves, the occurrence of first undetected infections were dated at January 26 coming from Germany[3]. The Italian Government disposed different measures to hamper the diffusion of the syndrome as to close all the kind of schools up to the universities, the theatres, the cinemas all the business activities except for the food delivery[4].

During these few months the National Health Service have made a great effort to cope with the increasing request of intensive care beds and all the elective activities in hospital have been suspended.

Data from the different Italian regions shows different patterns of positive and dead for this syndrome[5].

Moreover, striking differences of the observed lethality of the infections among different areas were immediately evident from the epidemic reports. As we look at the data of Bergamo, Brescia, Milano or Lodi including Codogno (the first hot spot "red area" in Italy) some hypotheses might be supposed. A very first hypothesis is related to the demographic age structure of the population in the different areas with possibly different susceptibility to the infectious disease and progression. We might speculate that overabundant elderly population and the contacts with younger people act as the contagion's vector. Social patterns, especially of the elderly and younger population, who would meet in normal social contexts, may have had a particularly important role. It is important to clarify the role of public healthcare measures across regions, such as the testing procedures adopted for symptomatic and exposed people, the relation of healthcare practice for the elderly or frail people with major hospital institutions and the interactions in normal social life of the considered communities.

In addition, the availability of personal protective equipment is another important issue. Protective masks, from the beginning of the epidemic, were becoming scarce, they were sold at an increasing price and many were even not certified. Moreover, not homogenous indications about mask protection were provided since the beginning of the outbreak, WHO was recommending the use of masks only for the infected people and health care practitioners, whereas in the USA the CDC was recommending the use of surgical masks or any face tissue protection for all, forbidding the use of professional masks for normal people. This situation was faced also by the residential home for elderly people which were affected by very high lethality rates.

Looking at the tables at March 19 (table 1) and April 9 (table 2), striking differences are noticeable at both times regarding the lethality proportion between Lombardia and Emilia-Romagna compared to the other Italian regions and, at the same time, the proportion of infected health workers appears strikingly high in these two regions. Moreover the increase of lethality in Lombardia was particularly high. Looking at the age distribution of infected people, the Veneto

region reports younger cases. This might partly explain the differences in lethality showing the results of a different healthcare management of the outbreak, together with the actual underestimation of infected cases in Lombardia and Emilia-Romagna. However, given the similar demographic age structure of these regions, the role of hospitals together with a different healthcare practice outside the hospital would explain the observed heterogeneity in the epidemic spread, suggesting improved strategies for the protection of the elderly and frail people at major risk of disease contagion and following spread. In the next future, it will be important to set priorities in preventive measures to stop the spread of the epidemic diffusion, paying attention to social interaction models as a major target. The role of local healthcare systems, with specific attention to the early disease treatment at home rather than the hospitalization, was actually showing a paradigmatic reversal of the traditional modern role of hospitals. Their major weakness in the outbreak is calling for the empowerment of community and territorial medicine with trained general practitioners and specialized healthcare personnel. It will be of critical relevance to understand the expected evolution of the first lock-down phase, driving the exhaustion of the Covid-19 outbreak.

1   Coronavirus disease 2019 (COVID-19) Situation Report – 51, 11 March 2020, https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_4

2   Riccardo F., Andrianou X., Bella A. et Al., Epidemia COVID-19. https://www.epicentro.iss.it/coronavirus/bollettino/Bollettino-sorveglianza-integrata-COVID-19_9-aprile-2020.pdf

3   Lai A, Bergna A, Acciarri C, Galli M, Zehender G. Early phylogenetic estimate of the effective reproduction number of SARS-CoV-2. J Med Virol 2020; : 14–8.

4   Decreto del Presidente del Consiglio dei Ministri 23 febbraio 2020https://www.gazzettaufficiale.it/eli/id/2020/02/23/20A01228/sg

5   Nacoti M, Ciocca A, Giupponi A, Brambillasca P. At the Epicenter of the Covid-19 Pandemic and Humanitarian Crises in Italy : Changing Perspectives on Preparation and Mitigation. 2020; : 1–5. NEJM Catalyst https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0080