OPINION

COVID-19 pandemic: Monitoring space-time data and learning from global experience

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Abstract. COVID-19 pandemic is a reality. This study extracted information from a case in Italy and a case in South Korea during COVID-19 pandemic. Epidemic threat evolved differently in Italy compared to that in South Korea. Case fatality ratios from Italy and South Korea were consistently diverging over time. It appears that 'epi-epidemic' determinants can strongly influence the epidemic burden in the communities.

Statistics based opinion

COVID-19 pandemic is a 'bad dream' reality for the planet. Global daily news dealing with the threat of such viral infection recalls from our memory scenes from movies with similar stressful scenarios. Longitudinal information was extracted from the case in Italy and from that in South Korea during COVID-19 pandemic, by analyzing online global data. Johns Hopkins e-monitoring platform (1) periodically updated the latest information of confirmed cases and deaths globally among other data. At the time of the first observation (1), 126,660 total cases were globally confirmed, 4,641 total deaths were registered and 68,305 were totally recovered. One month later (2), 1,783,941 total cases were confirmed, 109,312 total deaths were registered and 405,972 were totally recovered. Five months later (3), 20,306,856 total cases were reported, 741,723 total deaths were registered and 12,602,544 were totally recovered.

Observing numbers and thinking that, beyond the arithmetics, people suffer, a couple of points appear to be demanding in their content analysis. The case in Italy and the case in South Korea are extremely different in their geographical, environmental, social, cultural and racial characteristics, with 12,462 confirmed cases and 7,869 respectively, on 12th March 2020 (1). On that date, Italy and South Korea were listed among COVID-19 most threatened countries. One month later, Italy recorded 152,271 confirmed cases and South Korea 10,512 cases (2). At five months Italy registered 251,237 confirmed cases and South Korea 14,714 cases (3). Epidemic burden was different for the two countries and the gap evolved by further opening. During our first e-data observation (1), by extracting the rates of total deaths per total confirmed cases at a specific time period (4), we noted that Italy reported a case fatality ratio (CFR) of 6.6% (827/12,462) and South Korea presented a CFR of 0.8% (66/7,869). Global total rate was calculated at 3.6%. One month later, Italy reported a CFR of 12.8% (19,468/152,271) and South Korea a rate of 2.0% (214/10,512). Global total rate was calculated at 6.1% (2). Five months later, Italy reported a CFR of 14.0% (35,215/251,237) and South Korea presented a CFR of 2.0% (305/14,714). Global total rate was calculated at 3.6% (3). All figures from Italy and South Korea diverge in a consistent manner from total global rates. Of course, these are non-adjusted per age, sex or other feature rates and attention is brought to readers to avoid misunderstandings, especially when data from different countries or regions are compared (5). At the time of publication absolute numbers will definitely differ. However, CFRs in the two countries are likely to evolve without surprising changes.

As evidence becomes more palpable (6,7), some explanations were given on the poor situation, reporting that the control of infectious wave was totally lost early on, and that population is aged and thus vulnerable (8), since deaths are more common among elderly or frail. On the the contrary, extensive diagnostic testing performed in South Korea was seen as a really protective measure (9). With great respect to the Italian people, we are extremely cautious not to deal with other explanations of this phenomenon observed across the two countries. Noxious or protective systemic factors can occur and play a synergistic role towards a more positive or negative scenario (6,10). We cannot exclude other causes that are related to administration model and local health system

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parameters by creating a different reaction to emergency (11), citizens' compliance, public health surveillance tactics and readiness (5,12,13), health system adaptation (14), articulation of services from primary care to intensive care flow handling (11), level of health sector readiness to absorb an exponential 'pressure' and, finally, system capacity to 'resist' in terms of time and effort endurance. A safe conclusion is that both scenarios, 'bad' or 'good', are simultaneously likely to occur at moment 'zero' and arithmetical or geometrical death rate figures are related to the scenario that prevails. It appears that 'epi-epidemic' parameters (15) can strongly influence population health during COVID-19 pandemic, and the good or bad scenario seems to endure in terms of CFRs over time.

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References

1. Johns Hopkins University & Medicine: Coronavirus Resource Center. https://coronavirus.jhu.edu/map.html. Last Accessed March 12, 2020.
2. Johns Hopkins University & Medicine: Coronavirus Resource Center. https://coronavirus.jhu.edu/map.html. Last Accessed April 12, 2020.
3. Johns Hopkins University & Medicine: Coronavirus Resource Center. https://coronavirus.jhu.edu/map.html. Last Accessed August 12, 2020..
4. Harrington RA: Case fatality rate. Encyclopædia Britannica, Inc., Chicago, IL, 2020. https://www.britannica.com/science/case-fatality-rate. Accessed May 05, 2020.
5. Onder G, Rezza G and Brusaferro S: Case-fatality rate and characteristics of patients dying in relation to COVID-19 in Italy. JAMA: Mar 23, 2020 (Epub ahead of print).
6. Shim E, Tariq A, Choi W, Lee Y and Chowell G: Transmission potential and severity of COVID-19 in South Korea. Int J Infect Dis 93: 339-344, 2020.
7. Centre for Evidence-Based Medicine (CEBM): Oxford COVID-19 Evidence Service. CEBM, Oxford, 2020. https://www.cebm.net/covid-19/global-covid-19-case-fatality-rates/. First Accessed March 27, 2020.
8. Boccia S, Ricciardi W and Ioannidis JPA: What other countries can learn from Italy during the COVID-19 pandemic. JAMA Intern Med 180: 927, 2020.
9. Park SY, Kim YM, Yi S, Lee S, Na BJ, Kim CB, Kim JI, Kim HS, Kim YB, Park Y, *et al*: Coronavirus Disease Outbreak in Call Center, South Korea. Emerg Infect Dis 26: 1666-1670, 2020.
10. Armocida B, Formenti B, Ussai S, Palestra F and Missoni E: The Italian health system and the COVID-19 challenge. Lancet Public Health 5: e253, 2020.
11. Odone A, Delmonte D, Scognamiglio T and Signorelli C: COVID-19 deaths in Lombardy, Italy: Data in context. Lancet Public Health 5: e310, 2020.
12. Signorelli C, Scognamiglio T and Odone A: COVID-19 in Italy: Impact of containment measures and prevalence estimates of infection in the general population. Acta Biomed 91: 175-179, 2020.
13. Cortés ME: Coronavirus as a threat to public health. Rev Med Chil 148: 124-126, 2020 (In Spanish).
14. Signorelli C: A study compares mortality from COVID-19 in six western metropolitan areas. Università Vita - Salute San Raffaele, 2020. https://www.unisr.it/en/news/2020/4/studio-mette-confronto-mortalita-per-covid-19-in-sei-aree-metropolitane-occidentali. Accessed April 17, 2020.
15. Goumenou M, Sarigiannis D, Tsatsakis A, Anesti O, Docea AO, Petrakis D, Tsoukalas D, Kostoff R, Rakitskii V, Spandidos DA, *et al*: COVID-19 in Northern Italy: An integrative overview of factors possibly influencing the sharp increase of the outbreak (Review). Mol Med Rep 22: 20-32, 2020.