EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 7
Issue: 6
01-06
Year: 2020

HOW TO RESPOND TO THE ONGOING PANDEMIC OUTBREAK OF THE CORONAVIRUS DISEASE (COVID-19)

Ramin Zibaseresht*

Department of Chemistry and Physics, Faculty of Sciences, Maritime University of Imam Khomeini, Nowshahr, Iran; Biomaterials and Medicinal Chemistry Research Centre, Aja University of Medical Sciences, Tehran, Iran.

***Corresponding Author: Dr. Ramin Zibaseresht**

Department of Chemistry and Physics, Faculty of Sciences, Maritime University of Imam Khomeini, Nowshahr, Iran; Biomaterials and Medicinal Chemistry Research Centre, Aja University of Medical Sciences, Tehran, Iran.

Article Received on 24/03/2020 **Article Revised on 14/04/2020** **Article Accepted on 04/05/2020**

ABSTRACT

The pandemic COVID-19 virus outbreak is drastically expanding and as its consequences the uncertainty, the fears and the anxiety of all societies including the publics, politics, economics, *etc*. have affected the global activities. We are aiming, based on the data reported by W.H.O., to evaluate the COVID-19 outbreak and to give information to the others what really is going on and what will most likely happen in the future. A variety of factors have been discussed which could be notably could be taken into account by governments based on their geopolitical conditions to be considered in order to slow down the outbreak which might result in less deaths with little struggles. Although epidemic curves have the capacity of showing progression of illnesses in an outbreak over time, but with regard to COVID-19 pandemic, it seems to be extremely complicated to give prediction close to a reality for the whole country where the epidemic is at its early stages of the outbreak. Countries are strongly suggested to take measures as early as possible before the spread of the infectious be far beyond their capacities.

INTRODUCTION

For the first time, since the coronavirus outbreak began in late December 2019, the number of people infected with the coronavirus COVID-19 daily outside of China exceeds the number in China.[1,2] Many countries all entire the world are witnessing the outbreak. The National Health Commission of People's Republic of China reported on Wednesday March 18, 2020 that they received 80,928 reports of confirmed coronavirus COVID-19 cases, 3,245 deaths, 7,263 remained confirmed cases (including 2,314 in serious conditions) and 105 suspected cases.[3] Although China's coronavirus epicenter has reported on Friday March 20, 2020 that there was no new cases of the disease for the first time since the outbreak began there.[4,5], but the epicenter of the pandemic in now stretched to the West in the Europe, with more reported cases and deaths than the rest of the world combined, apart from China.[6] Other countries such as Iran and the U.S.A. are also struggling with the rapidly spreading the COVID-19 disease.[7-9] Now, the COVID-19 is affecting at least 163 countries and territories around the world and 1 international conveyance (the Diamond Princess Cruise ship harbored in Yokohama, Japan). The number of the countries where the virus spread takes place along with their people get infected rise every day. Based on the data reported by the World Health Organization (W.H.O.) on Tuesday 17 March, 2020, the COVID-19 virus outbreak is drastically growing and as its consequences the uncertainty, the fears and the anxiety of all societies including the publics, politics, economics, etc. have affected the global activities. The situation stretched entire the globe, such that the W.H.O. announced, on Wednesday 11 March 2020, COVID-19 pandemic[10] and later on Friday March 14, 2020, the Europe as another epicenter for the coronavirus outbreak.[11,12] At the same day, a U.S. national emergency was declared to combat coronavirus.[13]

DISCUSSION

The W.H.O. director general emphasized on Monday 16 March, 2020 that he had a simple message to countries all around the world on how to deal with the coronavirus outbreak sweeping the globe: 'Test, test, test.[14] Based on his addressing why testing could be that important? During our studies we are dealing with two important numbers: total cases and confirmed cases. The numbers of confirmed cases are those with laboratory confirmation of COVID-19 infection (COVID-19 test).[1] Since the confirmed cases are only a subset of the total number of cases of which are not known nor reported precisely by organizations, the most successful approach to verify our studies is that to bring these two numbers as close as possible and that can be done by doing as much as test possible. Since total number of cases are related to the number of tests taken, therefore we can conclude that the more tests, the more confirmed infected person discovered, and thereafter by discovering more infected

people, the earlier precautions for suppressing the outbreak can be done which that will lead into lowering deaths. In fact, all countries have been struggling to test a large number of cases to everyone who are either infected or suspicious to infection; we, however, rely on the data available to us for the time being.

Although the numbers of deaths related to COVID-19 are relatively well reported by the countries, but the lack of information of the exact numbers of total cases would also be considered as problem in finding the mortality rate for COVID-19 infection.

We are aiming, based on the data reported by W.H.O., to evaluate the COVID-19 outbreak and to give information to the others what really is going on and what will most likely happen in the future. To predict the COVID-19 pandemic, there are a variety of factors might be involved and therefore should be taken into account. Factors such as geographical location, national behavior, population, population density, the percentage of vulnerable people (such as elderly, poverty, people with no access to reasonable health care or health facilities due to war or other disasters, people with more underlining health conditions), infrastructures, financial resources, national experiences, degree of mutual trust between the public and the governors, governmental decisions, political situations, national health impact and facilities, public awareness, collective coordination, sharing information and experiences with other countries, degree of readiness to deal with the disasters, speed of actions, protocols and procedures and so on. Therefore, considering all these main factors each of which might be tied up with other sub-factors would be extremely difficult to predict exactly how and when the outbreak flattened or contained regionally or globally. The question is, based on W.H.O. data collected, whether the patterns of behavior in the countries follow each other, and if this is so, in what extend can be helpful to contain the outbreak with less damage. Although there are ambiguities of the data available from some countries around the world with regard to the statistics related to the COVID-19 outbreak, we, however, rely on the W.H.O. data collected, at least in this study to answer the question.

It is worth noting that a number of other organizations, including Johns Hopkins University report their own lists of the statistics related to COVID-19 outbreak.[15] There are not many differences between the organizational reports in this regard, but some may include other data which might not affect our studies as a whole.

For the purpose of our studies, we need to know some crucial data in addition to those mentioned above for each country individually. The data that are required to provide us valuable information to predict the outbreak are:
1. First report of confirmed case; 2. total cases; 3. confirmed cases; 4. growth rate or doubling time of cases; 5. exponential growth; 6. the speed at which the number of confirmed cases increased; and 7. the mortality risk of the COVID-19 outbreak.

Considering well-known epidemic (epi) curves (Figure 1), every country where there has been the COVID-19 outbreak report is trying hard to take measures to control the virus spread in order to not to reach to the capacity of their corresponding healthcare system with the lowest possible death.

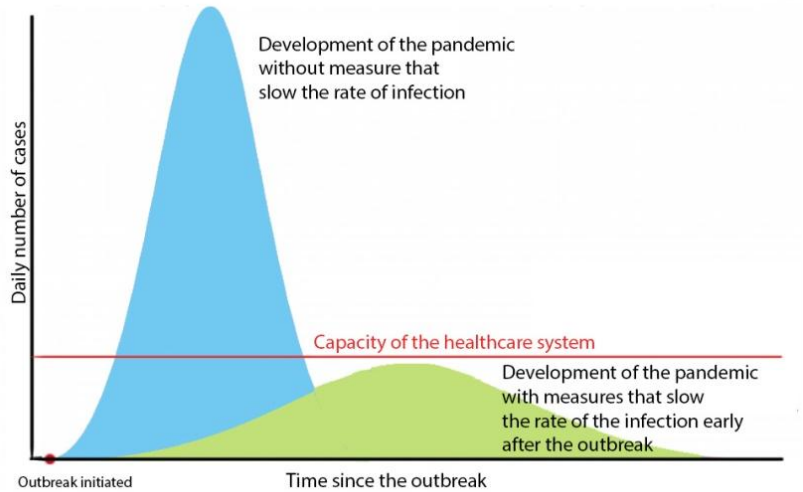

Figure 1: Possible epidemic curves (epi curves) show progression of illnesses in an outbreak over time.

As it is shown in Figure 2, based on the data released by W.H.O., since the outbreak begins in China, the outbreak is still rising in the world.[15,16]

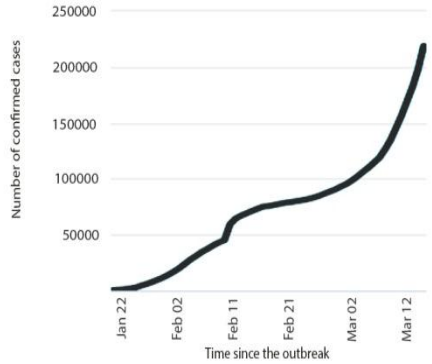

Figure 2a. Number of confirmed cases in the world over the time of the COVID-19 outbreak.

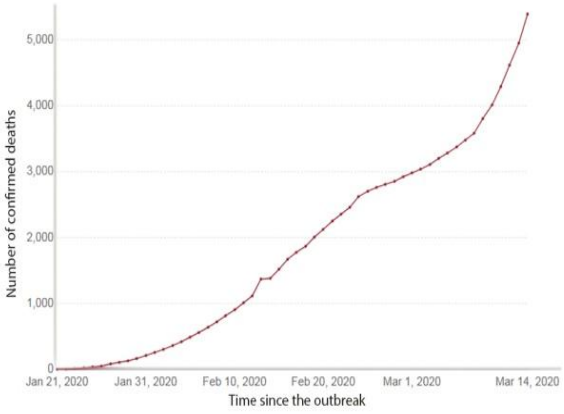

Figure 2b. Number of confirmed deaths in the world over the time of the COVID-19 outbreak.

The epi curves in Figures 2a and 2b have been obtained from the data corresponding to countries where confirmed cases and deaths derived from the COVID-19 outbreak. The curves can be drawn for each country individually mentioned. For the purpose of our study, we chose some countries based on Geographical positions with different outbreak stages and the measures they have taken to avoid exceeding their capacities of healthcare systems. China and South Korea in East, Iran in the Middle East, Italy in the Europe and the U.S.A in West were selected for our study (Figure 3a-j) based on the data till Thursday March 19, 2020.

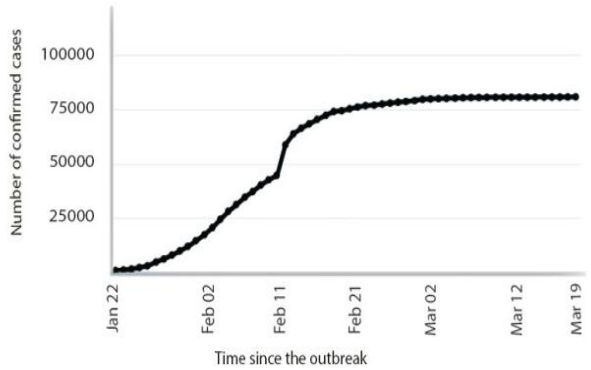

Figure 3a. Number of confirmed cases in China over the time of the COVID-19 outbreak.

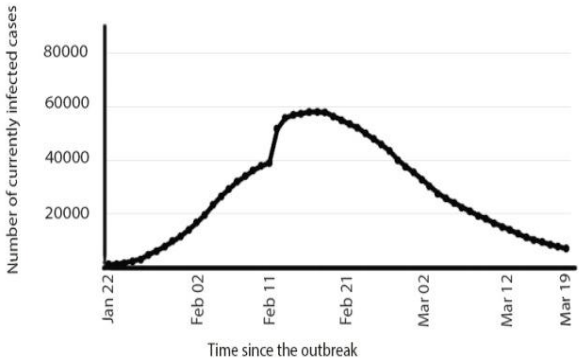

Figure 3b. Number of currently infected cases in China over the time of the COVID-19 outbreak.

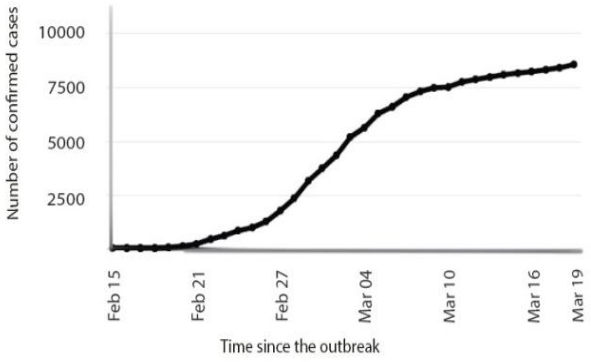

Figure 3c. Number of confirmed cases in South Korea over the time of the COVID-19 outbreak.

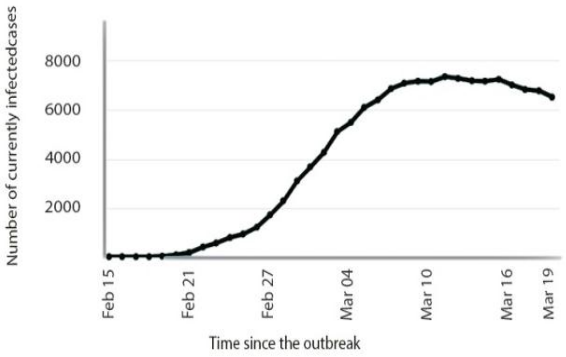

Figure 3d. Number of currently infected cases in South Korea over the time of the COVID-19 outbreak.

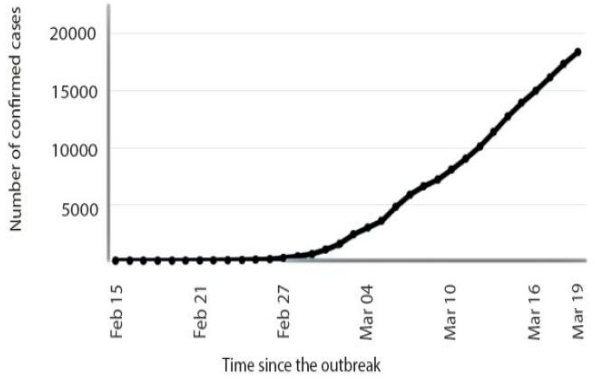

Figure 3e. Number of confirmed cases in Iran over the time of the COVID-19 outbreak.

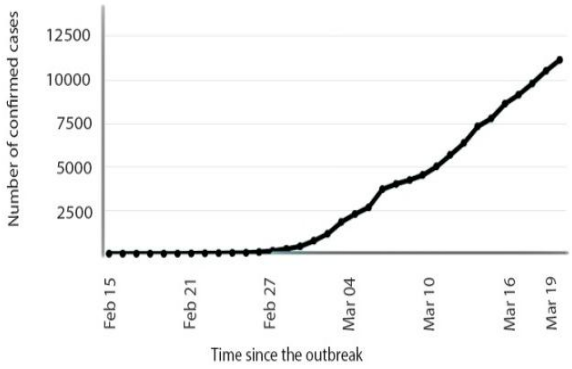

Figure 3f. Number of currently infected cases in Iran over the time of the COVID-19 outbreak.

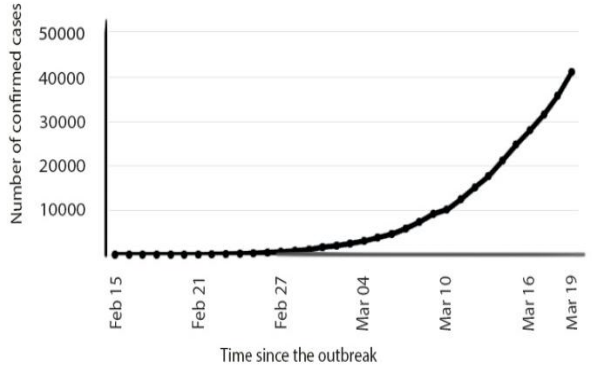

Figure 3g. Number of confirmed cases in Italy over the time of the COVID-19 outbreak.

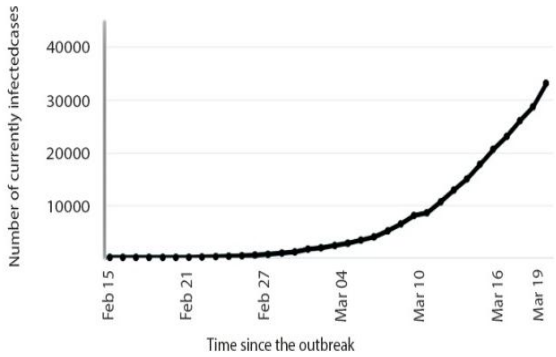

Figure 3h. Number of currently infected cases in Italy over the time of the COVID-19 outbreak.

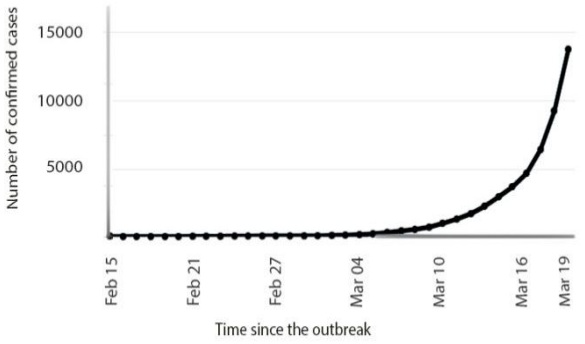

Figure 3i. Number of confirmed cases in the U.S.A over the time of the COVID-19 outbreak.

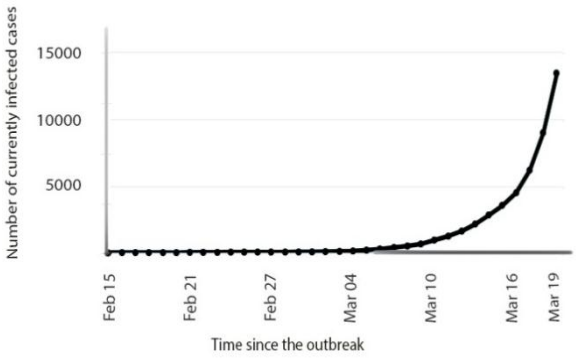

Figure 3j. Number of currently infected cases in the U.S.A over the time of the COVID-19 outbreak.

As it is shown in Figures 3a-3j (15), there were two clear peaks of increase in the number of total cases in China since the epidemic outbreak initiated; however, in South Korea where the first infected report was approximately one month later than that of in China, there was only one significant peak corresponding to the number of total cases which is to be considered as the first epidemic peak. The other countries of Italy, Iran and the U.S.A, mainly because of the geographical situation, the first infected report was approximately four, four and five weeks later than in China, respectively; therefore, the question is: 'will the corresponding epidemic curves follow those of in China or South Korea?' To answer this question and many others related ones to the pandemic outbreak, we need to find out what kinds of measures China has implemented to suppress the spread of the virus spread during the outbreak. Considering the epi curves shown in Figure 1, a country where the first report of the infected person was tested positive, should either take early actions to slow down the speed of the spread,

or/ and immediate increase in the required healthcare facilities to keep up with caring of infected people. As it is mentioned earlier, all these measures depend on a variety of factors such as lockdown the infected area, supporting the vulnerable people whom might get affected the restrictions applied economically, minimizing the social gathering at every aspects such as sports events, festivals, shopping centers, schools, *etc*. In order to do these measures, there should be solidarity, coordination, collaboration, and trust amongst the nation as well as the governmental departments within a nation state. It's very clear from the Figures 3a and 3b that the actions taken in China have almost brought to an end their first wave of infections. However, it is not clear if China measures would necessarily be either sustainable in the long term or applicable in other countries. Many factors involving the extend of the measures that might be taken by all governments must be listed based on every possible conditions that the country is located in, then that would be much easier to predict what will happen in the future outbreak within that country.

Readiness, speed, resources in all aspects (such as financial, health, technology, human, education), and crisis organizations are crucial factors by which a government can take efficient, suitable and sustainable measures in order to slow down the outbreak which will result in less deaths with little struggles.

It is worth noting that every country has its individuality in terms of events, politics, economics, awareness and readiness to face the COVID-19 outbreak. For example, a country like Iran constitutes of many religious people who gather in daily prayers in the mosques and pilgrimage in holy places with lots of visitors from overseas. It is notable that the country has also been under ongoing and increasingly sanctions by the U.S.A. which made restrictions to the government to access to its financial resources globally. Additionally, the Persian New Year during which millions of Iranians travel across the country to celebrate the fest with relatives every year is considered as a huge upcoming event.

Italy is a country with relatively large elderly population whom are considered as vulnerable people to the virus infection, hosts millions visitors annually as it has become increasingly popular as a tourist destination globally.

Although epidemic curves have the capacity of showing progression of illnesses in an outbreak over time, but with regard to COVID-19 pandemic, it seems to be extremely complicated to give prediction close to a reality for the whole country where the epidemic is at the early stages of outbreak. Even by knowing the first report of the infected person and understanding the figures of doubling the confirmed cases and the nature of exponential growth of the outbreak, it must be reminded that every country must be individually evaluated for its ongoing outbreak. As it is mentioned above, every country has its own nature of factors to be taken into account for the COVID-19 epidemic evaluation. Every country will have to be reminded of what we call that for the first time as 'rule of i3t' (isolation, testing, treatment and tracing the suspected/ healed people).

Countries based on their resources and many other factors which most likely be involved in delaying the outbreak, are implementing a combination of response measures to flatten the epi-curve; *e.g.* in Iran, the government called for the U.N for the removal of financial related sanctions imposed by the U.S.A., enforced laws to restrain of congestion resulted in ongoing Persian New Year, extension of bed hospitals, implementing rule of i3t, supporting the low income families, practiced social distancing. Likewise, although in many other countries have implemented the required measures to flatten the epi-curve, but they face uncertain future amid COVID-19. The main reason for facing drastically fast outbreak exceeding the healthcare system capacity line (Figure 1) might be the delay in actions against the infectious spread. There might be controversies by the governors that the countries such as Italy, Spain, the U.K. and the U.S.A, in spite of being amongst those which have been infected by COVID-19 approximately two months later than in China, still struggling to keep up with the outbreak. The answer might be the delay in taking measures required to flatten the curve considering the factors that mentioned above.

As we go along the outbreak, we are witnessing that China is gradually removing the restrictions on social distancing and quarantine as they have gone through the so-called first peak of epidemic.[17] China is now helping other countries by providing healthcare aid packaging as well as deploying experts to share knowledge and experiences that they have obtained through the outbreak. Both China and South Korea, meanwhile, are aware of the possible second wave of epidemic.[18]

CONCLUSION

One of the most important factors that all countries must take in their actions might be of that how fast the governments have initiated their efficient measures to overcome the speed of the outbreak. The delay in actions would lead into a disastrously uncontrollable speed of the outbreak.

Based on factors being relatively varied from one country to another, the publics and their corresponding governments must prioritize their measures to steepen down the growth of the doubling the confirmed cases in order not to exceed the capacity of their healthcare system.

Disclosure statement

No potential conflict of interest was reported by the authors.

REFERENCES

1. P. Zhou, X.-L. Yang, X.-G. Wang, B. Hu, L. Zhang, W. Zhang, H.-R. Si, Y. Zhu, B. Li, C.-L. Huang, H.-D. Chen, J. Chen, Y. Luo, H. Guo, R.-D. Jiang, M.-Q. Liu, Y. Chen, X.-R. Shen, X. Wang, X.-S. Zheng, K. Zhao, Q.-J. Chen, F. Deng, L.-L. Liu, B. Yan, F.-X. Zhan, Y.-Y. Wang, G.-F. Xiao, Z.-L. Shi, A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature, 2020; 579: 270–273.
2. F. Wu, S. Zhao, B. Yu, Y.-M. Chen, W. Wang, Z.-G. Song, Y. Hu, Z.-W. Tao, J.-H. Tian, Y.-Y. Pei, M.-L. Yuan, Y.-L. Zhang, F.-H. Dai, Y. Liu, Q.-M. Wang, J.-J. Zheng, L. Xu, E. C. Holmes, Y.-Z. Zhang, A new coronavirus associated with human respiratory disease in China. Nature, 2020; 579: 265–269.
3. http://en.nhc.gov.cn/2020-03/19/c_77945.htm.
4. http://en.nhc.gov.cn/2020-03/20/c_78006.htm
5. https://www.businessinsider.com/china-no-new-local-coronavirus-cases-first-time-during-outbreak-2020-3.
6. https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-mission-briefing-on-covid-19---13-march-2020.
7. https://time.com/5804706/iran-coronavirus/.
8. https://edition.cnn.com/videos/health/2020/03/18/us-hospitals-underprepared-coronavirus-medical-supplies-gupta-pkg-cpt-vpx.cnn.
9. https://www.wsj.com/articles/coronavirus-testing-chaos-across-america-11584618703.
10. https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.
11. https://www.cnbc.com/2020/03/13/europe-is-now-the-epicenter-of-the-coronavirus-pandemic-who-says.html.
12. https://www.reuters.com/article/us-health-coronavirus-who/europe-is-epicenter-of-coronavirus-pandemic-who-idUSKBN2102Q0.
13. https://edition.cnn.com/world/live-news/coronavirus-outbreak-03-14-20-intl-hnk/index.html.
14. https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---16-march-2020.
15. https://hub.jhu.edu/novel-coronavirus-information/.
16. https://www.nytimes.com/2020/03/22/world/coronavirus-news.html.
17. https://www.nytimes.com/2020/03/18/world/asia/china-coronavirus-zero-infections.html.
18. https://fortune.com/2020/03/11/coronavirus-south-korea-peak/.