



COVID-19: FROM OUTBREAK TO PANDEMIC

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Abstract

COVID-19 has been spreading rapidly across the planet, overstressing health services, scaring the world population to levels never seen before, intensified with the shelter confinement caused by the quarantine. Coronavirus is an infectious disease caused by severe acute respiratory syndrome, as well as MERS-CoV, and the Severe Acute Respiratory Syndrome, (SARS). Covid-19 became the first pandemic of the XXI century. Several countries close their borders and limited civilian circulation in major cities. In this article, we conducted an explanatory, multiple method research, within $N=4$ countries as the unit of analysis. Key findings shows that permanent lockdown could bring severe economic and social harm and may not be the only efficient way to handle the pandemic. Discussion and recommendations for future research compile the present study.

Keywords: Coronavirus, Covid-19, SARS, MERS, pandemic

1. Introduction

This study investigated Covid-19 infection data computed by Chinese, Italian, American and Brazilian governments and the World Health Organization (described in this paper from now on by its acronym - WHO), as the unit of analysis (Yin, 1988), in this case study.

The newest strain of coronavirus, the Covid-19, was first identified in Wuhan, China on December 2019. Less than 3 months later, the WHO declared Covid-19 as a pandemic. According to the WHO, a pandemic is a worldwide spread of a new disease. In contrast, an

endemic is when a new disease is contained in one specific region. Ebola is the last example we had of an endemic. Ebola affected heavily Guinea, Sierra Leone and Liberia, countries on the west coast of Africa, but it remains confined in that region. Viruses like Influenza and Covid-19 are propagated much more efficiently and affected the whole globe.

The biggest pandemic of all time was smallpox, which claimed the lives of more than 500 million people through 100 years. The risk of death of those infected by smallpox was a staggering 30%. Smallpox was declared eradicated by the WHO in 1980. SARS, non-seasonal Influenza and Covid-19 share similar characteristics when compared (SARS and the new Coronavirus belong to the same family of viruses, coronavirus):

Table 1

Comparison of SARS, H1N1 and Covid-19. Source: World Health Organization

Virus	SARS (SARS-CoV)	Influenza A (2009 H1N1pdm09)	New Coronavirus (Covid-19)
Transmission Method	Mainly respiratory droplets in close contact		
Number of Cases Globally	8096	Up to 1.4 B	509 K (as of March 27, 2020)
Number of deaths Globally	774	Up to 575 K	23 K (as of March 27, 2020)
Lethality	9.6%	0.03%	3.6%

Despite the official WHO lethality rate, there is no consensus around measures like lethality rates, or mortality rates. Wong et al (2013) demonstrated the difficulties in establish the seriousness of the H1N1 influenza infection using the case fatality risk, which is the probability of mortality among people classified as cases.

On top of that, numbers published by the WHO and the Centers for Disease Control and Prevention(described from now on in this paper by its acronym - CDC) are meaningful to professionals who know how to interpret those numbers. Dr. Arthur Reingold division head of epidemiology and biostatistics at U.C. Berkeley’s School of Public Health stated in an interview for a newspaper (Mitchel, 2020) that it’s impossible to epidemiologists to accurately measure mortality rates in the early stages of a pandemic. Simply dividing the number of deaths by the number of reported cases do not produce an accurate mortality rate.

Next, methods and limitations are presented in the next section, as well as the case, further analysis, and discussion in the following sections.

2. Methods and Limitations

The present article is a qualitative, explanatoryresearch (Yin, 1988), single descriptive case study, which unit of analysis (Yin, 1988) are the countries of China, Italy, US and Brazil (N=4). Secondary data were gathered through literature review and archival research. This study

is limited on these four countries. Other countries affected by Covid-19 are not in the scope of the present research. This study compiled data publicly available until March 28, 2020.

3. Background

Pandemics are critical events that had happened sporadically, so far. Before the recent Covid-19 pandemic, there was the H1N1 Influenza pandemic in 2009. H1N1 pandemic struck the US on April 2009, and for one year, the CDC estimates numbers are of 60.8 million cases, 274,304 hospitalizations and 12,469 deaths in the US alone. Worldwide the H1N1 pandemic death toll is estimated around 575,000 lives, and 80% of deaths impacted people under 65 years. WHO declared the Influenza H1N1 global pandemic ended in August 2010, 17 months after its outbreak.

Covid-19 on the other hand, is still in the early days. From the first reported case in December 2019 until now, WHO estimates that 500,000 people are already infected. According to the CDC, the risk group, however, is composed by:

- i. People aged 65 and older.
- ii. People with chronic lung disease or moderate to severe asthma.
- iii. People who have serious heart conditions.
- iv. People who are immunocompromised, including cancer patients.
- v. People of any age with severe obesity (body mass index ≥ 40), diabetes, renal failure or liver disease.

Another important difference from Influenza A H1N1 is that asymptomatic persons are potential sources of Covid-19 infection, as demonstrated by Rothe, et. Al. (2020). This can change the whole transmission dynamics for Covid-19.

As the unit of analysis of this research, the countries analyzed differ in many aspects. As of March 28, 2020, China, Italy and the US are the three major focus of Covid-19 around the world.

Brazil was included as the unit of analysis in this study as the authors' homeland. The most interesting aspects of these nations, for this research, are compared in the table below:

Table 2

Comparison of China, Italy, U.S and Brazil. Source: The World Bank

Countries	China	Italy	U.S.	Brazil
Reported Cases (March 28, 2020)	82093	80539	68334	2433
Territory (km ²)	9,596,960	301,338	9,833,520	8,511,000
Population	1,392,730,000	60,431,028	327,167,043	209,469,033
Inhabitants / km ²	148	205	36	25

Average Age	37.4	45.5	38.1	32.6
Smoking Prevalence, men (%)	48	28	25	18

The figures presented can be correlated with the facts in many ways:

- i. As the catalyst of the outbreak, is expected that China will have more reported cases than any other country in the early phases of the outbreak.
- ii. Italy as the second place in cases reported could be attributed to the fact that Italy has the most inhabitants per km², the highest average age among the top three and the second highest smoking prevalence.
- iii. U.S. third place in cases reported could be attributed to the fact that the U.S. is the third place with significant Chinese overseas population, accounting for more than 5 million Chinese people in U.S. territory. This number is only surpassed by Thailand and Malaysia. China is also the biggest U.S. trade partner.
- iv. Brazil is the 21st country by cases reported so far.

Table 3 shows cases by country as of March 28, 2020:

Table 3

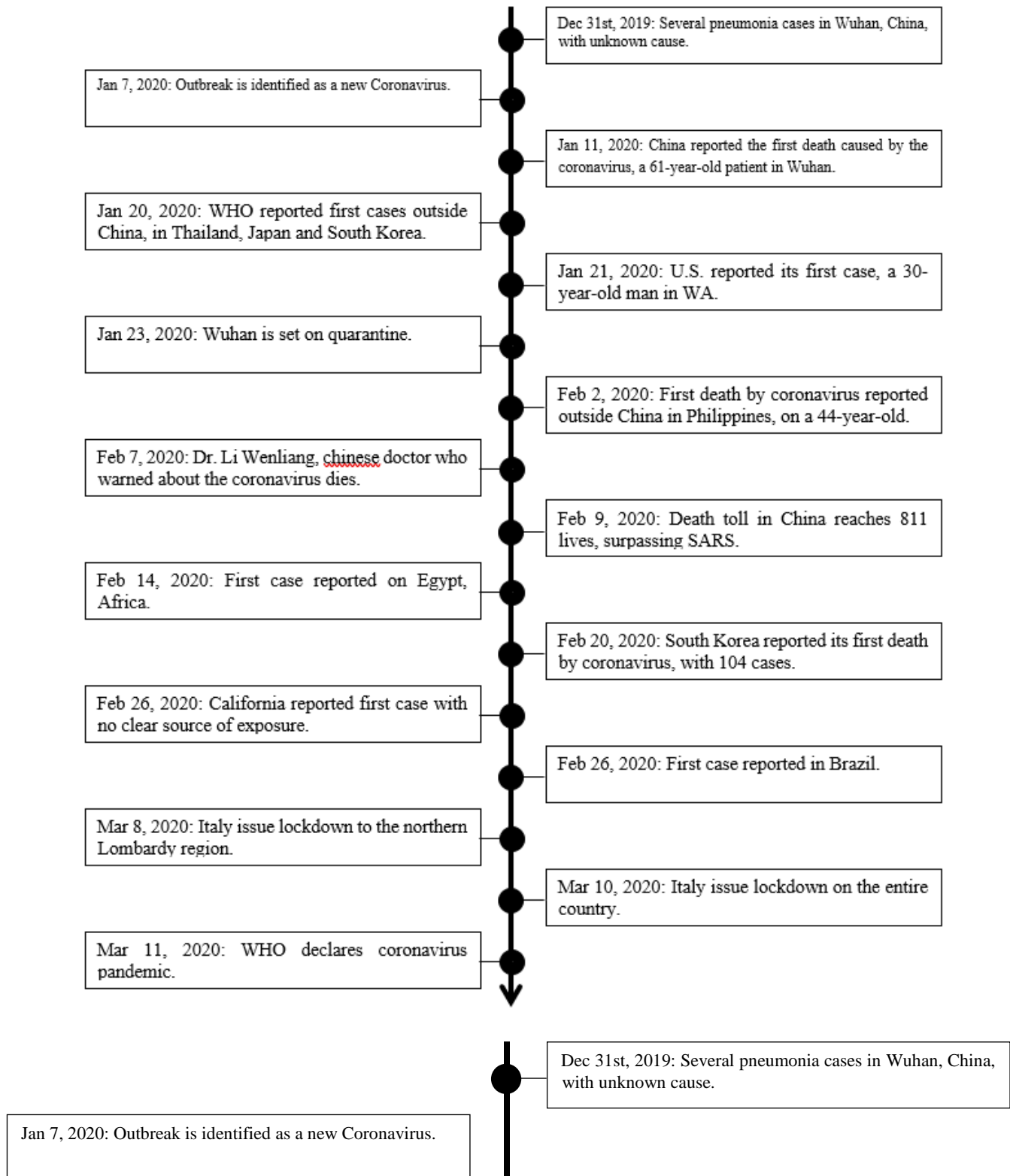
Reported cases by country. Source: WHO

Countries	Reported cases
China	82,093
Italy	80,539
United States of America	68,334
Spain	56,188
Germany	42,288
Iran (Islamic Republic of)	32,332
France	28,786
The United Kingdom	11,662
Switzerland	10,714
Republic of Korea	9,332
Netherlands	7,431
Austria	7,029
Belgium	6,235
Turkey	3,629
Canada	3,555
Portugal	3,544
Norway	3,156
Israel	3,035
Australia	2,985
Sweden	2,806
Brazil	2,433

4. Key findings

In order to properly analyze the facts and actions taken by official bodies and countries worldwide, it's imperative to understand the sequence of events on a timeline. Only the major events relevant to this study is shown:

Covid-19 Timeline



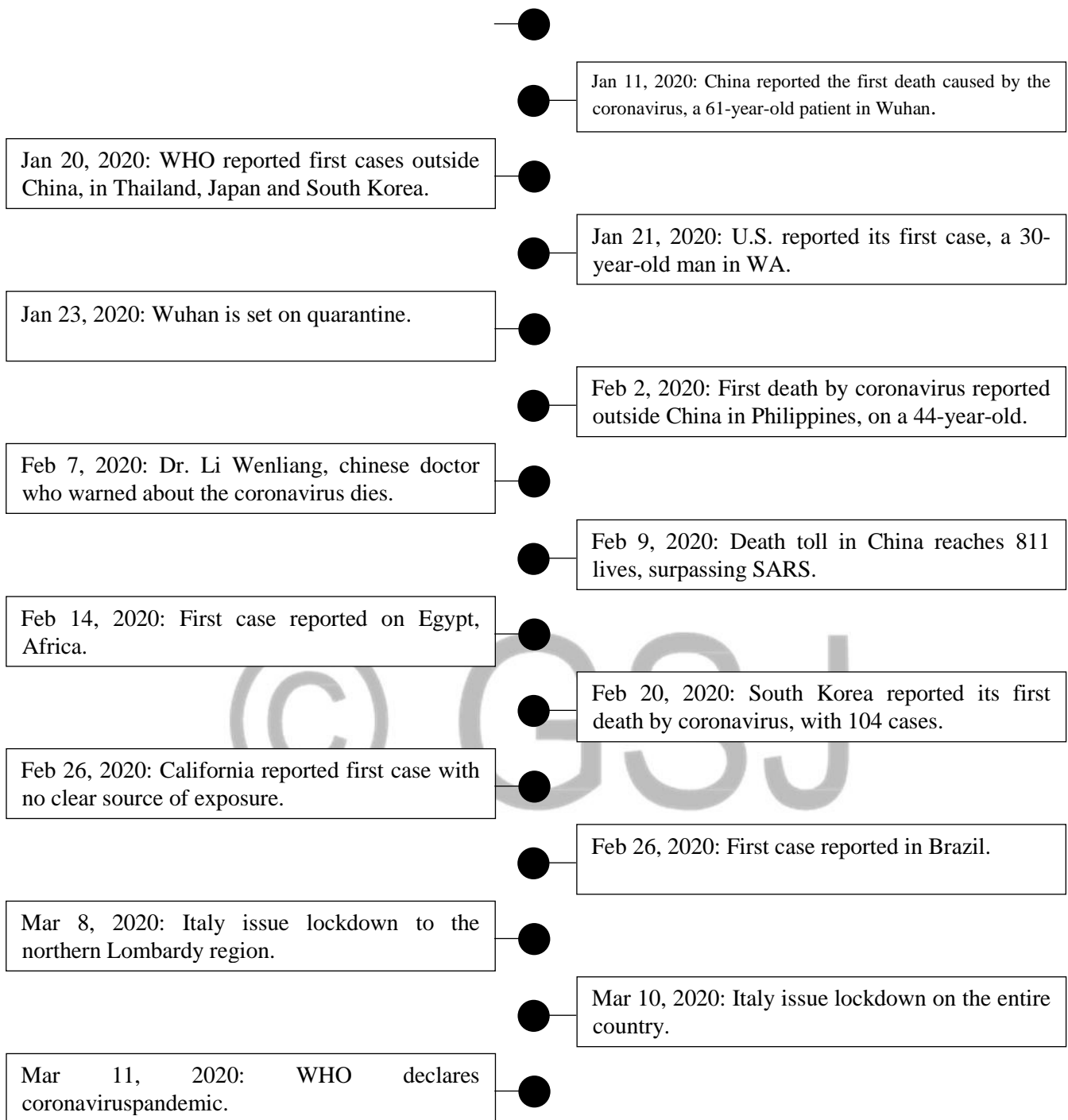


Figure 1: COVID-19 expansion timeline

5. Analysis

Evidence suggest that not all relevant actions were taken, in a timely manner, to efficiently address the spread of Covid-19. A few questions arise from the data gathered. It is

also possible, to look for the answers to those questions based on the evidence available publicly online.

- A. Why WHO took 3 months to declare coronavirus a pandemic, as strong evidence of cases outside mainland China were available since February?
- R. There are multiple factors to be considered in order to understand why WHO took time to declare de pandemic. WHO's Director General TedrosAdhanom Ghebreyesus has played down the scale of the outbreak. Even before WHO declared Covid-19 pandemic, the CDC was already alerting Americans, that Covid-19 would spread to U.S. territory. WHO is funded by its members?Today, 20 (twenty) member countries are responsible for 75% of the budget, and China is the major donor. China's interest in keep the economy working could have a part in WHO delay declaring the pandemic (Therese, 2020).
- B. Why countries close to the initial outbreak are not the most affected?
- R. Again, there's multiple facts to be considered to answer this question. For instance, the Republic of Korea has 9,583 reported cases and 152 deaths, as reported on March 29,2020. Since the beginning of the outbreak the Republic of Korea its enforcing one of the strongest testing policies worldwide. They're capable of processing 10,000 test a day, and this policy may be responsible for 0.6% fatality rate, far lower than WHO's 3.6%. Disinfection measures also can contribute to the efficient handling of the outbreak.
- C. Why Italy was struck so hard by the infection?
- R. Italy's population has the greater average age from the compared countries, and has life expectancy around 80 years (WHO, 2020). This information is compatible with the risk groups identified by WHO, described above. As shown in Table 2, Italy has the most inhabitants per km² and the second greatest smoking prevalence in man. Those factors may have contributed to the large dissemination of the virus and the great number of deaths.
- D. Do scientific data show evidence of the efficiency of the lockdown to counter the pandemic?
- R. No. Scientific evidence and studies point to social distance measures as one way to slow the spread of infection and reduce the intensity of the epidemic, also known as flatten the epidemic curve. This, in turn, is a key mechanism to keep critical care capacities from being overwhelmed. However, the duration, intensity and frequency of this social distance remain unclear. In fact, studies show that one-time social distance measures are incapable to keep Covid-19 prevalence with the critical-care capacity of the US, which is 0.89 free beds for 10,000 adults (Kissler et. Al., 2020).

Notice that the desired effect of the social distance policies being enforce in many countries is to free up critical care resources to handle the pandemic. In some places 50% of the available critical care bedswere freed as the result of the quarantine (Mandetta, 2020).

Implications of this case are observed in virtually all domains of the existence, such as the paralyzed economic sectors (a) aircraft manufacturer industry (Cruz, B.S. & Dias, M.O., 2020; Dias, M.O., Teles, and Duzert, 2018; Dias, M.O. and Duzert, 2018); (b) carmaker industry (Dias, M.O., Navarro and Valle, 2013, Dias, M.O., et al., 2014; Dias, M.O., et al., 2013); once bars and restaurants are closed, there is significant impact on (c) craft beer industry (Dias, M.O. & Falconi, 2018; Dias, M.O., 2018); (d) mining industry (Dias, M.O., & Davila, 2018); (e) government and non-government activities (Dias, M.O., 2018; Paradela, Dias, M.O.; Assis; O., J.; Fonseca, R. (2019;Dias, M.O. & Navarro, 2017).

Other industries are impacted positively, such ashome-office, e-business negotiation (Dias, M.O. & Duzert, 2017), and streaming film industry (Dias, M. O., & Navarro, 2018), as the result of the confinement at home, among others.

6. Discussion and future research

As a result of the outbreak, there is an intense work by the media to reach its audience with updates ad official announcements. In an interesting turn of events, general population is getting back at traditional media vehicles like printed newspaper and TV instead of the internet.

Future research showing how the media is using this event to turn the tide in its favor how specific content can raise or lower the general interest in one specific vehicle of communication may lead to a better understanding on how content is being molded to the viewers.

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