REAL-TIME DATA ANALYTICS AND PREDICTION OF THE COVID-19 PANDEMIC (PERIOD TO MARCH 22TH, 2020)

Chehbi Gamoura Chehbi

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SAMIA CHEHBI GAMOURA

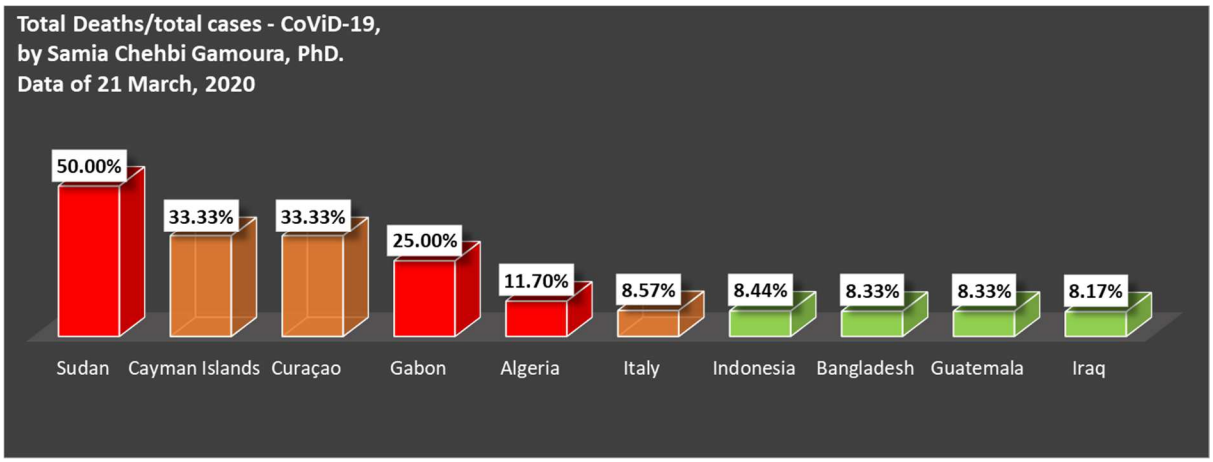
Humanis, EM Strasbourg, University of Strasbourg, Strasbourg, France

samia.gamoura@em-strasbourg.eu

Abstract

This brief paper is versioned 1 in a series of short papers that describe a set of descriptive and predictive analytics of the pandemic COVID-19 around the world. We exceptionally propose this new and uncommon way of publications because of the current emergency circumstances where Data are gathered and analyzed directly day by day. Because of the new behavior regarding the spread speed and the contagion features of this virus, we opted by comparative analytics based on demographic characteristics in localities and countries for prediction, without using historical data in epidemiology. The test proofs of our findings are done day by day with the real figures reported from the Data. To feed our models in algorithms, we refer to the reported cases from the Data of the World Health Organization (WHO). Because of the current circumstances of emergency, this paper is brief and will be succeeded with a series of versions until the end of the pandemic. The full paper will be published afterward with more details about the functions, the model, and the variables included in our algorithms. .

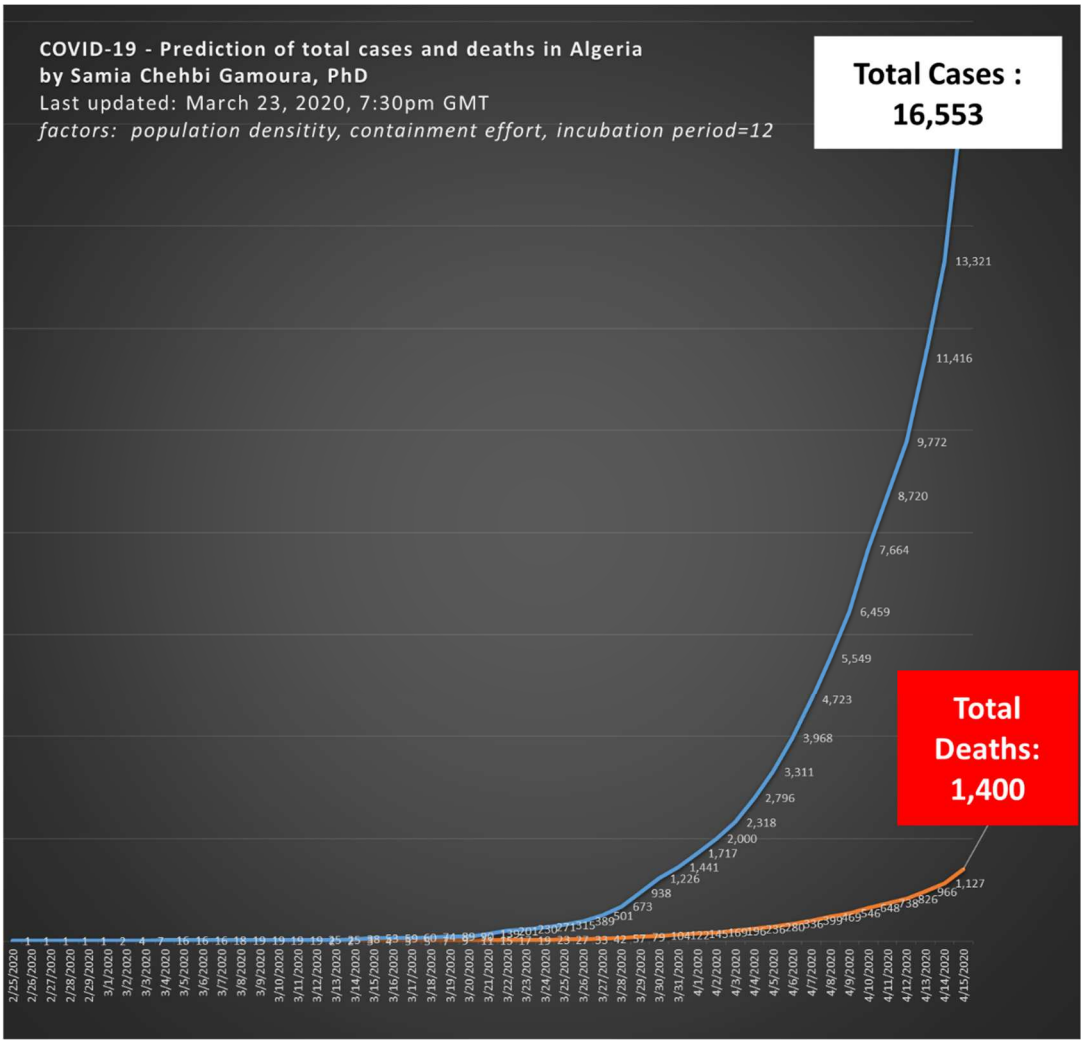
Findings 1: High mortality rate in underdeveloped countries



The top 10 countries in high mortality rate at the update on March 21th, 2020. The mortality rate is high in the underdeveloped countries (except Italy).

[1] Date of publication : March 25, 2020

Finding 2 : Prediction of the total number of cases and mortality in Algeria

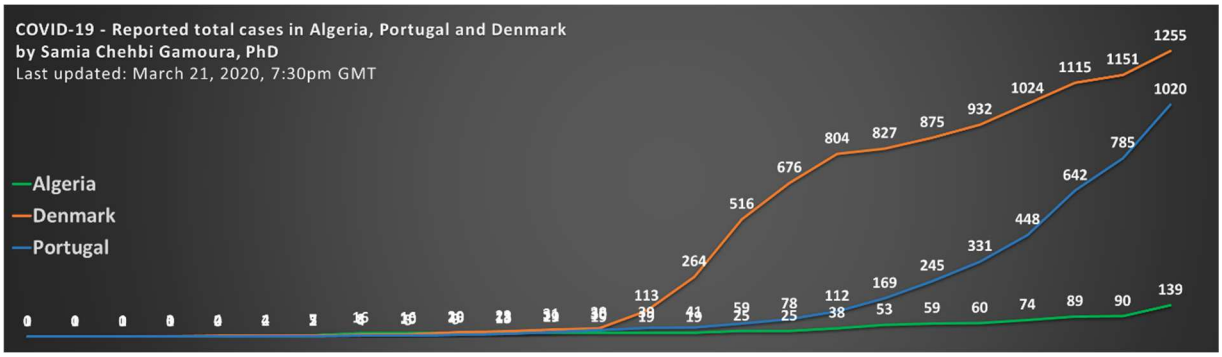


We take into account the following features:

1. Update date: March 23th, 2020.
2. Population density: 17.49,
3. Containment effort: no containment law imposed yet,
4. Incubation period: 12 days (average).

Our algorithm predicts **16 553** total cases and **1 400** total deaths on April 15th, 2020.

Finding 3: Comparison between 3 countries having had the first cases at the same time (same day with delta of 1~3 days): Algeria, Portugal, and Denmark

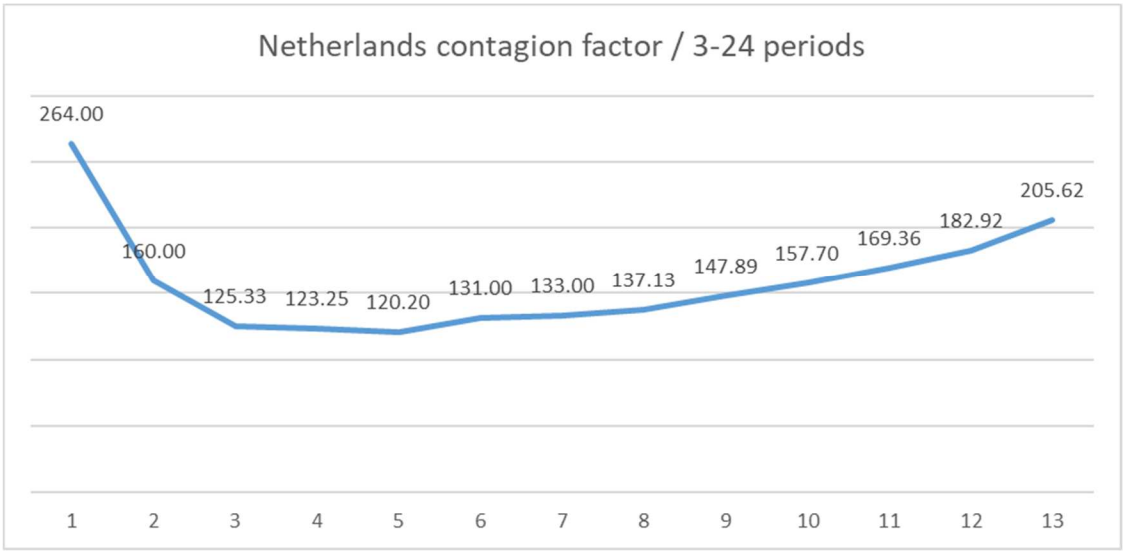


The illustration shows: On Algeria, not all cases are reported to the health services.

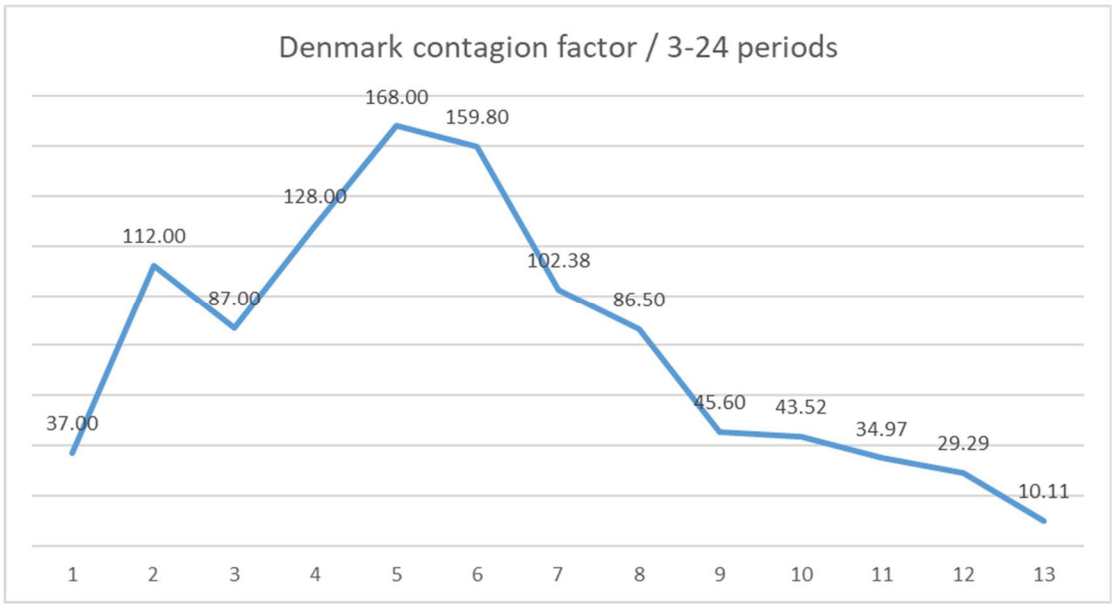
Finding 4: Extraction of Contagion Factor in the countries (up to date March 22th, 2020):

We put a function to compute the contagion that we call: the contagion factor. The function is based on the incubation period that is estimated around the world by comparative figures. We compare the countries, which are in the advanced phase of the epidemic lasting 20 days. We compute the incubation period (average) based on the events that happened in localities by using Big Data, and then we try to estimate the impacted peaks. Based on this factor, we can estimate the reaching of the epidemic peak and predict the future cases figures. However, this factor can not estimate the deaths figures.

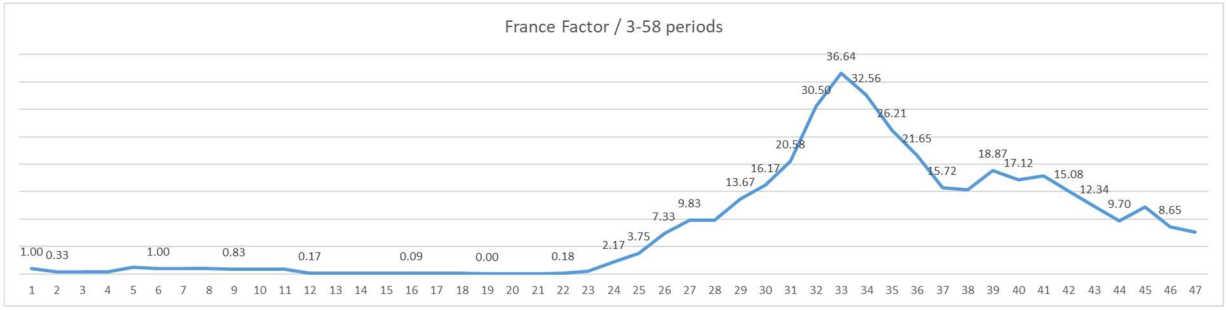
A detailed study devoted to this factor will be provided later in another paper.



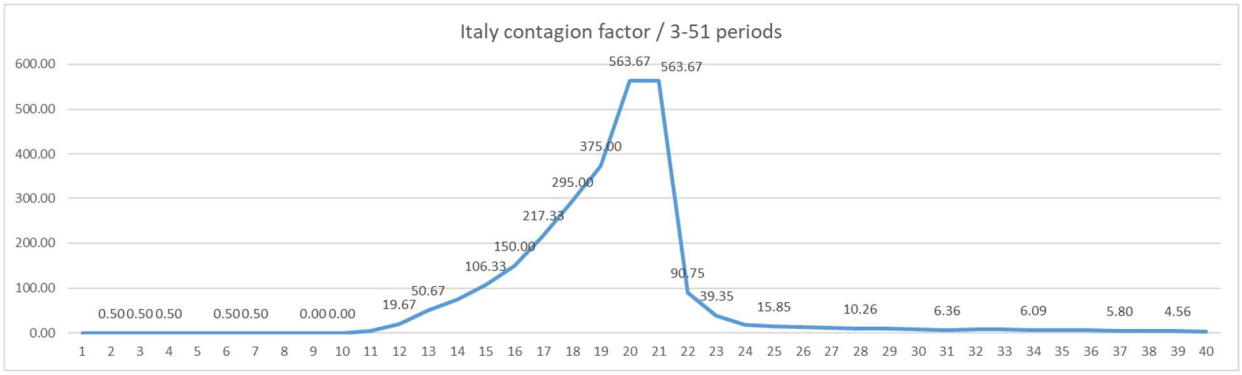
On March 22, 2020, Netherlands is at a significant contagion factor (> 200), which starts to rise again on the 24th day. Therefore, we think the peak of the epidemic is still far away.



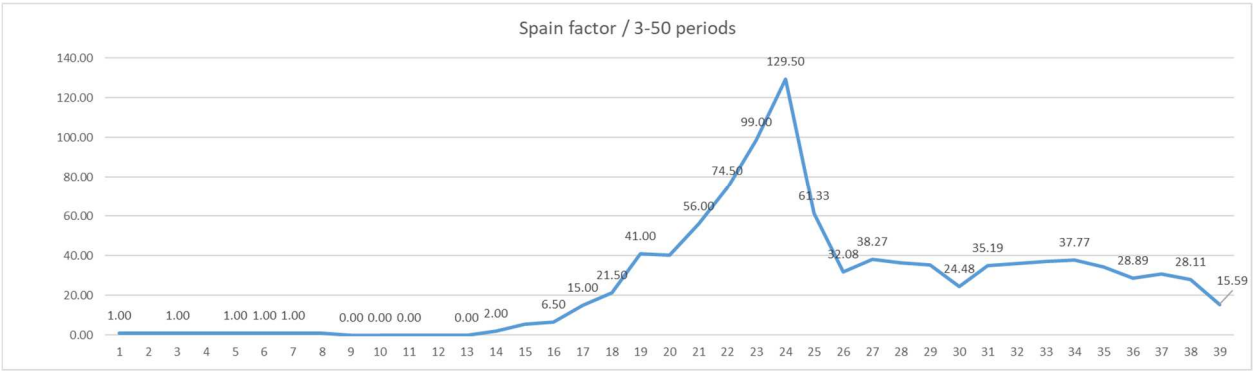
On March 22, 2020, the contagion factor of Denmark is going decreasing (<10.11), but was relatively high at the beginning (> 150). We think the population successfully are following the containment instructions at the 13th day.



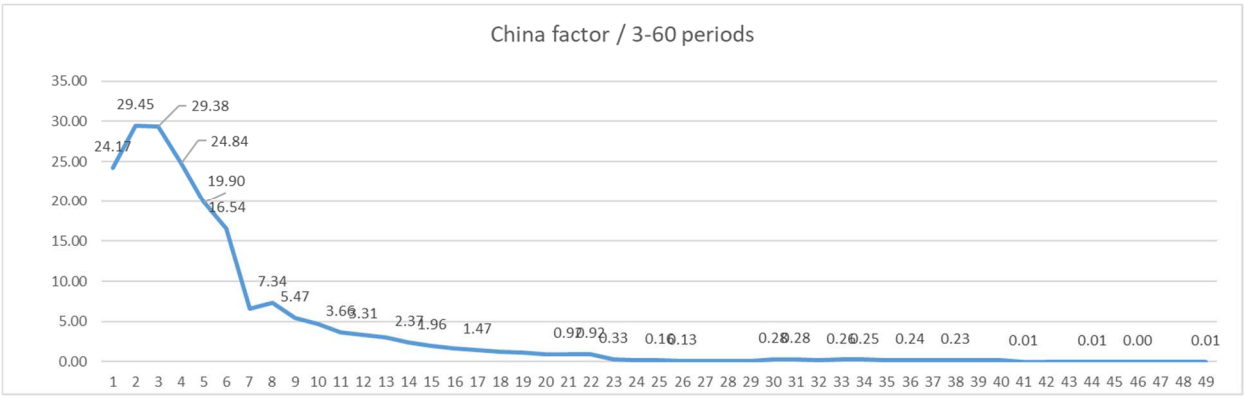
In France, the contagion was high on the 33rd and went smoothly increasingly since the 22nd day. Those ten days were enough to cause significant damages in cases and deaths in France. Since the 34th days, we think things are going better with a decreasing contagion factor because of progressive restrictions of containment. We think the peak will come in few days (during the next weak) if containment restrictions continue in application.



In Italy, the contagion factor is the highest around the world (>550) at an early period (20th day). The mistake of the government was not imposing containment since the early second weak. Now, Italy is recording the lowest contagion factor (4.56). We think the country is beginning the peak epidemic.



In Spain, the contagion factor was high (> 120) at the 23 day. However, despite the decreasing of contagion, it still high with more than 15 recently. This explains the damages being reported today. We think the peak still far and could overpass Italy in the humanitarian disaster.



The contagion factor of China is decreasing and records near 0.01 today.