

IDENTIFICATION OF RISK AND SEVERITY OF COVID-19 SPREAD IN DIFFERENT COUNTRIES WORLDWIDE

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ABSTRACT

Corona virus disease (COVID-19) Pandemic outbreak is increasing day by day since it started and has reached to all the corners of the world. In last few months, it has covered all countries/regions and almost entire population in the world in under the threat of COVID 19. Spread of COVID 19 is not only important in terms of the number of people getting infected but also important that how a government is managing to control the disease. So, present manuscript is integrating the concept of classification by segregating the daily cases COVID 19 cases in different risk zones. We have also analysed COVID 19 cases reported with reference to area and population and then identified the countries which are severely affected continuously and those which are the under zero impact groups.

Keywords: COVID 19, Risk Zone, Empirical parameters,

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1. Introduction:

SARS-CoV-2 (COVID-19) which causes severe acute respiratory syndrome emerged in Wuhan, China in mid-December 2019 [1]. Despite of the best of the efforts by China to contain the disease, it quickly spread to other regions of China and also to the other countries across the world. CoV-2 is very similar to the previous two coronaviruses which lead to epidemics in 2002-2003 (SARS-CoV) and 2012–2014 (MERS-CoV), in terms of viral structure but too fast as compared to the previous two similar epidemics. SARS-CoV-2 outbreak was declared as global health emergency on 30 January 2020 by World Health Organization (WHO) [2]. Within three months it infected more than 4.5 million people throughout both northern and southern hemispheres with three lakhs deaths. After China, other countries which were severely hit are Iran, Italy, Spain, France, Germany and USA. Other countries of Europe and UK also were badly affected as the time progressed. For the pandemics, it is very important to monitor the timeline of spread and trace the progress of disease event with time. In case of highly transmissible disease like influenza [3, 4] and, previous and ongoing SARS-CoV epidemic [5] and, real time tracking of disease spread and using population travel data for prediction of spread risk [6] are becoming necessary for timely understanding of the new origin source or hotspots of disease, epidemiology and dynamics, and in guiding our effective response to it. Mapping the disease spread acts as critical means for tracking and managing contagious diseases. Many pandemics in the past, including Plague in Italy in 17th century [7] followed by cholera, yellow fever and Influenza pandemic in 1918 worldwide had been tackled by means of mapping the cases at any place. According to a report published on 2014 about health information system, twenty eight percent focused on mapping of infectious disease [8].

There is a dramatic advancement in geographical mapping applied to health through web-based tools [9, 10]. In the pandemic situations like COVID-19, it is very important to monitor the spread of disease and keep informing both the government and, public and health professionals. It helps in decision and policy making by government of different countries. It also helps to understand the issues like source of outbreak, Public events, hotspots identification, supply chain etc. Effective information system along with the use of big data from different sources and display results in interactive and real-time platforms have become a main information source during the ongoing COVID-19 outbreak.

In the study of infectious disease, unexpected shifts or trends can be detected through quality control limits. [11] Discussed a general trend for serology testing in centralized laboratories based on quality control (QC) principles. They analyzed 103 QC data sets and obtained six different infectious

diseases for establishing statistical control limits. [12] used robust statistical methods for analyzing surveillance data and compared through contrast statistical process control (SPC) charts with Twitter's anomaly and breakout detection algorithms. Similar study can be seen by [13, 14, 15].

This paper offers mapping the spread of disease with total cases to understand the risk of COVID 19 in various regions of the world. The risk of COVID 19 spreading is more if infected person is moving which can be stopped majorly by social distancing. We have studied the cumulative cases of COVID 19 and identified the regions which are severely affected. Its applications will help for tracking the coronavirus epidemic and events associated with it as they come forward to the world. Receiving data updates in real-time from different sources and collecting at one place in a single, easy to understand visual form, can support to contain infectious COVID-19 disease and other outbreaks and epidemics.

2. Material and Methods:

2.1 Data Source: COVID 19 came into picture on December 31, 2019 when WHO office of China detected the cases of pneumonia with unknown etiology in Wuhan City, Hubei Province of China. This was a new disease and recorded first time, so no idea was available about the complexity and behavior of its spread. Present era is globally open for economy as well as knowledge due to which there is regular movement of people between the province and countries. Government may try their level best and try various measures to contain the disease in country or at province, but due to unknown behavior of disease, its efforts may succeed or fail. This analysis can be done based of daily recorded CIVID19 infection and analyzing with respect to area as well as population. The data regarding number of COVID-19 patients, human population of a particular geographical location was collected from various sources listed below:

S. No.	Information	Source
1	Country Code	https://countrycode.org/
2	Temperature	https://www.timeanddate.com/
4	Land Area & Population	https://www.worldometers.info/world-population/population-by-country/
5	daily number of COVID-19 infection	https://ourworldindata.org/coronavirus-source-data/

We have analysed total COVID19 cases for which we have arranged the day wise update considering $t=1$ as first infection day, $t=2$ as second infection day and so on. Then, obtained the empirical parameters like mean and variance and then identified those countries which are lying in following regions:

S. No.	Name of Region	No of COVID19 infection lies in
1	SER: Severe Risk	No of COVID 19 Cases $< \mu + 3\sigma$
2	EXR: Extremely risk	$\mu + 2\sigma \leq$ No of COVID 19 Cases $< \mu + 3\sigma$
3	HIR: Highly Risk	$\mu + \sigma \leq$ No of COVID 19 Cases $< \mu + 2\sigma$
4	RIS: Average Risk	$\mu \leq$ No of COVID 19 Cases $< \mu + \sigma$
5	LES: Less Risk	$\mu - \sigma <$ No of COVID 19 Cases $\leq \mu$
6	LOR: Low Risk	$\mu - 2\sigma <$ No of COVID 19 Cases $\leq \mu - \sigma$
7	NOR: No Risk	$\mu - 3\sigma <$ No of COVID 19 Cases $\leq \mu - 2\sigma$
8	NEE: Zero Effect	No of COVID 19 Cases $\leq \mu - 3\sigma$

As per the distribution theory, a variable follows specific distribution functions. Considering the limitation of study, we have taken minimum 25 participating countries for the analysis and assumed that COVID 19 cases are following normal distribution and then identified the list of the countries falling in above eight zones. For data handling and processing purposes, R and MS Excel were used. Maps and visualizations were generated using Tableau.

3. Results and Discussion

First case of COVID 19 came in picture on December 31, 2019 and within few months it reached all over the world. The infectious disease usually expands in exponential manner across the population as well as area through the medium/ opportunity. The Social distancing has also became a proven mechanism to slow down the growth of present pandemic So, we have analysed the total COVID 19 cases recorded from the first day of infection and segregated the countries assuming the normal distribution of positive cases from various countries in all eight regions.

3.1: COVID 19 Infection Severity: All transmission disease depends on the transmission opportunity or medium like humans in COVID-19. Due to globalization and regular movement of people from one country to another, spread of COVID 19 reached to 208 countries till May 10, 2020. For any society health is major concern for humanity as well as administration. Any pandemic is declared as and when it reached at a particular severity level and control vice versa. So, we have

continued the daily COVID 19 cases analysis and segregated till May 10, 2020. We have included at least 25 countries for the analysis purpose due to limitation of number of observations in the analysis. Maximum number of day's data available for China is for 100 days, followed by Iran for 81 days, minimum number of days data is for 16 days for Western Sahara and Tajikistan.

3.2: COVID 19 till May 10, 2020:

For any society health is major concern for humanity as well as administration. So, we have continued the analysis and segregated it for every ten days starting from March 31, 2020 till May 10, 2020. We have identified the severity of COVID 19 cases in various infected countries. As the infectious disease always depends on opportunity of spreading and transporter, so we identified the severity level with respect to population and area.

3.2.1: Number of COVID 19 till May 10, 2020

Present section dealt with the COVID19 cases recorded in various countries till the May 10, 2020. The Figure-1 given below is showing daily COVID 19 confirmed cases in each country's severity zone.

Figure shows the zone in which a country remains for the maximum days. The increase level of severity % is denoted by upper direction arrow(\uparrow) and decrease by lower direction arrow (\downarrow). Turkey and Iran are in the same zone as seen in previous day's analysis, the SRZ and Tajikistan also now belongs to SRZ. Portugal's, Switzerland's and Netherlands' dominant zone is still HRZ. Brazil had a rapid increase in COVID-19 cases in recent days, and this forced it to enter ERZ and recorded its presence in it for 20% of days. Only China (11% \uparrow) and Iran (8.64 \uparrow %) were found in ERZ from Asia. USA was present in ERZ for 3% \downarrow of its total days. European countries to fall under ERZ are – Switzerland (30.67 \downarrow %), Netherlands (38.36% \uparrow), Germany (9% \uparrow), Italy (7% \downarrow), Spain (7% \downarrow).

European countries falling under HRZ are – Austria (29.33% \downarrow), Netherlands (41.10% \downarrow), Norway (12.16% \downarrow), Switzerland (33.33% \uparrow), Portugal (55.07% \downarrow), Spain (17% \uparrow), France (5% \uparrow) and UK (8% \uparrow). In Asia, China (12% \downarrow), Kazakhstan (7.02% \downarrow), Tajikistan (20% \uparrow), Iran (11.11% \downarrow), Kyrgyzstan (0% \downarrow), Uzbekistan (0% \downarrow), Qatar (4.23% \uparrow) and Turkey (1.67 % \downarrow) of their total days were observed to be in High Risk Zone. Peru (32.31% \uparrow), Brazil (29.33% \uparrow) and Panama (12.9% \uparrow) was found for considerable percentage of days in HRZ in South America and USA (3% \uparrow) was found for most percentage of days in HRZ in North America. Entire Africa and Australia weren't found in HRZ.

In the segregation of HRZ, it is also important to know, which countries are in normal situation named ARZ. Third figure of Figure-1 gives us idea about the percentage of its total days (after first case) for which a certain country has gone through average risk. Mexico has increased its days in ARZ and now it has recorded 62.5%↑ of days in this zone and USA (3%↓) has decreased its % of days in ARZ. In Asian continent, Kazakhstan (70.18%↓), Uzbekistan (60.71%↓), Kyrgyzstan (35.85%↓) and Saudi Arabia (86.96%↑), China (32%↓), South Korea (17%↓), Pakistan (68.92%↑), Iraq (9.21%↓), Iran (9.88%↑), Qatar (63.38%), Oman (1.32%↑) and Indonesia (67.14%↓) also consists some percentage of their total days being in ARZ. Almost whole South America is observed to be in ARZ for a large percentage of days. Australia recorded its 1.0%↓ presence in this zone. The similar pattern (as of previous day's analyses) can be seen that mainly the large countries across the world are lying under the LRZ. Australia was found in LRZ for 99%↑ of its total days after being affected by corona virus infection. A large portion of Africa is also lying in this zone. Kazakhstan(22.8%↑), Uzbekistan(39.3%↑), Saudi Arabia(13%↓), Pakistan(31.1%↓), China(16%↑), Iran(1.2%↓), Turkey(6.7%↓) and Indonesia(32.9%↑) were observed in this zone for significantly lesser % of days than Kyrgyzstan(64.2%↑), South Korea(83%↑).

Iran and Turkey have suffered for more percentage of days in the SRZ than the mainland China. Turkey 88.33%↓, Iran 69.14%↓, China 23.75% (Asia), USA (North America) 32%↑ and Uruguay (South America) is now out of SRZ. The countries which have been under SRZ for some days give us the picture of rapidly transmission of corona virus in the country.

3.2.2 Total no. of confirmed cases per 1000 km² till May 10, 2020

Health equally depends on awareness and opportunity of infection. This may cover more population if it gets a dense population. Density of population depends on area so after analysis the number of cases recorded till May 10, 2020. We have analysed the number of cases per 1000 Km² area. Here, we have calculated the total confirmed cases per 1000km² area to scale the land area under the threat of COVID 19 comparing the countries across the world. In this section, we have studied the COVID19 cases recorded per 10000 Km² area. After scaling the COVID 19 cases, we have identified different risk zones are presented below in Figure-2

We have recorded from the Figure 2 Andorra, Bermuda, Bahrain, Isle of Man, Jersey, Luxembourg, Malta, San Marino and Sint Maarten fall under ARZ as their dominant zone. Guernsey has changed for maximum % of its days from HRZ to ARZ. Vatican City, Monaco and Gibraltar are falling under SRZ (same as the previous analysis). This analysis gave us the result that no country in now under the dominance of ERZ an HRZ.

Due to different number of days of infection, we reported the result in percentage, a country may fall in different zones on different days due to variation in data and hence variation in the specific limits. All countries look to be totally out of this zone (except Belgium for 2.06%↓) in the map but Vatican City (53.85%↑), Monaco (2.78%↑), Guernsey (13.46%↓), Bahrain (1.3%↑) had also entered in ERZ for some days. Only Belgium (6.18%↓) and Singapore (3%↓) are visible in HRZ. Other than those, Guernsey (34.62%↓), Jersey (15.38%↓), Monaco (6.94%↓) and San Marino (26.03%↓) are having some significant percentage of days in HRZ. Israel is now recorded out of HRZ completely.

African, Australian, North America and South American continent had never entered in ARZ and now Asia is also free from ARZ. Some countries are from Europe which gets into the ARZ for a considerable percentage of days. Some of these are, Spain (12%↓), Germany (11%↓), United Kingdom (17%↓), Switzerland (4%↓), Belgium (17.53%↑), Netherlands (6.85%↑), Italy (18%) and Luxembourg (59.15%).

Maximum of the countries were seen to be in LRZ for 100% of their days (after getting infected). This is because, the countries with very less land area have attained very much value due to this transformation (total cases to total cases per 1000km² area) and hence the countries observations were found to very much less. Entire Asia is now observed in LRZ for all days. Again, the countries from Europe which weren't in LRZ for all days and these are Germany (89%↑), Belgium (74.2%↑), Switzerland (96%↑), Italy (82%↑), UK (83%↑), Spain (88%↑).

There are only a few countries falling in SRZ, Gibraltar (65.38%), Monaco (90.28%↑) and Vatican City (53.85%↑) have also this zone to be its dominant zone with a huge percentage of days. Though Singapore (23%↓) and Bahrain (5.19%↓) have been in this zone for a very less percentage of days, but this doesn't mean that these will be out of this zone further. These countries must take quick actions to curb the spread of COVID-19 because they can come under this zone in upcoming days.

3.2.3: Number of COVID 19 per million populations till May 10, 2020: Health is not for total area under threat but also depends on the number of carriers. In COVID 19, all humans can become the carrier for COVID transmission. So, we have analysed the total number of COVID 19 cases till May 10, 2020. Here, we have analysed total confirmed COVID 19 cases per 1 million populations to get more generalized idea for comparing the countries across the world. This will give idea about the shifting of risk zone due to population. Figure 3 showing the countries falling on various risk zone.

In the analysis of COVID 19 cases in reference to population we recorded that large number of countries are in LRZ according to the dominant zone. There are 169↑ countries in the LRZ and again recorded the trend that countries with a very small population are in dominance of Severe Risk Zone (Andorra, Faeroe Islands, Falkland Island, Gibraltar, San Marino and Vatican City). Guernsey, Iceland, Isle of Man, Luxembourg recorded in ERZ for maximum % of their total days. Countries with HRZ are Ireland Jersey, Montserrat, Switzerland and Liechtenstein. The number of countries under dominance of ARZ is 20↓. Some of the European countries had suffered in ERZ for a significant percentage of days. These were Iceland (31.94%↓), Belgium (24.74%↑), Spain (21%↑) of days. Italy and Austria were now recorded out of ERZ.

Study recorded that Italy and United Kingdom had LRZ as their dominant zone, but these countries had also faced some days in the HRZ. This gives us the about rapid transmission of corona virus in these countries. This rapid transmission of corona virus is driving these countries to enter HRZ from the LRZ. The rate of spread of corona virus is not so high in South America, Australia and Africa this is the reason that's why these continents had never been in HRZ entirely. USA recorded its presence of 6% of its total days in HRZ.

Iran (33.3%), Turkey and Qatar (29.6%) are observed to be in ARZ for some days from Asia. Turkey had now recorded its presence for 60%↑ days in ARZ. Most of the European countries showed some increment % of days in ARZ. Norway (77%↑), Austria (66.7%↑), Netherlands (64.4%↑), Ireland (26.8%↓), Portugal (62.67%↓), Switzerland (34.7%↑), Denmark (55.4%↑), Germany (29%), UK (18%↓), France (27%↓) and Serbia (46.2%↑) of total days.

Every country of Africa, Australia and South America (except Panama, Peru, Ecuador and Chile) were found in LRZ for their total days. USA, Canada and Greenland were observed to lie under this zone for 74%↓, 86%↓ and 63.5%↑ of days respectively. Only the countries with a very small population were never recorded in LRZ and some of these are Bermuda, Faeroe Island, Falkland Island, Gibraltar, Jersey, Puerto Rico, US Virgin Islands, San Marino and Vatican City. Entire Asia was also totally in LRZ except Qatar (for 45.1%↓), Iran (for 66.7%↓), Turkey (for 40%↓) and Israel (for 46.8%↓). Europe contains many countries which had not been in LRZ for 100% of their total days. This can make us think about the rapid growth of COVID-19 positive cases per million population in Europe.

There are only a few countries falling in SRZ, Faeroe Islands (for 63.46%↓), San Marino (for 86.3%↑), Andorra (for 65.22%↑), Falkland Island (for 81.08%↓), Guernsey (for 26.92%↓) and Vatican City (for 86.15%↑) were recorded in SRZ. Spain (for 6%↓), Montserrat (for 7.84%↓) were also now found to be out of SRZ, and Switzerland is now out of SRZ.

3.3: Variation on Severity level worldwide in respect to time: Severity of infection disease depends on time of infection. So, we have analysed the COVID 19 infection in 10 days difference starting from March 31, 2020. Table 1 provided the list of countries, which are in Severe Risk Zone (SRZ) on the mentioned date based on (i) No of cases (ii) No. of cases per 1M population (iii) No. of cases per 1000 Km².

As there are different number of days of infections of various countries so we have recorded the in Table 2, countries (with their % of days) in Severe Risk Zone(SRZ) till the data of analysis (i) No of cases (ii) No. of cases per 1M population (iii) No. of cases per 1000 Km²

Among the countries which are severely affected form COVID 19, Table 2 interprets the countries which are on the peak of severe infection. In reference to COVID 19 cases, Puerto Rico was most severely affected, and Uruguay was least severely affected. Puerto Rico had 4 days of infection with 64, 100, 127 and 174 COVID-19 positive cases on day 1, day 2, day 3 and day 4 respectively. On the other hand, China's COVID 19 cases reached 63 on 18th day. This can give you a clear picture that how fast the virus speeded in Puerto Rico. Considering population in account, COVID 19 cases per 1M population, Faeroe Islands and Vatican City were in Severe Risk Zone (SRZ) for all days, and Spain was least in SRZ. Similarly, for number COVID 19 cases per 1000Km² area, Vatican City was seen most severely affected and Israel, Switzerland were least severely affected. During the analysis on May 10, 2020, we noted Turkey to be in SRZ for maximum portion of days and Faeroe Islands for least portion of days in SRZ based on COVID 19 cases. Similarly COVID 19 cases per 1M population showed us Vatican City and San Marino as maximum severely affected and Isle of Man as minimum severely affected countries. Similarly, for no. of cases per 1000Km² area, Monaco was seen most severely affected and San Marino as least severely affected country.

4. Conclusion:

The main aim of present manuscript is to know the pattern of severity of COVID 19 worldwide. It has been recorded that during initial days of infection, China was falling mostly under Severe Risk Zone(SRZ). But after March 31, 2020, China had recorded a regular decrease in percentage of days

under Severe Risk Zone(SRZ), as China was last recorded in SRZ on its 57th day of infection. USA showed a lower rate of spread in its initial days and was capable to keep this rate quite low for almost 2 months since first case. USA was recorded in LRZ till 59th day and after this, the virus took a rapid rate of transmission and as a result, USA entered SRZ just after 9 days, i.e., 69th day. Turkey and Iran were also under SRZ on 31st march, but after that only Turkey was found under SRZ. Iran had reduced the growth in cases after 31st march and hence now out of this zone. Turkey is the only country which was in SRZ on each analysis day.

We have analysed the COVID 19 cases per million population and recorded that the countries with small population gives very high values in this transformation (COVID 19 cases per million population), and consequently, these countries probably fall in either Extreme Risk Zone (ERZ) or Severe Risk Zone (SRZ). Bahrain, Monaco and Singapore were found in Severe Risk Zone(SRZ) in every analysis. In the analysis we have recorded change on the group when COVID 19 cases are scaled. We have also performed the analysis for both scaling that per 1000Km² area and per million population and recorded that the small countries are falling in Severe Risk Zone(SRZ).

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Fig. 1 Total Number of Positive Cases of COVID 19

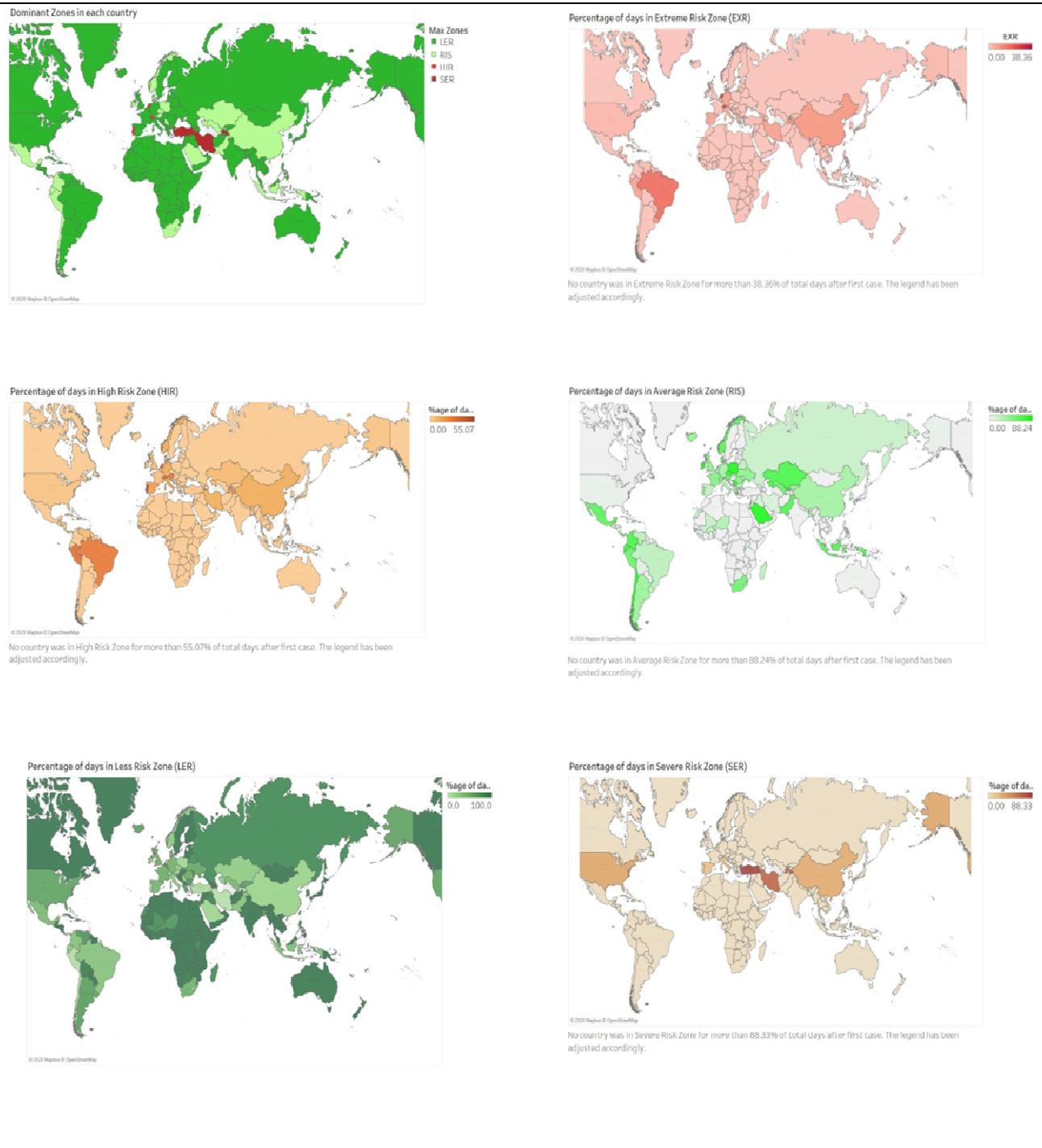


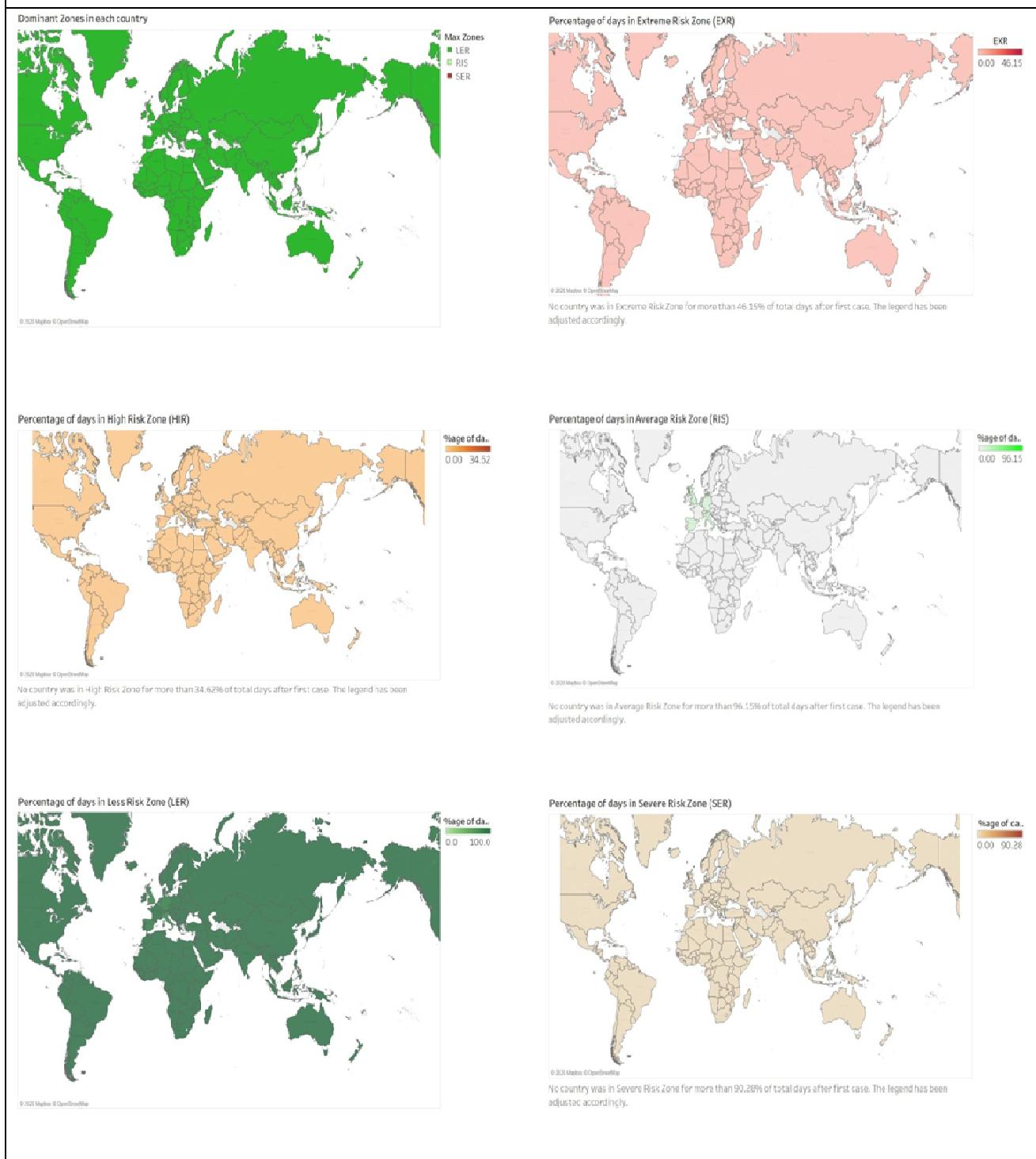
Fig. 2 Total Number of Positive Cases per 1000 km²

Fig. 3 Total Number of Positive Cases per million population

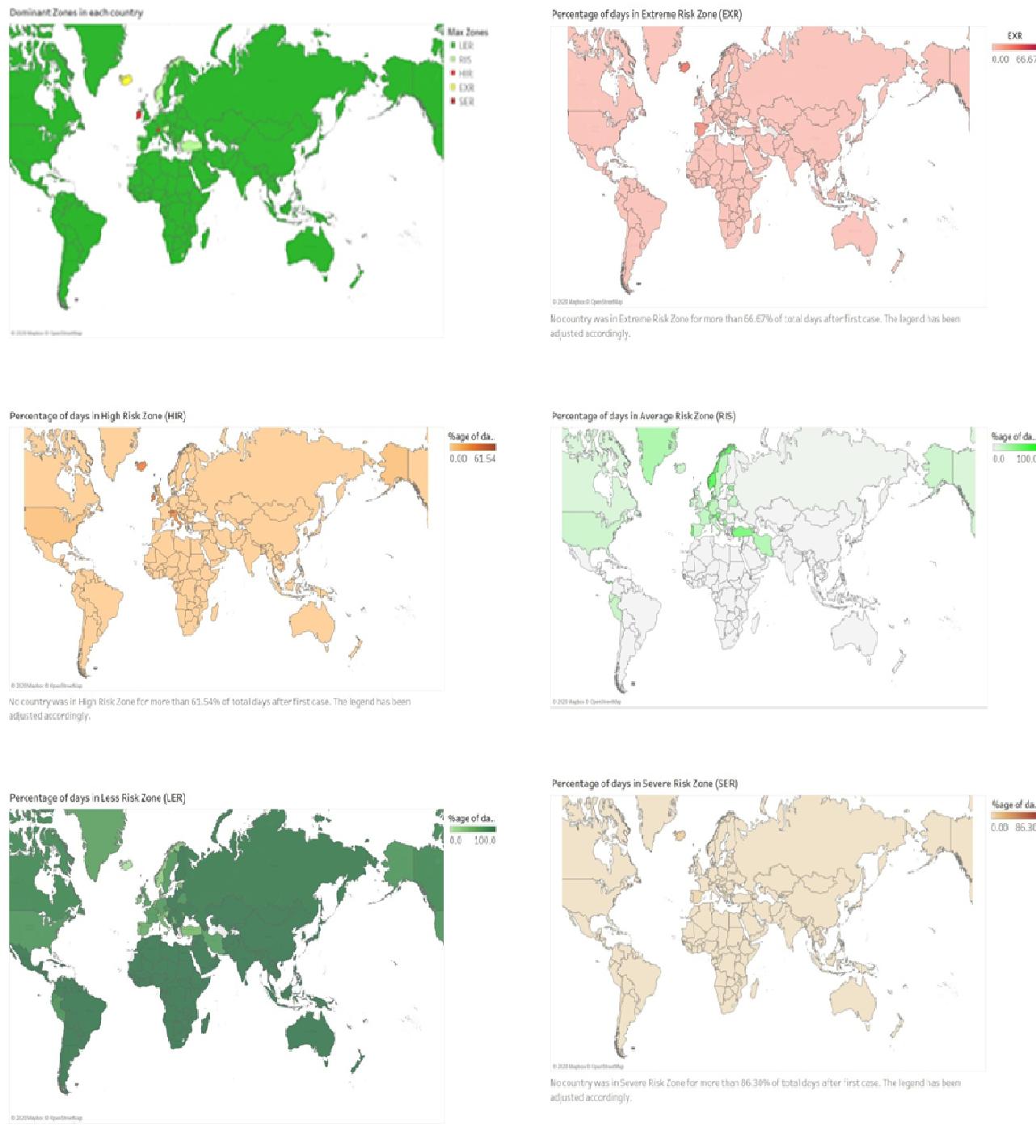


Table-1: List of Countries belongs of Severe Risk Zone (SRZ)

Date of analysis	No. of Cases	No. of cases per million population	No. of cases per 1000 Km²
March 31, 2020	Turkey, Iran, Puerto Rico	Andorra, Faeroe Islands, Gibraltar, Iran, Israel, Italy, San Marino, Spain, Switzerland, Vatican City	Bahrain, Gibraltar, Israel, Monaco, San Marino, Singapore, Switzerland, Vatican City
April 10, 2020	Turkey	Andorra, Faeroe Islands, Falkland Islands, Gibraltar, Guernsey, Iceland, Iran, Luxembourg, San Marino, Spain, Switzerland, Vatican City	Bahrain, Gibraltar, Israel, Monaco, Singapore
April 20, 2020	Turkey, United States	Andorra, Falkland Islands, Gibraltar, San Marino, Spain, Switzerland, Vatican City	Bahrain, Gibraltar, Israel, Monaco, Singapore
April 30, 2020	Turkey, United States	Andorra, Falkland Islands, San Marino, Switzerland, Vatican City	Bahrain, Monaco, San Marino, Singapore
May 10, 2020	Tajikistan, Turkey, United States	Andorra, San Marino, Vatican City	Bahrain, Monaco, San Marino, Singapore

Table 2: Percentage days a Country belongs on Severe Risk Zone (SRZ)

Up to Date of analysis	No. of Cases	No. of cases per million population	No. of cases per 1000 Km2
March 31, 2020	China (38.33%), Faeroe Islands (75%), Turkey (70%), Iran (87.8%), Puerto Rico (100%), Uruguay (29.41%)	Andorra (13.79%), Faeroe Islands (100%), Gibraltar (50%), Iran (12.2%), Israel (10.26%), Italy (28.33%), Liechtenstein (14.81%), Montserrat (36.36%), San Marino (69.7%), Spain (5%), Switzerland (5.71%), Vatican City (100%)	Bahrain (10.81%), Gibraltar (100%), Israel (5.13%), Monaco (87.5%), San Marino (15.15%), Singapore (36.67%), Switzerland (5.71%), Vatican City (88%)
April 10, 2020	China (35.71%), Faeroe Islands (36.36%), Turkey (80%), Iran (84.31%), Puerto Rico (92.86%), Uruguay (14.81%), Netherlands (9.3%)	Andorra (38.46%), Faeroe Islands (100%), Falkland Islands (57.14%) Gibraltar (68.18%), Guernsey (36.36%), Iceland (7.14%), Iran (3.92%), Isle of Man (23.8%), Israel (8.16%), Italy (8.57%), Jersey (4.54%), Luxembourg (9.76%), Montserrat (19.04), San Marino (76.74%), Spain (18.57%), Switzerland (4.44%), Vatican City (82.57%)	Bahrain (8.51%), Gibraltar (100%), Israel (4.08%), Monaco (83.33%), San Marino (2.32%), Singapore (30%), Switzerland (2.22%), Vatican City (80%)
April 20, 2020	China (23.75%), Faeroe Islands (25%), Turkey (85%), Iran (78.69%), Puerto Rico (54.17%), Uruguay (10.81%), United States (10%)	Andorra (51.02%), Faeroe Islands (96.88%), Falkland Islands (82.35%), Gibraltar (78.12%), Guernsey (40.62%), Isle of Man (16.13%), Jersey (9.38%), Luxembourg (9.80%), Montserrat (16.13%), San Marino (81.13%), Spain (23.75%), Switzerland (3.64%), Vatican City (80%)	Bahrain (7.02%), Gibraltar (100%), Israel (3.39%), Monaco (86.53%), San Marino (1.89%), Singapore (27.5%), Vatican City (71.11%)
April 30, 2020	China (29.03%), Faeroe Islands (17.78%), Turkey (88.68%), Iran (74.32%), Puerto Rico (35.14%), Spain (12.9%), Uruguay (8%), United States (22.58%)	Andorra (61.29%), Faeroe Islands (73.33%), Falkland Islands (90%), Gibraltar (60%), Guernsey (31.11%), Iceland (7.69%), Isle of Man (4.54%), Luxembourg (25%), Montserrat (9.09%), San Marino (84.85%), Spain (12.90%), Switzerland (2.94%), Vatican City (84.48%)	Bahrain (5.71%), Gibraltar (75.56%), Monaco (89.23%), San Marino (1.52%), Singapore (24.73%), Vatican City (58.62%)
May 10, 2020	China (29%), Faeroe Islands (13.46%), Turkey (88.33%), Iran (69.14%), Puerto Rico (29.54%), Spain (16%), Tajikistan (70%), United States (32%)	Andorra (65.22%), Faeroe Islands (63.46%), Falkland Islands (81.08%), Gibraltar (51.92%), Guernsey (26.92%), Iceland (11.11%), Isle of Man (1.96%), Luxembourg (23.94%), Montserrat (7.84%), San Marino (86.3%), Spain (6%), Vatican City (86.15%)	Bahrain (5.19%), Gibraltar (65.38%), Monaco (90.28%), San Marino (1.37%), Singapore (23%), Vatican City (53.85%)