

## A Comparative Study on Corona Virus Pandemic – What do Figures Indicate?

Annamalai Alagappan<sup>1</sup>, Sampath Kumar Venkatachary<sup>2\*</sup>, Leo John Baptist<sup>3</sup>, Ravi Samikannu<sup>4</sup>, Jagdish Prasad<sup>5</sup>, Anitha Immaculate<sup>6</sup>

<sup>1</sup>Department of Software Engineering, Faculty of Computing, Botho University, Botswana, <sup>2</sup>Grant Thornton, Aumen Park, Fair Grounds, Gaborone, Botswana. <sup>3</sup>Department of Network and Infrastructure Management, Faculty of Computing, Botho University, Botswana, <sup>4</sup>Department of Electrical, Computers and Telecommunication Engineering, Botswana International University of Science and Technology, Palapye, Botswana, <sup>5</sup>Amity School of Applied Sciences, Amity University Rajasthan, Jaipur, Rajasthan, India, <sup>6</sup>Department of Chemistry, Holy Cross College (Autonomous), Trichy, Tamil Nadu, India.

\*Email: [sampathkumaris123@gmail.com](mailto:sampathkumaris123@gmail.com)

Received: 01 May 2020

Accepted: 20 June 2020

DOI: <https://doi.org/10.32479/irmm.10320>

### ABSTRACT

Coronavirus disease 2019 (COVID 19) is recognized as one of the most significant outbreak in recent times given the spread across the nations. It has affected over 185 countries across the globe and is still expanding significantly. This paper aims to compare the data on two counts and a detailed descriptive analysis is presented in the paper. Given the threat level and the classification of the disease as a pandemic, an attempt is made to analyse the data based on a linear regression estimation and predict its evolution. The statistical results indicate that the death and the recovery rate are influenced substantially by the facilities available in the form of hospital beds, patient-physician and nurse ratio.

**Keywords:** Corona Virus, Statistical, Severe Acute Respiratory Syndrome, Middle East Respiratory Syndrome

**JEL Classifications:** I0; I1; I2; C0

## 1. INTRODUCTION

The impact of COVID-19 has been a problem for most of the nations. World Health Organisation was compelled to declare COVID-19 as a Pandemic on 11 March 2020 (WHO, 2020) due to its rapid spread across nations. The apparent impacts in Asia and Africa are probably going to be more than the rest of the world. The reasons are due to the lack of infrastructure development in critical fields like health. The vulnerability to communicable diseases is magnified manifold due to numerous factors that influence the countries like the concentration of populations, conflicts, and so on. COVID-19 pandemic likewise has uncovered the vulnerability of health infrastructures across the globe. It not only has left the most of the countries unprepared to respond to the pandemic, but also has tested some of the worlds best healthcare systems like Italy, Switzerland, the United States and so forth. As the pandemic

advances, it is probably going to test many concerning nations like Romania, African nations like Nigeria, South Africa, Botswana, South American Nations like Brazil, Peru, Asian nations like Pakistan, Bangladesh, Sri Lanka, India and so on to give some examples which are viewed as high or specific hazard (Gherghel and Bulai, 2020). This hazard can be ascribed numerous variables like the postcolonialism or socialism, delay in executing changes, defilement, the proportion of patient to a specialist, government shakiness, economies, and so on (Gherghel and Bulai, 2020; Instabilitate guvernamentală cronică, 2017).

Although scientists have so far identified only six coronaviruses in the coronavirus family, it is believed that only two viruses SARS and MERS have been known to transmit between human population. Apart from the above two, the newly discovered COVID-19 is also now designated as a communicable disease

and is of the highest concern among the scientific community. COVID-19 is also known for its severity in the form of causing severe pneumonia in people. Though it affects all kinds of people irrespective of race, it is known to be severe on people with the weaker immune system such as diabetic, HIV positive individuals especially among the older people (Bradburne et al., 1967; Bradburne and Somerset, 1972; Monto, 1974; Patrick et al., 2006; Lieberman et al., 2010; Nickbakhsh et al., 2016; Jiang, 2020)

With WHO providing strict guidelines on various aspects of social life like prohibiting mass gatherings, social distancing as a measure of containment and affected countries strictly enforcing, it remains to be seen, if the countermeasures have been effective. The major reason for the spread has been the travellers as careers in many countries as in the case of Iran, Italy, Spain and many other countries (Pullano et al., 2020; Arab-Mazar et al., 2020; Gherghel and Bulai 2020; Biscayart et al., 2020; Rodriguez-Morales, et al., 2020).

Against this backdrop, this paper aims to study and provide an insight into the various influential factors. Section 2 reviews the pandemic. Section 3 discusses data modelling, while section 4 provides the statistical analysis. Section 5 discusses the result with section 6 concluding the paper.

## 2. OVERVIEW OF PANDEMICS

COVID-19 or Coronavirus 2019 first came to light in the city of Wuhan on 12 December as reported by the Wuhan Health Corporation, Hubei Province in the Peoples Republic of China (Biscayart et al., 2020). Though initial traces were narrowed down to the Wuhan wet market (Lu et al., 2020; Zhou et al., 2020; Biscayart et al., 2020) the scientific community is now revisiting to ascertain its primary source. What was initially a problem to the Wuhan city, had become a global problem. Thanks to the Chinese new year, during which time, most Chinese people travel to China to celebrate. With many returning or travelling to countries, after the festival, the world witnessed the emergence of the latest outbreak of zoonotic pathogen in the form of international transmission with China issuing a new confirmation on the human to human transmission. (Rodriguez-Morales, et al., 2020a; Rodriguez-Morales, et al., 2020b). By the time the Chinese government had enforced a clampdown on the towns, the disease had spread significantly to the other areas (Eder et al., 2020). Wuhan, which was the initial epicentre after the outbreak, slowly became insignificant with the USA now topping the number of infections outside of China. With the total cases across the globe now nearing 2.2 million, this pandemic is here to stay for the next couple of months if not years (Johns Hopkins School of Public Health, 2020).

### 2.1. Impacts of COVID-19

Tables 1-4 provides an insight into SARS, MERS and COVID-19 cases. As against the total global cases tested as reported accounted for COVID-19 stood at 2399849 as on April 9, 2020. When comparing it with the data as on July 20, 2020, the number of cases had increased to 14741412. While the recovery percentage was 25% as on April 9, 2020, the recovery percentage as on

**Table 1: SARS 2003 cases (WHO, 2004)**

SARS - 2003				
Total registered cases				
Total cases	Recovered cases	Total death	Total recovery percentage	Total death percentage
8096	7352	744	90.81027668	9.18972332

**Table 2: MERS case update as of January 2020 (WHO, 2020)**

MERS				
Total registered cases				
Total cases	Recovered cases	Total death	Total recovery percentage	Total death percentage
2519	1653	866	65.62127829	34.37872171

**Table 3: Abstract of total COVID-19 cases as on April 19, 2020 (WHO, 2020)**

COVID-19				
Total registered cases				
Total cases	Recovered cases	Total death	Total recovery percentage	Total death percentage
2399849	615674	164939	25.65469744	6.872890753
Total active cases				
Active cases	Serious cases		Percentage of serious cases	
1619236	54215		3.348183958	
Cases with results				
Total cases	Recovered	Death	Recovery percentage	Death percentage against outcome
780613	615674	164939	78.87057992	21.12942008

COVID-19 as on July 20, 2020				
Total registered cases				
Total cases	Recovered cases	Total death	Total recovery percentage	Total death percentage
14741412	8792382	610747	59.64409651	4.143069877
Total active cases				
Active cases	Serious cases		Percentage of serious cases	
5338283	59701		1.118355846	
Cases with results				
Total Cases	Recovered	Death	Recovery percentage	Death percentage against outcome
9403129	8792382	610747	93.50485354	6.495146456

July 20, 2020 stood at 60% indicating that the recovery rate has doubled. Similarly, when comparing the death percentage, which stood at 7% as on April 9, 2020, it has substantially come down to 4% as on July 20, 2020. The outcome of the total cases stood

**Table 4: Total reported, death and recovery for COVID-19 for the top 25 countries as on April 4, 2020**

Country/region	Confirmed cases 9 APR	Deaths 9 APR	Recovered 9 APR	Beds: Patients	Physicians: Patients	Nurses and Midwives: Patients	Death percentage	Recovery percentage
United States	461437	16478	25410	1338.1	1197.34	3945.29	3.57	5.51
Spain	153222	15447	52165	459.67	623.48	847.42	10.08	34.05
Italy	143626	18279	28470	488.33	587.88	842.98	12.73	19.82
France	118781	12228	23413	772.08	384.24	1150.83	10.29	19.71
Germany	118181	2607	52407	980.90	497.39	1559.60	2.21	44.34
China	82883	3339	77679	348.11	147.99	191.24	4.03	93.72
Iran, Islamic Rep.	66220	4110	32309	99.33	75.49	123.83	6.21	48.79
United Kingdom	65872	7111	359	184.44	184.82	545.93	10.80	0.54
Turkey	42282	908	2142	114.16	74.44	111.22	2.15	5.07
Belgium	24983	2523	5164	154.89	83.03	277.34	10.10	20.67
Switzerland	24051	948	10600	113.04	101.89	415.67	3.94	44.07
Netherlands	21903	2403	278	102.94	76.81	243.22	10.97	1.27
Canada	20654	503	5162	55.77	53.91	204.59	2.44	24.99
Brazil	18092	950	173	39.80	38.90	175.64	5.25	0.96
Portugal	13956	409	205	47.45	46.55	88.93	2.93	1.47
Austria	13244	295	5240	100.65	68.13	108.31	2.23	39.57
Korea, South	10423	204	6973	119.86	24.66	72.68	1.96	66.90
Russian federation	10131	76	698	83.07	40.66	87.34	0.75	6.89
Israel	9968	86	1011	30.90	32.07	51.88	0.86	10.14
Sweden	9141	793	205	23.77	49.36	105.52	8.68	2.24
India	6725	226	620	4.71	5.23	14.17	3.36	9.22
Ireland	6574	263	25	18.41	20.29	93.97	4.00	0.38
Norway	6211	108	32	24.22	28.78	112.57	1.74	0.52
Australia	6108	51	1472	23.21	21.91	77.33	0.83	24.10

at 780613 cases as recovered with a recovery percentage of 79% as on April 9, 2020 and 93% as on July 20, 2020. The overall mortality rate thus has been lower at 6.4% (as on July 20, 2020 in the case of COVID-19 when comparing it with SARS (9%) and MERS (34%). (Bradburne et al., 1967; Bradburne and Somerset, 1972; Monto, 1974; Patrick et al., 2006; Lieberman et al., 2010; Nickbakhsh et al., 2016; Jiang, 2020).

The world has encountered more than 20 scourges and pandemics from measles, Zika to Ebola, SARS, MERS and the current COVID-19. The present pandemic has caused largescale interruptions with numerous nations enforcing social standards like frequent handwashing, using masks, social distancing, school closures, lockdowns etc. As we witness the nations react and enforce aggressive policies as means to flatten the spread curve and improve the population immunity, which is a known method of controlling the pandemic spread, it is seen as a hindrance among the general public. Adding to the problem is the community's approach towards health workers and the affected. The contemptuous behaviour of some people in the community is causing more trauma to the health workers who are overwhelmed by the crisis. This insolent behaviour is likely to mentally impact the health workers and the infected people at large. The likeliness of neurological disorders during a lockdown could be as high as 3-4% as noticed after Boston bombings (Guerriero, 2014). As governments across the globe embark on isolation to protect its people, these measures may be acceptable during the instance such as terrorist attacks, natural disasters etc. Still, they could prove otherwise in the current scenario where the mental stress is already at stake (Fagan, 2003). There is also a need for awareness among the health care workers on the patients neurological and psychological condition of the patient testing positive for COVID 19 (Jeong et al., 2016) (Torales, 2020). The other impact is the

isolation and disconnection from societal care with some shocking consequences as the dying are "barriered" from the loved ones.

The pandemic so far has been disproportionately affecting all segments. The epidemic also led to widespread panic across the communities, including panic buying, stocking up, and so on. Though it is too early to comment on the social impacts, it is noticeable across the communities. The impact of social media on COVID 19 pandemic has also contributed enormously negatively and impacted the public and the health workers alike. This is primarily due to the incomplete information dissemination from the government. With information flooding the social media groups in the form genuine, misleading, and fake messages, the stress levels and the anxiety levels, unjustified fear among the public, in general, is high. This flood of misleading information could lead to discrimination, stigmatisation, which in turn could lead to other problems in the form of social bullying etc. (Purgato, 2018; Mowbray, 2020). It is estimated that close to 1.5 billion children are affected by the pandemic due to the closure of schools (WHO, 2020). According to the world bank, the resultant impact of COVID-19 in the world low and middle-income countries could have far-reaching implications for millions of people who live in poverty or have only emerged from it. It is estimated that east Asian countries and Africa could be the worst impacted and may lose half of GDP with food, drug, unemployment and investment problems even before the countries face the full wrath of the disease (World Bank, 2020; Sullivan and Chalkidou, 2020).

### 3. DATA MODELING AND METHODOLOGY

Data selection (global reported, death and recovered cases) for analyzing the impact were collected from the John Hopkins

School of public health data portal (Johns Hopkins School of Public Health, 2020). The data for the Physicians and nurses were collected from the World Bank data. The collected data was then segregated for data analysis using excel to build a time series data. Of the data for 185 countries were compared against the data of physicians and nurses/midwives and were selected for performing an analysis using COX Regression model.

#### 4. MODEL COMPARISON, ANALYSIS AND RESULTS

Figure 1 shows the increasing prevalence of difference between each previous day of the global cases reported to WHO as captured by John Hopkins school. That is the difference is computed as follows

$$\sum (Y_c - Y_p) \quad \text{Equation 1}$$

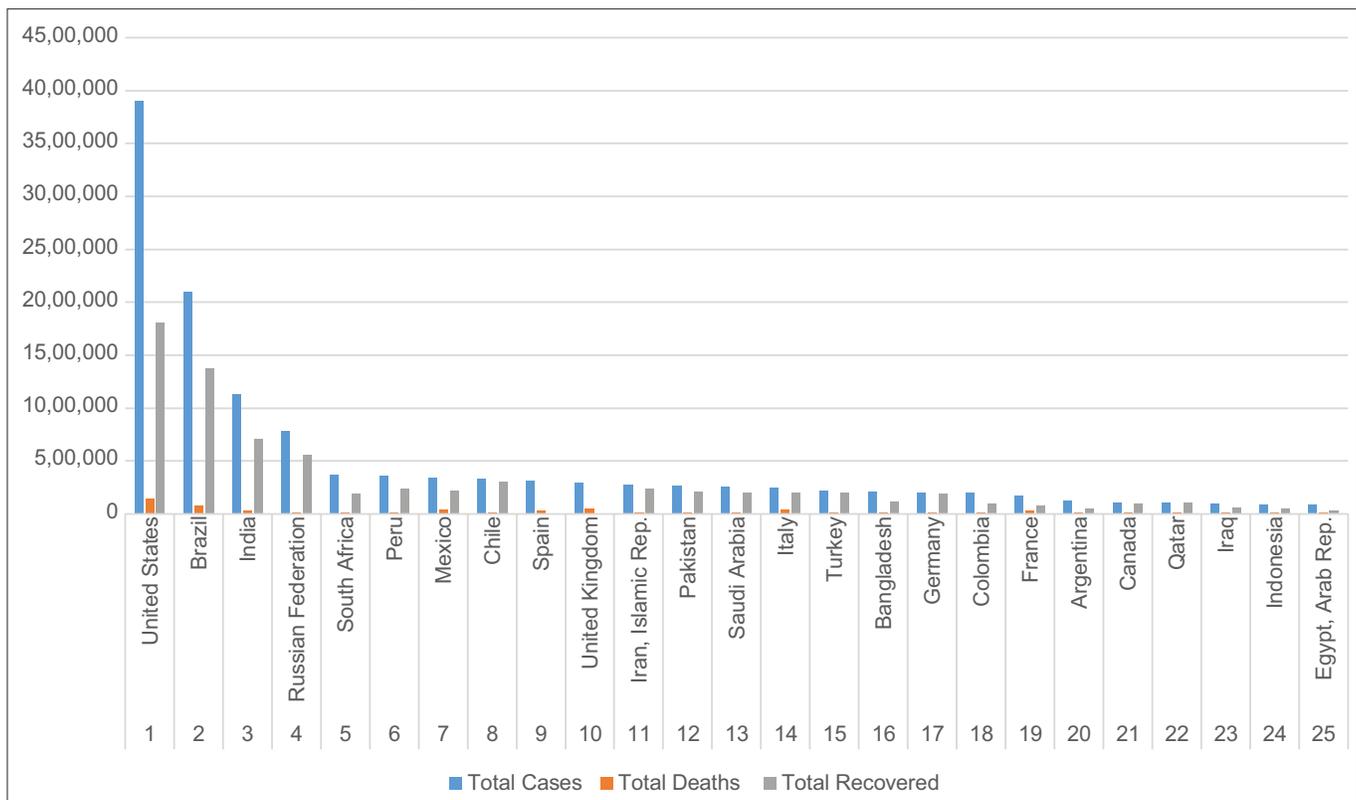
The trend showed a non-constant increase in the total number of reported cases for each of the 185 countries. A brief descriptive analysis of the data was performed to analyse the pattern of newly reported or confirmed cases.

Figures 1-4 shows the global confirmed cases, death rate and recovery rate as of April 9, 2020 and July 20, 2020. As seen in Figures 1-3, and Tables 4 and 5 the US has registered the highest number of cases with 461437 with a recovery per cent of 5.51% as against the death rate of 3.57% as on April 9, 2020. While comparing the same as on July 20, 2020, the recovery rate had improved significantly. It is interesting to note that death

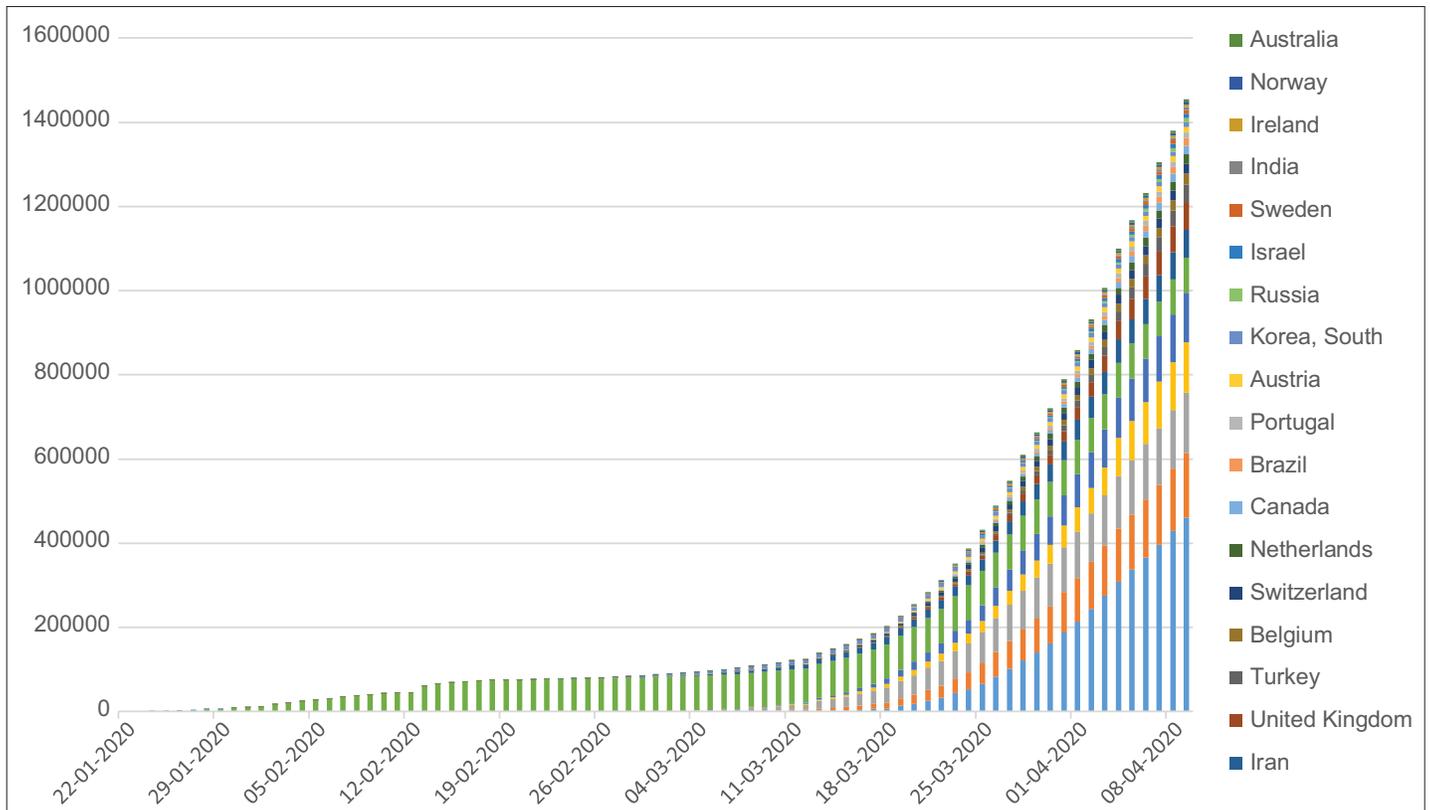
to recovery rate stood at 64% as on April 9, 2020, indicating a positive recovery rate. While Italy had the highest death rate of 12%, Spain, the Netherlands, United Kingdom, Belgium all had a near similar death rate of 10-11% indicating clearly that the overall death percentage rate is likely to be higher for most of the countries as on April 9, 2020. The same countries witnessed a significant improvement on recoveries as on July 20, 2020 and the reported cases had fallen drastically. The reason that could be attributed to initial high death rates in these countries perhaps could be attributed to the elderly population based on the regions. However, when analyzing death versus recovery percentage, the United Kingdom had the least recovery per cent of <1% as on April 9, 2020 and on par with the UK were Ireland, Brazil, Portugal, Sweden, with marginal differences. China and South Korea are the only two countries that had reported a positive recovery rate of over 60% given the trend. While performing analysis on data for April 9, 2020, for 185 countries, it can be seen that the recovery rate largely depends on various factors. It is worthwhile to note that South Korea (3%), Australia (3.46%), China (4.30%), Germany (5%), Chile (4.47%) have been effective in controlling the spread of the disease indicating that the social distancing, lockdown methods have been effective. That is technically, the countries have been effective in curtaining the movement of the people across the region.

When comparing the data for July 20, 2020 it can be seen that most countries that were in the top 25 countries as on April 9, 2020 had significantly dropped in ranking, while countries like India, Brazil, Russia, South Africa which had witnessed smaller numbers reported significant raise in the number of cases and moved up the ranking order standing in the top 5 countries. This

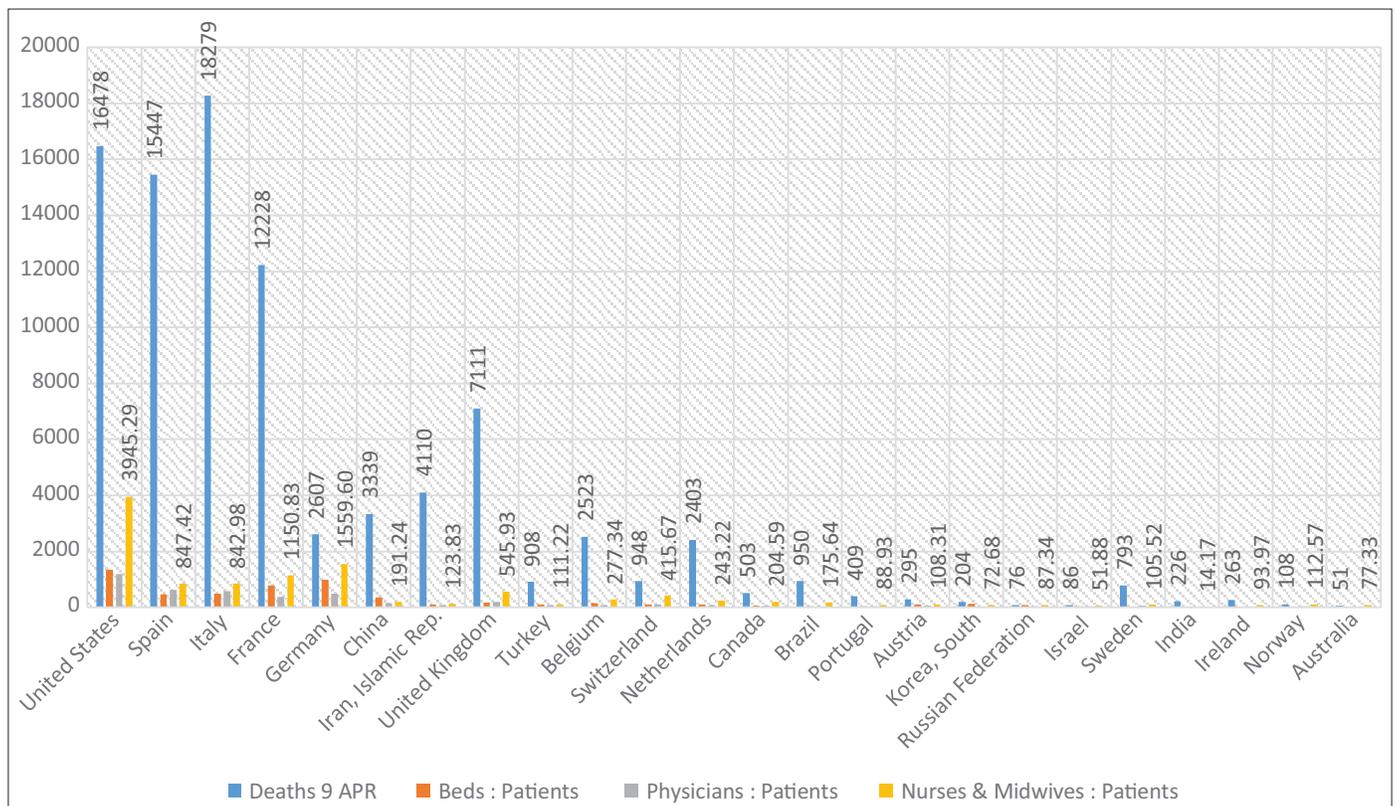
**Figure 1:** Top 25 countries – reported cases, recoveries, deaths as on July 20, 2020



**Figure 2:** Top 25 countries - reported Cases from January 22, 2020 to April 9, 2020



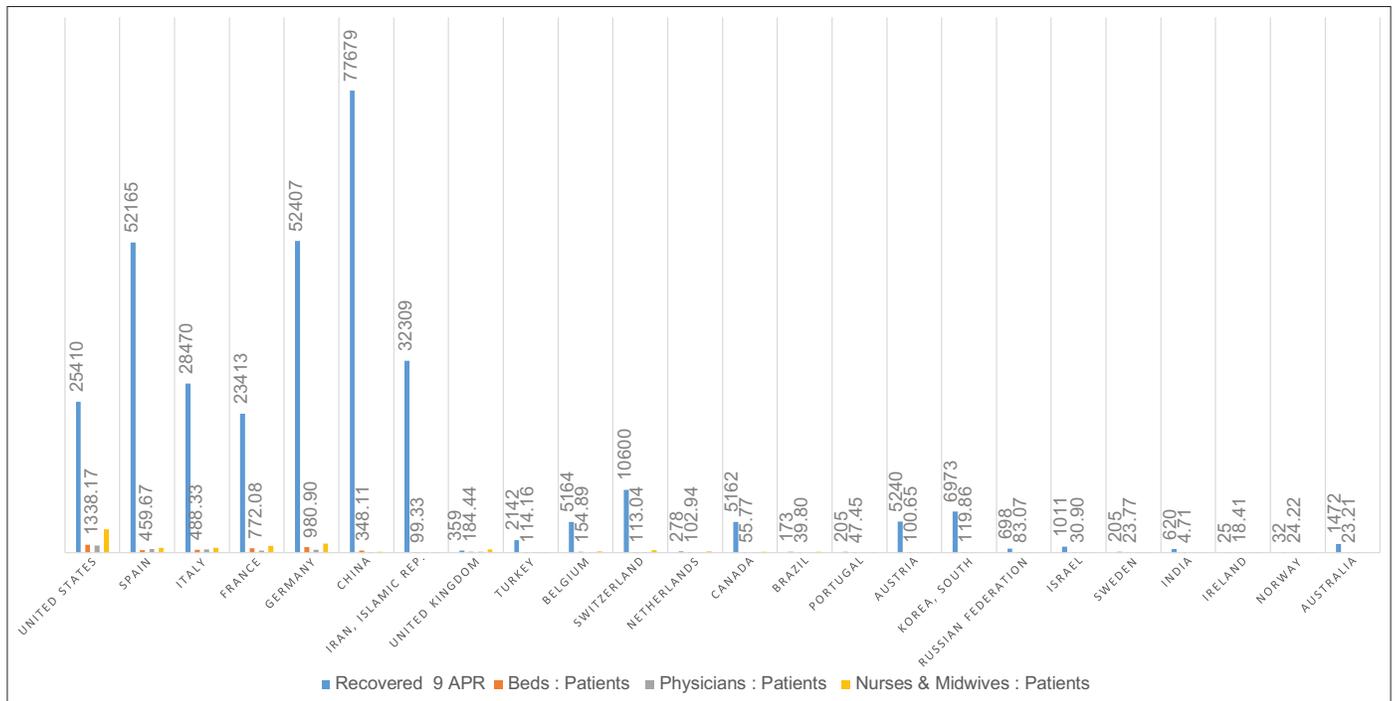
**Figure 3:** Top 25 Countries - death, patient-bed, nurse



perhaps could be attributed to number of initial cases recorded and influence of various other factors like social

distancing, testing ratio, lockdown effects etc. that influence the spread of the disease.

**Figure 4:** Top 25 Countries - recovered, patient-bed, nurse



**Table 5: Total cases, recoveries, deaths as on July 20, 2020 for top 25 countries**

Country	Total cases	Total deaths	Total recovered	Death %	Recovery %
United States	3,901,026	143,321	1,802,550	3.67	46.21
Brazil	2,100,112	79,535	1,371,229	3.79	65.29
India	1,127,281	27,628	707,523	2.45	62.76
Russian Federation	777,486	12,427	553,602	1.60	71.20
South Africa	364,328	5,033	191,059	1.38	52.44
Peru	353,590	13,187	241,955	3.73	68.43
Mexico	344,224	39,184	217,423	11.38	63.16
Chile	330,930	8,503	301,794	2.57	91.20
Spain	307,335	28,420	N/A	9.25	#VALUE!
United Kingdom	294,792	45,300	N/A	15.37	#VALUE!
Iran, Islamic Rep.	276,202	14,405	240,087	5.22	86.92
Pakistan	265,083	5,599	205,929	2.11	77.68
Saudi Arabia	253,349	2,523	203,259	1.00	80.23
Italy	244,434	35,045	196,949	14.34	80.57
Turkey	219,641	5,491	202,010	2.50	91.97
Bangladesh	207,453	2,668	113,556	1.29	54.74
Germany	202,901	9,163	187,800	4.52	92.56
Colombia	197,278	6,736	91,793	3.41	46.53
France	174,674	30,152	79,233	17.26	45.36
Argentina	126,755	2,260	54,105	1.78	42.68
Canada	110,338	8,852	97,051	8.02	87.96
Qatar	107,037	159	103,782	0.15	96.96
Iraq	92,530	3,781	60,528	4.09	65.41
Indonesia	88,214	4,239	46,977	4.81	53.25
Egypt, Arab Rep.	87,775	4,302	28,380	4.90	32.33

The comparative results for April 9, 2020 and July 20, 2020 is tabled in Table 6. From Table 6, it can be analysed that almost all Nations have reported significant recovery percentage and substantial decrease in death percentage, indicating that the nations are ensuring sufficient effective steps and mechanisms to bring the virus under control. The rise in recovery percentage also reflects in ensuring herd immunity.

**4.1. Estimating and Analysis Using Linear Regression and Bivariate Correlations**

Based on the observations, the data for April 9, 2020 was fed into the SPSS package for analysing the samples. The analysis provides a deep insight into the various aspects of the countries. The regression analysis indicates that there is a positive correlation when assessing the recovery and death rates reported in each of the countries.

**4.2. Regression – Does Number of Beds Influence the Death Rate and Recovery Rate?**

To ascertain if the beds to patients ratio influenced the recovery and the death rate in the pandemic COVID-19, an linear and bivariate analysis were carried out in SPSS. The data indicated that 70% of both recovery and death rate had a significant relationship to the number of beds in the hospital for all nations. The regression equation for the recovery and death is as follows.

Equations

$$\text{Recovery} = y = 0.005x + 5.084$$

$$\text{Death} = y = 0.036x + 5.084$$

**Table 6: Comparison of data for July 9, 2020 and July 20, 2020**

Country	July 20, 2020			April 9, 2020			Raise in case%	Decrease in death %	Raise in recovery %
	Total cases	Total deaths	Total	Total cases	Total deaths	Total			
	July 20, 2020	July 20, 2020	recovered - July 20, 2020	- April 9, 2020	- April 9, 2020	recovered- 9-7-2020			
United States	3,901,026	143,321	1,802,550	461437	16478	25410	88.17	3.25	45.56
Brazil	2,100,112	79,535	1,371,229	18092	950	173	99.14	3.74	65.28
India	1,127,281	27,628	707,523	6725	226	620	99.40	2.43	62.71
Russian Federation	777,486	12,427	553,602	10131	76	698	98.70	1.59	71.11
South Africa	364,328	5,033	191,059	1934	18	95	99.47	1.38	52.42
Peru	353,590	13,187	241,955	5256	138	1438	98.51	3.69	68.02
Mexico	344,224	39,184	217,423	3181	174	633	99.08	11.33	62.98
Chile	330,930	8,503	301,794	5972	57	1274	98.20	2.55	90.81
Spain	307,335	28,420	N/A	153222	15447	52165	50.14	4.22	#VALUE!
United Kingdom	294,792	45,300	N/A	65872	7111	359	77.65	12.95	#VALUE!
Iran, Islamic Rep.	276,202	14,405	240,087	66220	4110	32309	76.02	3.73	75.23
Pakistan	265,083	5,599	205,929	4489	65	572	98.31	2.09	77.47
Saudi Arabia	253,349	2,523	203,259	3287	44	666	98.70	0.98	79.97
Italy	244,434	35,045	196,949	143626	18279	28470	41.24	6.86	68.93
Turkey	219,641	5,491	202,010	42282	908	2142	80.75	2.09	91.00
Bangladesh	207,453	2,668	113,556	330	21	33	99.84	1.28	54.72
Germany	202,901	9,163	187,800	118181	2607	52407	41.75	3.23	66.73
Colombia	197,278	6,736	91,793	2223	69	174	98.87	3.38	46.44
France	174,674	30,152	79,233	118781	12228	23413	32.00	10.26	31.96
Argentina	126,755	2,260	54,105	1795	72	365	98.58	1.73	42.40
Canada	110,338	8,852	97,051	20654	503	5162	81.28	7.57	83.28
Qatar	107,037	159	103,782	2376	6	206	97.78	0.14	96.77
Iraq	92,530	3,781	60,528	1232	69	496	98.67	4.01	64.88
Indonesia	88,214	4,239	46,977	3293	280	252	96.27	4.49	52.97
Egypt, Arab Rep.	87,775	4,302	28,380	1699	118	348	98.06	4.77	31.94

Regression tables

Model summary				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.839 <sup>a</sup>	0.704	0.700	81.0268

ANOVA <sup>a</sup>						
Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	2714537.625	2	1357268.812	206.733	0.000 <sup>b</sup>
	Residual	1142368.305	174	6565.335		
	Total	3856905.930	176			

a. Dependent variable: BedsPatients

b. Predictors: (Constant), Deaths9APR, Recovered9APR

Coefficients <sup>a</sup>					
Model		Unstandardized coefficients		t	Sig.
		B	Std. error		
1	(Constant)	5.084	6.272	0.811	0.419
	Recovered9APR	0.005	0.001	0.330	0.000
	Deaths9APR	0.036	0.003	0.592	0.000

**4.3. Regression – Does the Number of Physicians in the Hospital Influenced the Death Rate and Recovery Rate?**

The data indicated that 82% of both recovery and death rate had a significant relationship to the number of physicians attending to the

COVID-19 patients in the hospital for all nations. The regression equation for the recovery and death is as follows.

Equations

$$\text{Recovery} = y = 0.002x + 1.932$$

$$\text{Death} = y = 0.040x + 1.932$$

Model summary				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.906 <sup>a</sup>	0.820	0.818	51.3195

ANOVA <sup>a</sup>						
Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	2087803.327	2	1043901.663	396.365	0.000 <sup>b</sup>
	Residual	458262.014	174	2633.690		
	Total	2546065.340	176			

Coefficients <sup>a</sup>					
Model		Unstandardized coefficients		t	Sig.
		B	Std. error		
1	(Constant)	1.932	3.972	0.486	0.627
	Recovered9APR	0.002	0.001	0.131	0.002
	Deaths9APR	0.040	0.002	0.818	0.000

#### 4.4. Regression – Does Number of Nurse/Midwife in the Hospital Influenced the Death Rate and Recovery Rate?

The data indicated that 58% of both recovery and death rate had a significant relationship to the number of the nurses or midwife attending to the COVID-19 patients in the hospital for all nations. The regression equation for the recovery and death is as follows.

Equations

$$\text{Recovery} = y = 0.003x + 9.216$$

$$\text{Death} = y = 0.102x + 9.216$$

Model summary				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.766 <sup>a</sup>	0.586	0.581	222.7877

ANOVA <sup>a</sup>						
Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	12162267.109	2	6081133.555	122.519	0.000 <sup>b</sup>
	Residual	8586744.272	173	49634.360		
	Total	20749011.382	175			

Coefficients <sup>a</sup>						
Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. Error	Beta		
		1	(Constant)	9.216		
	Recovered9APR	0.003	0.002	0.066	1.053	0.294
	Deaths9APR	0.102	0.009	0.722	11.509	0.000

#### 4.5. Bivariate - correlations

Correlations			
	Deaths9APR	Recovered9APR	Beds patients
Deaths9APR			
Pearson correlation	1	0.628**	0.799**
Sig. (2-tailed)		0.000	0.000
n	184	184	177
Recovered9APR			
Pearson correlation	0.628**	1	0.701**
Sig. (2-tailed)	0.000		0.000
n	184	185	177
Beds patients			
Pearson correlation	0.799**	0.701**	1
Sig. (2-tailed)	0.000	0.000	
n	177	177	177
Physicians patients			
Pearson correlation	0.900**	0.644**	0.943**
Sig. (2-tailed)	0.000	0.000	0.000
n	177	177	177
Nursesamp midwives patients			
Pearson correlation	0.764**	0.519**	0.945**
Sig. (2-tailed)	0.000	0.000	0.000
n	176	176	176

	Correlations	
	Physicians patients	Nursesamp midwives patients
Deaths9APR		
Pearson correlation	0.900	0.764**
Sig. (2-tailed)	0.000	0.000
n	177	176
Recovered9APR		
Pearson correlation	0.644**	0.519
Sig. (2-tailed)	0.000	0.000
n	177	176
Beds patients		
Pearson correlation	0.943**	0.945**
Sig. (2-tailed)	0.000	0.000
n	177	176
Physicians patients		
Pearson correlation	1**	0.952**
Sig. (2-tailed)		0.000
n	177	176
Nursesamp midwives patients		
Pearson correlation	0.952**	1**
Sig. (2-tailed)	0.000	
n	176	176

\*\*Correlation is significant at the 0.01 level (2-tailed)

The variables the patient to hospital beds has a positive influence of 70%. That is, the number of beds in the hospital decided the outcome of the patient's recovery, while the converse on death is also visible. Similarly, the result of the physicians and nurse treating the COVID 19 cases had a profound influence of 81% and 58% respectively. This indicated that the countries with good infrastructure with an adequate number of physicians and nurse made a huge difference in the recovery of the patient. Though these factors play a vital role, the other influential factors namely, the intensive care provided to the patients in terms of giving proper attention, medication, ventilators, had a decisive role to play. This study is limited to the analysis of understanding the relationship of what factors influenced based either the recovery or the death.

## 5. DISCUSSION

The mapping and analysis of the total Coronavirus cases against data indicated some exciting results. Notably, countries with high infrastructure facilities like the US, Spain, Italy all had been rated to have fared in containing the pandemic. However, the results indicated that there are other influential factors that influenced the recovery percentage. The US had a recovery rate of 5.51% and nearly on par with the death rate of 3.58%, while Spain, Switzerland and numerous other countries had a better recovery rate as indicated in Table 4. Though it is too early to provide complete information, the early detection of COVID-19 is crucial to prevent the spread. However, it should be noted that the infrastructure facilities and better healthcare professionals played a vital role in the process of recovery. As the second wave of onward transmission is active, it potentially risks the weaker health systems across the globe and as indicated the infrastructure facilities need to be attended to with high priority and the nations need to establish more temporary healthcare facilities to contain the pandemic. Many Asia and African nations are likely to be impacted more due to

the infrastructure facilities available in the countries. However, the response of many African countries towards the pandemic has been more positive and have managed the crises well so far. It is also essential that nations support each other in both monetarily and aid in providing assistance in the form of sending professionals under the “Doctors/Nurses without Borders.”

## 6. CONCLUSION

Results indicate that there is a strong correlation between the selected variables when analysing the trend. The study indicated that the model is statistically significant at this point due to data on patient-bed, hospital-physicians, nurse ration influence the death and recovery process duly. It is also essential to note that these variables are influenced by other the dependent variables in the form of available ventilators, medications, safety equipment, it can be concluded that the model will result in a significant finding when the data for the reported cases, death and recovery stabilise.

## REFERENCES

- Arab-Mazar, Z., Shah, R., Rabaan, A.A., Dharma, K., Rodriguez-Morales, A.J. (2020), Mapping the incidence of COVID-19 hotspot in Iran-implications for travellers. *Travel Medicine and Infectious Disease*, 34, 101630.
- Biscayart, C., Angeleri, P., Lloveras, S., Chaves, T.D.S., Schlagenhauf, P., Rodriguez-Morales, A.J. (2020), The next big threat to global health? 2019 novel coronavirus (2019-nCoV): What advice can we give to travellers? Interim recommendations January 2020, from the Latin-American society for travel medicine (SLAMVI). *Travel Medicine and Infectious Diseases*, 33, 101567.
- Bradburne, A.F., Bynoe, M.L., Tyrrell, D.A. (1967), Effects of a new human respiratory virus in volunteers. *British Medical Journal*, 3(55658), 767-769.
- Bradburne, A.F., Somerset, B.A. (1972), Coronative antibody titres in sera of healthy adults and experimentally infected volunteers. *The Journal of Hygiene*, 70(2), 235-244.
- Eder, S., Fountain, H., Keller, M.H., Xiao, M., Stevenson, A. (2020), 430,000 People Have Traveled From China to U.S. Since Coronavirus Surfaced. New York: Times.
- Fagan, J.G. (2003), Relationship of self-reported asthma severity and urgent health care utilization to psychological sequelae of the September 11, 2001 terrorist attacks on the world trade center among New York city area residents. *Psychosomatic Medicine*, 65, 993-996.
- Gherghel, I., Bulai, M. (2020), Is Romania ready to face the novel coronavirus (COVID 19) outbreak? The role of incoming travellers and that of Romanian diaspora. *Travel Medicine and Infectious Disease*, 34, 101628.
- Guerriero, R.M.L. (2014), Increased pediatric functional neurological symptom disorders after the Boston marathon bombings: A case series. *Pediatric Neurology*, 51, 619-623.
- Instabilitate Guvernamentală Cronică. (2017), Cifrele Care Arată de ce România are Una Dintre Cele Mai Ridicate Instabilități Guvernamentale Europene, în Ultimii 27 de ani. Bucharest, Romania: National University of Political Studies and Public Administration, Center for the Promotion of Participation and of Democracy.
- Jeong, H., Yim, H.W., Song, Y.J. (2016), Mental health status of people isolated due to Middle East respiratory syndrome. *Epidemiology and Health*, 38, e2016048.
- Jiang, R. (2020), Inside China and COVID-19: Questions and answers. *Travel Medicine and Infectious Disease*, 34, 101640.
- Johns Hopkins School of Public Health. (2020), Novel Coronavirus (COVID-19) Cases Data. Available from: <https://www.data.humdata.org/organization/jhsph>; <https://www.data.humdata.org/dataset/novel-coronavirus-2019-ncov-cases>.
- Lieberman, D., Shimoni, A., Shemer-Avni, Y., Keren-Naos, A., Shtainberg, R., Lieberman, D. (2010), Respiratory viruses in adults with community-acquired pneumonia. *Chest*, 138(4), 811-816.
- Lu, H., Stratton, C.W., Tang, Y.W. (2020), Outbreak of Pneumonia of unknown etiology in Wuhan China: The mystery and miracle. *Journal of Medical Virology*, 92(4), 401-425.
- Monto, A.S. (1974), Medical reviews. Coronaviruses. *The Yale Journal of Biology and Medicine*, 47(4), 234-251.
- Mowbray, H. (2020), In Beijing, coronavirus 2019-nCoV has created a siege mentality. *British Medical Journal*, 368, m516.
- Nickbakhsh, S., Thorburn, F., von Wissmann, B., McMenamin, J., Gunson, R.N., Murcia, P.R. (2016), Extensive multiplex PCR diagnostics reveal new insights into the epidemiology of viral respiratory infections. *Epidemiology and Infection*, 144(10), 2064-2076.
- Patrick, D.M., Petric, M., Skowronski, D.M. (2006), An outbreak of human coronavirus OC43 infection and serological cross-reactivity with SARS coronavirus. *The Canadian Journal of Infectious Diseases and Medical Microbiology*, 17(6), 330-336.
- Pullano, G., Pinotti, F., Valdano, E., Boëlle, P.Y., Poletto, C., Colizza, V. (2020), Novel coronavirus (2019-nCoV) early stage importation risk to Europe. *Eurosurveillance*, 25(4), 2000057.
- Purgato, M.G., Gastaldon, C., Papola, D., van Ommeren, M., Barbui, C., Tol, W.A. (2018), Psychological therapies for the treatment of mental disorders in low-and middle-income countries affected by humanitarian crises. *Cochrane Database of Systematic Reviews*, 7(7), CD011849.
- Rodriguez-Morales, A.J., Bonilla-Aldana, D.K., Balbin-Ramon, G.J., Paniz-Mondolfi, A., Rabaan, A., Sah, R. (2020a), History is repeating itself, a probable zoonotic spillover as a cause of an epidemic: The case of 2019 novel coronavirus. *Infezmed*, 28, 3-5.
- Rodriguez-Morales, A.J., MacGregor, K., Kanagarajah, S., Patel, D., Schlagenhauf, P. (2020b), Going global travel and the 2019 novel coronavirus. *Travel Medicine and Infectious Disease*, 33, 3-5.
- Sullivan, R., Chalkidou, K. (2020), Urgent Call for an Exit Plan: The Economic and Social Consequences of Responses to COVID-19 Pandemic. Available from: <https://www.cgdev.org/blog/urgent-call-exit-plan-economic-and-social-consequences-responses-covid-19-pandemic>.
- Torales, J.O.M. (2020), The outbreak of COVID-19 Coronavirus and its impact on global mental health. *International Journal of Social Psychiatry*, 66(4), 317-320.
- WHO. (2020), Corona Virus Disease 2019, (COVID) Situation Report 77. WHO. Available from: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200406-sitrep-77-covid-19.pdf?sfvrsn=21d1e632\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200406-sitrep-77-covid-19.pdf?sfvrsn=21d1e632_2).
- WHO. (2020), Epidemic and Pandemic-prone Diseases-MERS Situation Update; 2020. Available from: <http://www.emro.who.int/pandemic-epidemic-diseases/mers-cov/mers-situation-update-january-2020.html>.
- WHO. (2020), Who Declares COVID-19 as Pandemic. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>.
- World Bank. (2020), Available from: <https://www.worldbank.org/en/news/feature/2020/04/02/the-world-bank-group-moves-quickly-to-help-countries-respond-to-covid-19>.
- Zhou, P., Yang, X.I, Wang, X.G., Hu, B., Zhang, L., Zhang, W. (2020), Discovery of a Novel Coronavirus associated with the recent pneumonia outbreak in humans and its potential bat origin. *BioRxiv*, 2020, 914952.