Original Article

The Contributions of the Scientists across the Globe in the COVID-19 Pandemic

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Abstract

Background: The COVID-19 disease, which was declared pandemic by WHO on the 11th of March 2020, has affected more than 200 countries worldwide and adversely affected whole areas of life.
Aim: Our aim in this study is to investigate whether scientists in countries with low mortality rates and a higher reported number of COVID-19 cases among OECD countries sufficiently share their scientific knowledge.
Methodology: A literature search was conducted with the keywords, "COVID-19, SARS-CoV2, Coronavirus" in scientific databases such as PubMed, EMBASE, Scopus and Medline to find the number of published articles conducted by scientists in OECD countries between the period 01 March 2020 to 01 July 2020. To define the number of academic population of the countries, the number of residents in tertiary education levels of OECD countries was obtained from the educational attainment of 25-64 year-olds report published on the OECD website.
Results: In regards to the countries with the lowest fatality rates, India (n:1578), Australia (n:1097), and Korea (n:876) are the top three countries that have contributed to the scientific literature with the most published studies on COVID-19 issue.
Conclusions: Concerning the current scientific data, about 2,000 papers regarding COVID-19 disease have been registered in the PubMed database since the early beginning of this year. The number of scientific publications is not consistent with the rate of tertiary education levels. Besides, the number of observed cases, and the data-sharing policies of the countries are determinants of the number of scientific publications.

Keywords: COVID-19, Coronavirus, Information Dissemination, Pandemics, Publications.

Introduction

The COVID-19 disease, which was declared pandemic by WHO on the 11th of March 2020, has affected more than 200 countries worldwide and adversely affected whole areas of life. Up to now, in many countries, prolonged curfews have been declared, borders have been closed, and flights have been canceled (WHO, 2020a; Torales et al., 2020; Remuzzi and Remuzzi, 2020).

The disease-related concerns continue to increase due to the lack of definitive treatment and ongoing vaccination studies. Despite all the shortcomings and uncertainties, people try to maintain daily life all over the world (WHO, 2020a; Li, Liu, Ge, 2020).

Background

Although it has been reported that the disease has regressed substantially and the normalization process has begun, concerns remain whether this normalization process is due to the decrease in the number of patients or economic concerns. Governments and scientists have a significant role in eliminating these doubts and making predictions for the future (Fang, Nie, Penny, 2020; Dye et al., 2016).At this stage, the task of governments is to provide adequate treatment opportunities for patients, properly isolate non-patients, and provide economic support to their residents (Fang, Nie, Penny, 2020). Besides, the duty of scientists should be to try to explain the etiology of the disease, dissemination pattern,

determine the most appropriate treatment method, and to spread this knowledge (Dye et al., 2016).

At this point, the experience of the scientists in countries where the disease is common and has low mortality rates is significantly needed. Thanks to this shared information, societies, where the disease is less common, will be able to take the necessary precautions and develop treatment algorithms. However, there is no sufficient data as to whether scientists adequately share this knowledge.

Our aim in this study is to investigate whether scientists in countries with low mortality rates and a higher reported number of COVID-19 cases among OECD countries sufficiently share their scientific knowledge.

Methodology

A literature search was conducted with the keywords, "COVID-19, SARS-CoV2, Coronavirus" in scientific databases such as PubMed, EMBASE, Scopus and Medline to find the number of published articles conducted by scientists in OECD countries between the period 01 March 2020 to 01 July 2020. The total number of COVID-19 cases and deaths due to the virus was obtained from the World Health Organization (WHO)'s Current Situation Report: No. 185-23 July 2020 (WHO, 2020b). The disease fatality rate was calculated by dividing the number of deaths to the number of COVID-19 cases. To define the number of academic population of the countries, the number of residents in tertiary education levels of OECD countries was obtained from the educational attainment of 25-64 year-olds report published on the OECD website (OEDC, 2020).Validation from ethics committee was not necessary since this was an observational study using only data that is publicly available.

Results

In regards to the countries with the lowest fatality rates, India (n:1578), Australia (n:1097), and Korea (n:876) are the top three countries that have contributed to the scientific literature with the most published studies on COVID-19 issue. On the other hand, the countries with low mortality rates, the least scientific contributors on COVID-19 disease are from Iceland (n:13), Slovakia (n:19), and Luxembourg (n:24) (Table 1).

Table 2 depicts the countries with a high fatality rate of COVID-19 disease. Italy (n: 3683), France (n:1621), and Canada (n:1586) are the top three countries that have contributed to the literature with the articles related to the COVID-19 disease. Regardless of the fatality rate ranking, it was observed that the top three countries are China, the USA, and Germany when it comes to considering the scientific contribution (Table 3

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Table 1. The Least Fatality Rate

Countries	Confirmed Cases Over Time	Deaths	Fatality Rate	Tertiary Education	Publication	Public/ Edu%
Iceland	1839	10	0.54	43.74	13	0.29
Israel	52381	419	0.80	50.91	369	7.24
Australia	12428	126	1.01	45.72	1097	23.99
Slovakia	2021	28	1.39	24.58	19	0.77
Russia	789190	12745	1.61	56.7	145	2.55
New Zealand	1205	22	1.83	39.29	163	4.14
Luxembourg	5725	111	1.94	43.88	24	0.54
Korea	13879	297	2.14	49.00	876	17.87
India	1192915	28732	2.40	10.6	1578	148.86
Turkey	221500	5526	2.49	20.78	613	29.49

Table 2. The Highest FR

Countries	Confirmed Cases Over Time	Deaths	Fatality Rate	Tertiary Education	Publication	Public/ Edu%
France	166511	30054	18.05	36.89	1621	43.93
UK	295821	45422	15.35	45.78	1251	27.32
Belgium	64258	9805	15.26	40.63	496	12.20
Italy	244752	35073	14.33	19.32	3683	190.59
Hungary	4366	596	13.65	25.10	76	3.02
Netherlands	52073	6136	11.78	38.34	964	25.14
Mexico	349396	39485	11.30	17.97	264	14.68
Spain	266194	28424	10.68	37.25	1197	32.13
Canada	111124	8558	7.70	57.88	1586	27.39
Sweden	78166	5646	7.22	43.26	353	8.15

Table 3. The Other Countries

Countries	Confirmed Cases Over Time	Deaths	Fatality Rate	Tertiary Education	Publication	Public / Edu%
Ireland	25802	1753	6.79	46.93	302	6.43
Slovenia	1977	111	5.61	32.45	42	1.29
China	86226	4655	5.39	9.7	8138	838.96
Switzerland	33655	1690	5.02	43.74	734	16.77
Greece	4048	197	4.87	31.73	284	8.94
Denmark	13302	611	4.59	38.05	239	6.28
Germany	202799	9095	4.48	29.06	1472	50.64
Finland	7351	328	4.46	45.18	118	2.61
Lithuania	1949	80	4.10	41.65	22	0.52
Poland	40782	1636	4.01	30.91	284	9.18
Brazil	2118646	80120	3.78	17.2	803	46.68
Japan	26303	989	3.76	51.92	918	17.67
USA	3805524	140437	3.69	47.43	4377	92.2
Austria	19679	710	3.61	32.71	269	8.22
Portugal	48898	1697	3.47	24.98	216	8.64
Estonia	2022	69	3.41	41.13	16	0.38

Colombia	204005	6929	3.40	23.39	136	5.81
Norway	9038	255	2.82	43.57	157	3.60
Latvia	1193	31	2.60	33.93	6	0.17
Chile	334683	8677	2.59	25.16	101	4.01
Czech Republic	14324	360	2.51	24.26	67	2.76

Discussion

WHO recently reported the top ten Organization for Economic Co-operation and Development (OECD) countries with the highest rates of COVID-19 disease. Based on this data, the top 10 countries are the USA, Brazil, India, Russia, Mexico, Chile, the UK, Spain, Italy, and Turkey (OECD, 2020). Apart from this, the countries with the most frequent mortality rates are observed in France, the UK, Belgium, Italy, Hungary, Netherlands, Mexico, Spain, Canada, and Sweden (WHO, 2020b). When considering the number of affected patients, the countries with the lowest mortality rates are Iceland, Israel, Australia, Slovakia, Russia, New Zealand, Luxembourg, Korea, India and Turkey (WHO, 2020b). It was reported that the success behind of this lower mortality rates were utilization of early diagnostic tests, social isolation, immediate treatment, intensive patient care, the presence of adequate health-care facilities (Remuzzi and Remuzzi, 2020; Kramer et al., 2020).

The importance of rapid access to both raw and analyzed data or other pertinent research findings is definite when a new or re-emergent pathogen causes a significant outbreak, to achieve a prompt and effective public health response. The dissemination of knowledge in a pandemic is more crucial than ever, particularly in low- and middle-income countries, where public health systems are already overburdened (Moreira, 2020; El-Jardali, Bou-Larroum, Fadlallah, 2020; Modjarred et al., 2016; Whittey et al., 2015). The failure in data sharing on time could have disastrous consequences on public health. A negative example was the 2009 H1N1 influenza pandemic, in which the data regarding the implemented response measures were hindered due to a lack of planning, political concerns, and legal issues. This lead to a missed opportunity in learning what worked for patients in the community (El-Jardali, Bou-Larroum, Fadlallah, 2020). Another example was the 2014–2015 Ebola epidemic, which was observed in West Africa, revealed the importance of information sharing regarding vaccine production. There was an open data collaboration that facilitated two Ebola vaccine trials held in Africa, Europe, and North America (Smolinski, Crawley, Olsen, 2017; Agdandji et al., 2016; Ledgerwood et al., 2017; Rampling et al., 2016; Regules et al., 2017).

Concerning the current scientific data, about 2,000 papers regarding COVID-19 disease have been registered in the PubMed database since the early beginning of this year. These studies include laboratory studies to diagnose the disease in early stages, committee opinions, guidelines, editorials with experts' opinions, and experimental and observational studies. These articles illuminated initial experience regarding possible efficient medical treatments, presenting symptoms, and the short term outcomes of the patients with COVID-19 (Moreira, 2020).

The report released on 30 January 2020 regarding the outbreak of novel coronavirus (2019-nCoV) mentioned the essential role of the continued data sharing with the World Health Organization (WHO). It was also stressed that the information declared through peer-reviewed journals and online data sets is crucial for health authorities across the world (Dye et al., 2016; Modjarred et al., 2016; Whittey et al., 2015).

It was beneficial evidence of data sharing that the early declaration of full viral genome

sequences, and reporting the polymerase chain reaction assay protocols. Moreover, the Bulletin of the World Health Organization declared an "open nCoV" data sharing and reporting protocol to improve secure access to data in the COVID-19 pandemic. This project aimed to encourage all researchers, who deal with the COVID-19 virus, to share their data as quickly and efficiently as possible. The "nCoV-2019 Open" platform also allowed the researchers to retain their authorship, and facilitate international cooperation in the pandemic era (Moorthy et al., 2017; ProMED, 2020; F1000 Research, 2020).

In light of the importance of data sharing during the COVID-19 pandemic, the top three contributor countries were China (n:8138), USA (n:4377), and Italy (n:3683). The fatality rate in these countries was 5.39, 3.69, and 14.33, respectively. Regarding the tertiary educational levels, China was at a rate of 9,7%, which was lower compared to other countries (OECD, 2020). The most important factors that reduce the number of cases in China are the patient monitoring systems implemented in daily-life, follow-up measures including sharing the data of infected patients with the public, and sharing scientific publications about the disease (Kramer et al., 2020). The highest scientific contribution rates could be explained that China was the country where the cases were seen first. Besides, China covers around 1.4 billion of the world's population, including the highest rates of infected people. Similarly, Italy, which was the second host of the virus, had 19,32% of residents with tertiary education and had a significant contribution to science despite having around 60 million. The countries with the least scientific publications on COVID-19 were Latvia (n:6), Iceland (n:13), and Estonia (n:16) despite their high number of tertiary educational level. However, it can be speculated that these countries were with the least observed number of COVID-19 cases and the least population in general.

Many obstacles affect data sharing. First, the technical challenges, such as inconsistency of data sharing policies, are the primary limiting factors of research. Another issue to consider is unstandardized data capture procedures, resulting lack of data quality and harmonization (Modjarred et al., 2016). Second, countries' attitudes on data sharing, advancement in science, privacy policies, and negative beliefs about risks and benefits to data sharing (Shah et al., 2020). These entities for sharing data may raise valid concerns regarding the protection of data privacy. However, in the context of a pandemic, there could be a higher risk to both individual and public health by not sharing knowledge. Besides, it is a moral obligation to share data to provide sufficient recommendations to deal with a pandemic. For that reason, incentives for sharing data should be organized and encouraged by governments, industries or institutions (Modjarred et al., 2016).

In conclusion, the importance of data sharing has emerged, especially during the pandemic period. The number of scientific publications is not consistent with the rate of tertiary education levels. Besides, the number of observed cases, and the data-sharing policies of the countries are determinants of the number of scientific publications.

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