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International Efforts to Save Healthcare Personnel during COVID-19

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An emerging virus, called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is the etiological agent of the coronavirus disease 2019 (COVID-19). The first cases of COVID-19 were reported on December 31st, 2019; all 41 reported individuals resided in Wuhan, Hubei province, China (1). However, symptoms of these positive patients appeared at least as early as December 1st, 2019 (2). Thus, the outbreak of COVID-19 has been suggested to have begun two months prior (3). This disease, that was contained to one specific region, in one specific province, in one specific country, is currently plaguing the entirety of

the world (4). Indeed, the World Health Organization (WHO) declared a pandemic on March 11th, 2020. At that point, 118,000 cases in 114 countries were known, and 4,291 people had already lost their lives (5). Meanwhile it was difficult to guess that more than 1,500,000 new cases in almost all countries and territories will be identified within a month (April 11th, 2020) after announcing the pandemic; and more than 5.7 million affected cases and more than 350,000 deaths in less than 6 months from the first reported case (May 27th, 2020) (6). Despite the fact that an epidemiologic study is needed to validate these numbers, the current estimates are alarming enough for the members of the scientific community, government officials, and even many lay citizens, to realize the severity of this pandemic (7, 8).

So, this generates an alarm all over the world, since it puts the lives of many people at risk, especially those with advanced age and/or with associated diseases such as diabetes mellitus, hypertension and cardiovascular problems, which increase the morbidity and mortality of patients with COVID-19 (2). So, social (physical) distancing has been practiced in several countries. Such measures are installed for periods ranging from 2 weeks to 2 months, as a maximum measure to prevent the virus from spreading among countries, states and citizens. We can witness the success of this rigorous method in China, where social distancing was applied in regions other than Hubei, thus having a lower number of confirmed cases, considering the official report. Conversely, the opposite is true in countries such as the USA, Spain, and Italy, where there was a delay in applying social distancing, resulting to the highest confirmed cases in these countries (9) .

It worth mentioning that healthcare personnel (HCP) are the group, who are not only suffered from family distancing (even parents and/or children), but also have been at a higher risk of infection with COVID-19 since the start of the pandemic (10). A study from China showed 2055 confirmed cases of COVID-19 among HCP during a 2-month period (December 18th, 2019 to February 20th, 2020) (11). In another report from Italy, the rate of infection in HCP was reported around 20% (12).Having little information about the new virus caused an increase in the HCP infection rates. Medical HCP in different fields have to act in a short time interval; some of them had not enough experience, knowledge and information about using personal protective equipment (12), especially at the beginning of before pandemic. Moreover, some HCP, who were the first line of defense against the COVID-19 pandemic, had to work long hours without any break due to the large number of patients. The rapid expansion of the epidemic also caused a severe shortage of critical PPE. Such excessive amounts of workload pressure and psychological distress has led to caregiver burnout in HCP (10, 13, 14)

So, international efforts are needed to do something quickly. Apart from 'lockdown' measures for public, which reduces extra pressure of affected individuals to the health system, another useful strategy is rapid testing. As it was modeled with Ebola, to control a pandemic in one year period, there is a need to test 80% of the symptomatic cases within one day of their symptoms appearance (15). Currently, the most used test for the diagnosis of COVID-19 is reverse transcription polymerase chain reaction (rRT-PCR); the test that tries to find the viral genetic material in the patient's specimen. Unfortunately, despite the test's quality, several practical drawbacks, such as the high cost and level of expertise, prevent its worldwide use for all. In China, an insufficiency of the test kits prompted the replacement of rRT-PCR with the computed tomography (CT) scan, followed by confirmatory laboratory tests. Not only does such a test face more limitations in terms of accuracy, CT scans, too, are still a luxury in some healthcare systems; thus, the urgency of having a rapid, affordable and cost effective test was arose (16). Despite many efforts which are being made to create cost-efficient alternatives, it is still questionable whether these tests can be made available on a global scale, and what will be the economic burden of these alternatives. Indeed, according to the United Nations trade agency the economic burden of this global pandemic is already estimated to be more than US $1 trillion.

In global crises such as these, funding is not the only commodity that is scarce. Time and timing, too, seem to be exceptionally valuable in preventing the spread of the disease. We should learn from our previous mistakes, if we want to prevent history from repeating itself. One example that we can recall within this context is the Ebola epidemic. A magnificent

Table 1. The total number of reported confirmed cases with COVID-19 and deaths in general population and Healthcare personnel (Date: May: 22, 2020)

Reporting Country/ Territory/Area	Total confirmed case (20)	Total deaths (20)	Healthcare personnel deaths (21)	Healthcare personnel/total deaths
Africa				
Algeria	7,728	575	6	1.04%
South Africa	19,137	369	5	1.3%
Nigeria	7,016	211	3	1.42%
Cameroon	4,288	156	2	1.28%
Ghana	6,269	31	1	3.225%
Central African Republic	436	0	0	
Rwanda	320	0	0	
Uganda	264	0	0	
Mozambique	162	0	0	
Burundi	42	0	0	
Eritrea	39	0	0	
Namibia	18	0	0	-
Seychelles	11	0	0	
Lesotho	1	0	0	
Guinea	3,067	19	-	-
Senegal	2,815	33	-	-
Côte d'Ivoire	2,301	29	-	-
Democratic Republic of the Congo	1 944	62	-	-
Gabon	1,567	12	-	-
Guinea-Bissau	1,109	6	-	-
Kenya	1,109	50	-	-
Equatorial Guinea	960	11	-	-
Mali	931	55	-	-
Niger	924	60	-	-
Zambia	866	7	-	-
Burkina Faso	812	52	-	-
Chad	588	58	-	-
Sierra Leone	585	35	-	-
United Republic of Tanzania	509	21	-	-
South Sudan	473	6	-	-
Congo	469	16	-	-
Madagascar	405	2	-	-
Ethiopia	399	5	-	-
Cabo Verde	356	3	-	-
Togo	354	12	-	-
Mauritius	332	10	-	-

Reporting Country/ Territory/Area	Total confirmed case (20)	Total deaths (20)	Healthcare personnel deaths (21)	Healthcare personnel/total deaths
Liberia	240	23	-	-
Eswatini	220	2	-	-
Mauritania	173	5	-	-
São Tomé and Príncipe	165	8	-	-
Benin	135	3	-	-
Malawi	72	3	-	-
Angola	60	3	-	-
Zimbabwe	51	3	-	-
Comoros	34	1	-	-
Botswana	29	1	-	-
Gambia	24	1	-	
Total Reported HCP Deaths			17	
Americas				
Mexico	56 ,594	6, 090	201	3.3%
United States of America	1, 525 ,186	91, 527	190 (2 suicides)	0.2%
Brazil	291, 579	18, 859	81	0.42%
Ecuador	34, 854	2, 888	81	2.8%
Peru	104, 020	3, 024	24	0.79%
Canada	80, 555	6, 062	15	0.24%
Argentina	9,283	403	7	1.7%
Colombia	17, 687	630	6	0.95%
Panama	9,977	287	4	1.39%
Bolivia	4,919	199	4	2%
Costa Rica	882	10	2	20%
Venezuela	824	10	2	20%
Chile	53, 617	544	1	0.18%
Dominican Republic	13, 657	448	1	0.22%
Honduras	3,100	151	1	0.66%
Paraguay	836	11	1	9%
Uruguay	746	20	1	5%
Guyana	125	10	1	10%
Bahamas	97	11	1	9%
Grenada	22	0	0	
Saint Lucia	18	0	0	
Saint Vincent and the Grenadines	18	0	0	
Dominica	16	0	0	
Guatemala	2,265	45	-	-
Cuba	1,908	80	-	-
El Salvador	1, 640	32	-	-

Reporting Country/ Territory/Area	Total confirmed case (20)	Total deaths (20)	Healthcare personnel deaths (21)	Healthcare personnel/total deaths
Haiti	663	22	-	-
Jamaica	529	9	-	-
Nicaragua	279	17	-	-
Trinidad and Tobago	116	8	-	-
Barbados	90	7	-	
Antigua and Barbuda	25	3	-	
Belize	18	2	-	
Total Reported HCP Deaths			624	
Eastern Mediterranean				
*Iran (Islamic Republic of)	129,341	7,249	107	1.48%
*Iraq	3,877	140	25	17.85%
Pakistan	50, 694	1, 067	9	0.84%
Egypt	15, 003	696	7	1%
Afghanistan	9,216	205	3	1.46%
Morocco	7,211	196	3	1.5%
United Arab Emirates	26, 898	237	2	0.84%
Kuwait	18, 609	129	2	1.55%
Oman	6 ,370	32	1	3.1%
*Bahrain	8,174	12	0	0
Saudi Arabia	65, 077	351	-	-
Qatar	38, 651	17	-	-
Sudan	3,138	121	-	-
Djibouti	2,047	10	-	-
Somalia	1,594	61	-	-
Tunisia	1,046	47	-	-
Lebanon	1,024	26	-	-
Jordan	684	9	-	-
Yemen	197	33	-	-
Libya	71	3	-	-
Syrian Arab Republic	58	3	-	-
Total Reported HCP Deaths			159	
Europe				
The United Kingdom	250, 912	36,042	149	0.41%
Italy	228,006	32, 486	131(one suicide)	0.4%
Spain	233, 037	27,940	40	0.14%
Turkey	153,548	4,249	35	0.82%
France	141,590	28,164	23	0.08%
Russian Federation	326,448	3,249	20	0.6%
*Germany	177,212	8,174	8	0.097%

Reporting Country/ Territory/Area	Total confirmed case (20)	Total deaths (20)	Healthcare personnel deaths (21)	Healthcare personnel/total deaths
Serbia	10,919	237	8	3.37%
Republic of Moldova	6,704	233	4	1.7%
Belgium	56,235	9,186	3	0.03%
Belarus	34,303	190	3	1.58%
Ukraine	20,148	588	2	0.34%
Poland	20,143	972	2	0.2%
Romania	17,585	1,151	2	0.17%
*Bulgaria	2,372	125	2	
Bosnia and Herzegovina	2,352	139	2	1.4%
Sweden	32,172	3,871	1	0.03%
Ireland	24,391	1,583	1	0.06%
Austria	16,332	633	1	0.16%
Finland	6,493	306	1	0.32%
Hungary	3,678	476	1	0.2%
Greece	2,853	168	1	0.6%
Netherlands	44,700	5,775	-	-
Switzerland	30, 611	1,637	-	-
Portugal	29,912	1,277	-	-
Denmark	11,182	561	-	-
Czech Republic	8,754	306	-	-
Norway	8,268	234	-	-
Kazakhstan	7,597	35	-	-
Armenia	5,928	74	-	-
Luxembourg	3,980	109	-	-
Azerbaijan	3,749	44	-	-
Uzbekistan	3,006	13		
Tajikistan	2,350	44	-	-
Croatia	2,237	97	-	-
North Macedonia	1,898	111	-	-
Iceland	1,803	10	-	-
Estonia	1,800	64	-	-
Lithuania	1,594	61	-	-
Slovakia	1,502	28	-	-
Slovenia	1,468	106	-	-
Kyrgyzstan	1,350	14	-	-
Latvia	1,025	22	-	-
Albania	969	31	-	-
Cyprus	923	17	-	-
Andorra	762	51	-	-

Reporting Country/ Territory/Area	Total confirmed case (20)	Total deaths (20)	Healthcare personnel deaths (21)	Healthcare personnel/total deaths
Georgia	723	12	-	-
San Marino	672	41	-	-
Total Reported HCP Deaths			440	
South-East Asia				
Indonesia	20,162	1,278	27	2.1%
India	118,447	3,583	9	0.25%
Thailand	3,037	56	2	3.5%
Bangladesh	28 511	408	1	0.24%
Timor-Leste	24	0	0	0
Maldives	1,216	4	-	-
Sri Lanka	1,055	9	-	-
Nepal	487	3	-	-
Myanmar	199	6	-	-
Total Reported HCP Deaths			39	
Western Pacific region				
China	84,520	4,645	30	0.65%
Philippines	13,434	846	30	3.5%
Malaysia	7,059	114	2	1.8%
Republic of Korea	11,142	264	1	0.38%
Australia	7,081	100	1	1%
Viet Nam	324	0	0	0
Brunei Darussalam	141	1	0	0
Mongolia	140	0	0	0
Cambodia	123	0	0	0
Lao People's Democratic Republic	19	0	0	0
Fiji	18	0	0	0
Papua New Guinea	8	0	0	0
Singapore	29,812	23	-	-
Japan	16,513	796	-	-
New Zealand	1,154	21	-	-
Total Reported HCP Deaths			64	
Total worldwide Reported HCP Deaths			1343	

Indications:
The – means no data available
For * the numbers were retrieved from domestic news.

testing kit was made in October 2014, but its obvious effects were shown no earlier than June 2015. This was 'too late', as the pandemic peak had dropped by then. This crucial loss of time occurred due to a lack of a rapid approval system; authorized by the FDA for example and a robust financial support for the manu-

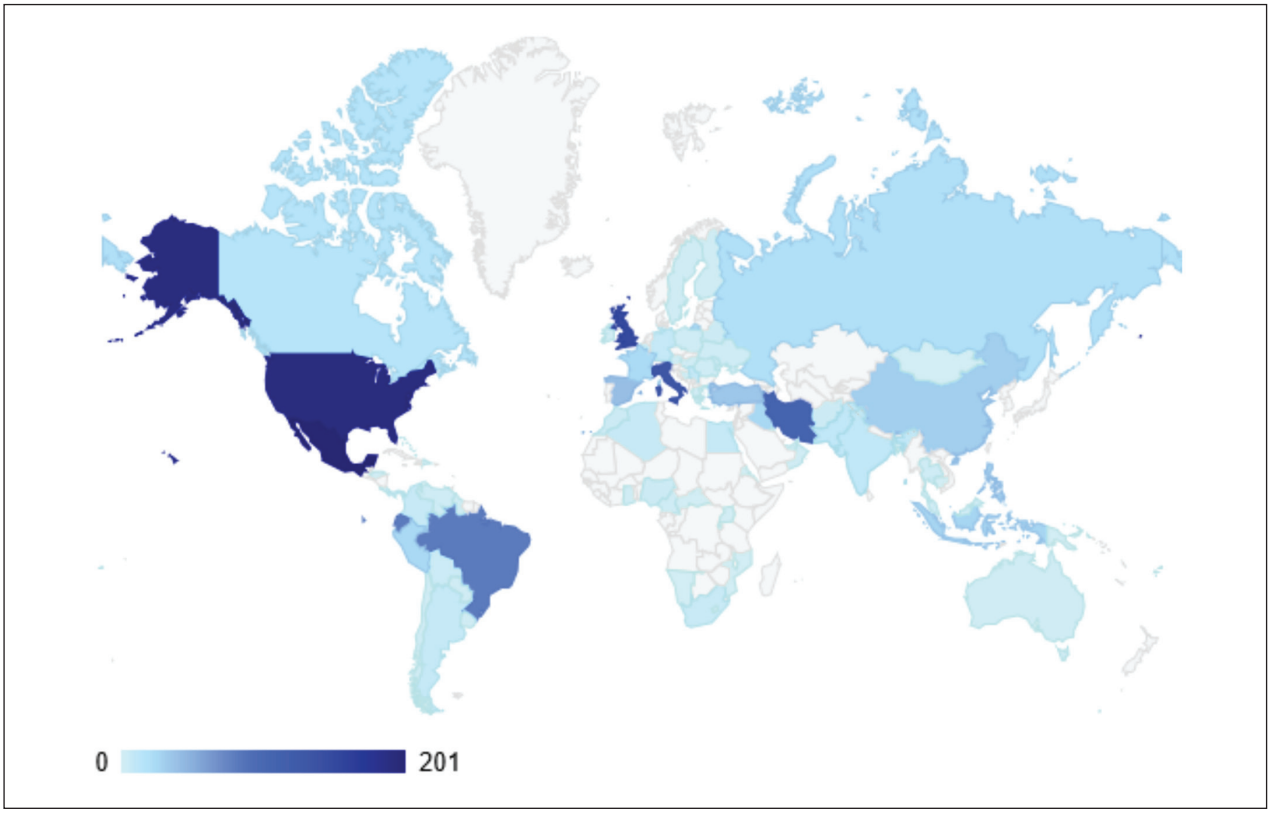

Figure 1. The total number of deaths worldwide in health care personnel due to COVID-19 (Date: May 22, 2020)

facturers (15).

Sadly enough, this story is not just one of time and money. COVID-19 is not only physically debilitating those who are infected, as the disease is revealing its immense psychological impact on all members of our global society, whether that is those who are infected, the health promoters and medics that care for such patients, or those of us who are still healthy, but quarantined. Indeed, those health care workers at the frontline, who are engaged in direct diagnosis, treatment, and care of patients with COVID-19, are said to have a higher risk of symptoms of depression, which can be debilitating as well as apathetic on long-term exhaustion (17).

What's more, many members of the general public (aka covidiots), who were (and perhaps still are) less informed, started panic-buying and ignoring social distancing rules. Attention must be sought and more efforts must be placed by psychological and mental health experts on three main levels: (1) healthcare workers and medical doctors, who are at risk of burden and burnout, even if trained to adapt to emergencies; (2) the public nation in quarantine, who might receive a suggested at-home creative plan; and (3) post-disease outbreak support for the recovered and medical teams. If these psychological factors are not handled with an equal amount of care as the physico-biological and economic problems, the impact of the disease will not just be seen, but also *felt* for many years following the pandemic.

This was only a chapter of this horrible scenario. Everything becomes worse, if we consider that despite the efforts that are done, no clear guidance is there for the diagnosis as well as a specific treatment; unfortunately supportive care is the only choice (18).

It might be quite optimistic that six vaccine developing programs from the USA, China, South Korea, Germany and the UK have started the Phase I vaccine candidates, but this is not the early solution that everyone expects, because it has been said that we

at least need 12-18 months to bring these vaccines to the markets, and this time is estimated based on ideal conditions (19).

In conclusion, it is clear that social distancing, cooperation, hygiene awareness (common sense) and abide by the recommendation and help of all governments are the best available solutions. However, these are not decisive solutions for the HCP dilemma during the current pandemic. An intensified global program is needed to control this pandemic at the lowest possible costs and the highest possible quality. International efforts to provide PPE for all HCP around the world as well a program to support their mental health are an urgent need, which should not be neglected.

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USERN Junior Ambassadors (UJAs) dedicate this paper to honoring the memory of our brave fallen healthcare personnel, who fought COVID-19.

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

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