International Efforts to Save Healthcare Personnel during COVID-19

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               | -                             | -                                |
### International Efforts to Save Healthcare Personnel during COVID-19

| 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                | -                               | -                               |
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-

| 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**

| Reporting Country/Territory/Area | Total confirmed case (20) | Total deaths (20) | Healthcare personnel deaths (21) | Healthcare personnel/total deaths |
|----------------------------------|---------------------------|-------------------|---------------------------------|---------------------------------|
| 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**

| Reporting Country/Territory/Area | Total confirmed case (20) | Total deaths (20) | Healthcare personnel deaths (21) | Healthcare personnel/total deaths |
|----------------------------------|---------------------------|-------------------|---------------------------------|---------------------------------|
| 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.
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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