Editorial

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Interdisciplinary Collaboration between Bench and Bedside in the COVID-19 Pandemic

Hossein Sanjari Moghaddam and Shahin Akhondzadeh *

Psychiatric Research Center, Roozbeh Hospital Tehran University of Medical Sciences, Tehran, Iran

*** Corresponding author:** Shahin Akhondzadeh, Pharm.D., Ph.D., FBPhS, Psychiatric Research Center, Roozbeh Psychiatric Hospital, Tehran University of Medical Sciences, Tehran, Iran
Tel: +98 21 55412222, **Fax:** +98 21 55419113
Email: s.akhond@neda.net
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The World Health Organization (WHO) announced Coronavirus disease (COVID-19) as a pandemic caused by SARS-CoV-2 on 11 March 2020 [1]. SARS-CoV-2 primarily affects the human respiratory system cells. Nonetheless, it has been revealed that other systems, such as the gastrointestinal tract, kidney system, liver, pancreas, eyes, and brain are affected by the virus [2]. The SARS-CoV-2 virus has about 79% and 50% similarity to SARS-CoV and MERS-CoV [3]. However, it caused millions due to the extremely high transmission rate. The complexity of COVID-19 treatment strategies, as compared to SARS-CoV and MERS-CoV, led to a global crisis. As of February 2023, more than 750 million confirmed cases of COVID-19 and 6.8 million deaths have been reported (https://covid19.who.int/). Extremely high rates of death along with no definitive treatment prompted governments and health institutes around the world to establish strict health and social guidelines and develop and mass-produce COVID-19 vaccines in a very short amount of time, leading to a stark reduction in mortality and morbidity due to COVID-19.

The experience from COVID-19 containment and vaccination highlights the important role of interdisciplinary collaboration between bench (virologist, immunologist, epidemiologist, *etc.*) and bedside (healthcare providers and clinicians) [4]. Interdisciplinarity is generally defined as when different disciplines investigate a shared topic/object from different perspectives so that each discipline accents a different aspect of that topic. One of the successful interdisciplinary example is the collaboration between psychiatry and neuroscience [5-10]. We, herein, use the example of the COVID-19 pandemic and its containment using vaccination and clinical guidelines to highlight the role of collaboration between basic and clinical sciences.

Various disciplines, such as clinicians, virologists, immunologist, epidemiologists, physicists, and economists have collaborated closely to overcome the COVID-19 pandemic. For example, the diagnostic tests for confirmation of COVID-19 by clinicians were developed and produced by virologists, whereas clinicians deal with how the virus affect the organs of the human host. Clinicians and immunologists investigated new mechanisms of damage to the lungs and blood clotting in patients with COVID-19, and existing interventions were modified to handle the new virus.

While the clinicians were saving lives in hospitals, preventive measures were implemented by epidemiologists and politicians to impede the most probable routes of transmission. These measures included wearing face masks, washing hands, coughing into elbows, avoiding handshakes, and social distancing. In this regard, physicists investigated what distance would be enough, given the behavior of fluids, to block the transmission of virus.

On the other hand, biomedical researchers at research institutes and pharmaceutical companies produced the fastest-developed vaccines in history. Multiple vaccines with different mechanisms of action, such as messenger RNA (mRNA) vaccine, vector vaccine, and protein subunit vaccine were generated in a short period of time, mass-produced, and distributed among the population [11]. Vaccination of the population led to a stark decrease in mortality and morbidity. In addition to vaccines, several pharmacological interventions such as remdesivir and convalescent plasma were crafted by biomedical researchers, which significantly helped clinicians in their fight against COVID-19.

These experiences confirm that close collaboration between different disciplines helped the community to tackle the COVID-19 pandemic with the least possible cost, mortality, and morbidity.

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