Journal of Biomedical Research & Environmental Sciences
ISSN: 2766-2276
Subject Area(s): CARDIOVASCULAR DISEASES | CLINICAL CARDIOLOGY | PAIN AND RELIEF | ONCOLOGY
EDITORIAL

Multifaceted Medical and Scientific Approaches and the Role of the Public in Combating the COVID-19 Pandemic in the Digital Era

Vijay Mahant*

MediLite, San Diego, CA, USA

EDITORIAL

Epidemics and pandemics have been recurrent in history. One of the worst pandemics in the modern history was the 1918 H1N1 flu ("Spanish flu") that claimed the lives of an estimated 50 million people globally [1]. The current pandemic, a severe acute respiratory syndrome coronavirus (SARS-CoV-2), the etiologic agent of COVID-19, was first reported in the city of Wuhan (China) in December 2019. According to the World Health Organization (WHO), at the time of writing, there were over 84 million confirmed cases and over 1.8 million deaths in 218 countries linked to COVID-19 [2], and the numbers of cases continue to climb globally. The viral transmission has been reported as predominantly horizontal while reports of vertical transmission have been limited [3]. The impact of COVID-19 on morbidity, mortality, lifestyle changes, and trillions of dollars loss in the economy is unprecedented in the modern history. There are significant synergies and a concerted role for multifaceted medical and scientific approaches to be utilized to engage the public in combating COVID-19 effectively.

COVID-19 has led to a spectrum of manifestations in infected persons from being asymptomatic to mild, severe, or even fatal. Some of the major and most common symptoms include: fever, cough, fatigue, loss of taste, loss of smell, diarrhea, and shortness of breath. The risk of the disease severity is known to increase with age, comorbidities such as diabetes, cardiovascular disease, cancer, chronic renal disease, and chronic lung disease, blood type, Chronic Obstructive Pulmonary Disease (COPD), sickle cell anemia, compromised immune system, co-infections and, certain medications such as Angiotensin Converting Enzyme (ACE) inhibitors [4]. The COVID-19 pandemic has resulted in psychological, social, and economic stress in people's lives. The psychological, economic, and social impact on non-COVID-19 patients during the pandemic is just beginning to emerge as evidenced by a recent cohort study at Cleveland Clinic (USA). The cohort study demonstrated [5] that there was a significant increase in Takotsubo syndrome (Stress cardiomyopathy or "broken heart" syndrome) from 1-.5-1.8% range during the pre-pandemic period to 7.8% during the pandemic period. Some of the long-term health implications and complications in COVID-19 infected patients have been reported [6]. It is, however, too early to understand the full impact in about one year history of the pandemic. Some of the long-term pathological conditions include cardiovascular, pulmonary, renal, neurological, and psychiatric conditions or disorders. The SARS-CoV-2 is thus a "formidable combatant"! In the wake of all these health issues, it is thus important to delineate as much about SAR-CoV-2 as possible, including molecular

***Corresponding author**

Vijay Mahant, MediLite, San Diego, CA, USA

Tel: +1-619 -992-3260
E-mail: Vijaymedilite@msn.com

DOI: 10.37871/jbres1179

Submitted: 07 January 2021

Accepted: 08 January 2021

Published: 11 January 2021

Subject: Medicine

Topic & Subtopic(s): Cardiovascular Diseases, Clinical Cardiology, Pain and Relief, Oncology

Keywords
- Artificial Intelligence (AI)
- Big Data
- Cardiovascular Centers for Disease Control and Prevention (CDC)
- Comorbidity
- Coronavirus
- COVID-19
- Diagnostics
- Digital
- HER
- Epidemic
- Neurological
- Pandemic
- PCR; SARS-CoV-2
- Telemedicine; Vaccines
- World Health Organization (WHO)

VOLUME: 2 ISSUE: 1

How to cite this article: Vijay M. Multifaceted Medical and Scientific Approaches and the Role of the Public in Combating the COVID-19 Pandemic in the Digital Era. J Biomed Res Environ Sci. 2021 Jan 11; 2(1): 008-010. doi: 10.37871/jbres1179, Article ID: JBRES1179

pathogenesis, potential viral latency, organotropism, long-term effects, re-infection, transmission and genetic variants.

The impact of the COVID-19 pandemic on the ecological system and the environmental factors such as degradation, air quality, climate, or meteorological factors including temperature are beginning to unveil [7]. The environmental impact of the pandemic may be compounded further due to unregulated potentially hazardous medical waste such as disposal of PPE (Masks and gloves, etc.) globally on an unprecedented scale. The "shedding" of the virus in the sewage system as a potential source of spreading the disease via water and this may thus negatively impact life and the ecology. The pandemic may be the tip of an iceberg that is dynamic and evolving.

The first SARS-CoV-2 genome sequence was released [8] on January 10, 2020. This was a major catalyst in the development of molecular diagnostic tests and therapeutics against the SARS-COV-2, including vaccines. While the diagnostic tools and therapeutics were being developed and/or undergoing (pre) clinical trials, the widespread use of PPE combined with the implementation of measures such as social distancing, and travel restrictions and the use of "online" services and meetings including "COVID-19 Apps" has played a critical role in combating the pandemic. As a result of the Emergency Use Authorization (EUA) as a countermeasure during the current pandemic, there are over two hundred SARS-CoV-2 diagnostic tests (molecular, antigen and serological) [9] and a few therapeutics available for use. The therapeutics under the EUA include COMIRNATY (BNT162B2) by Pfizer-BioNTech [10], mRNA-1273 by Moderna [11], and Casirivimab and Imdevimab by Regeneron Pharmaceuticals [12]. In October 2020, the FDA approved, Veklury (remdesivir) for the treatment of COVID-19 in certain situations [13]. On December the 30th, the British Medicines and Healthcare Products Regulatory Agency (MHRA) approved [14] the vaccine, AZD1222 by AstraZenenca (UK). The approval of the AZD1222 is a major step forward in combating the virus and furthermore, the vaccine is more affordable, easier to transport and store compared with the messenger-RNA-based vaccines. Currently, there are over eight hundred COVID-19 therapeutics [15] being developed worldwide. This includes a single-dose inter-nasal vaccine being developed by Altimmune (USA) [16].

The devastating impact of COVID-19 has nevertheless spawned, revolutionized, transformed and accelerated innovations. Digital medicine and digital services provide technological as well as economical solutions for monitoring and integrating vast amounts of data for addressing health issues confronted by patients and stakeholders. The use of Electronic Health Records (EHR) will play an increasing and a pivotal role during the pandemic and post-COVID-19. Some of the exciting developments and deployments include the use of telemedicine, "big data", Artificial Intelligence (AI), machine learning, the potential use of drones for transportation of medical supplies and collection of specimens (e.g., clinics and airborne microbes such as SARS-CoV-2), including the potential use of satellites for COVID-19-related meteorological applications [17-19]. Some of the other emerging tools and technologies include the medical imaging system such as the "red dot" developed by Behold.ai (UK); it uses an AI algorithm with machine learning for detecting abnormalities with 90% accuracy within 30 seconds in chest X-rays of patients with COVID-19 [20]. Similar AI tools such as the XGBoost and BlueDot with machine learning are being used for diagnosis and for detection of viral outbreaks [21]. The role of nasopharyngeal and oropharyngeal microbiota in immunity, however, is in its infancy. Nevertheless, further studies may provide insight into the viral impact on the "ecosystem", the pathogenesis, the potential role in immunity and the possible role of the microbiota on the outcome of a disease such as the COVID-19 and the recoveries by the infected patients.

The concerted effort by the public and all the stakeholders including the massive infusion of money into the COVID-19 programs by governments, industries, institutes, and charitable organizations such as the Bill and Melinda Gates Foundation has been a "key catalyst" and a shared responsibility for inspiring and fueling the development and deployment of novel technologies, diagnostic tools as well as therapeutics and educational programs.

I look forward to the participation and contribution by researchers, clinicians, scientists including stakeholders on an exciting and an enriching journey together for the global betterment.

References

1. Center for Disease Control. 1918 Pandemic (H1N1 Virus). 2021 January 02.
2. WHO Coronavirus Disease (COVID-19) Dashboard. 2021 January 6.
3. Kotlyar AM, Grechukhina O, Chen A, Popkhadze S, Grimshaw A, Tal O, Taylor HS, Tal R. Vertical transmission of coronavirus disease 2019: a systematic review and meta-analysis. Am J Obstet Gynecol. 2021 Jan;224(1):35-53.e3. doi: 10.1016/j.ajog.2020.07.049. Epub 2020 Jul 31. PMID: 32739398; PMCID: PMC7392880.
4. Azer SA. COVID-19: pathophysiology, diagnosis, complications and investigational therapeutics. New Microbes New Infect. 2020 Sep;37:100738. doi: 10.1016/j.nmni.2020.100738. Epub 2020 Aug 5. PMID: 32834902; PMCID: PMC7403867.
5. Jabri A, Kalra A, Kumar A, Alameh A, Adroja S, Bashir H, Nowacki AS, Shah R, Khubber S, Kanaa'N A, Hedrick DP, Sleik KM, Mehta N, Chung MK, Khot UN, Kapadia SR, Puri R, Reed GW. Incidence of Stress Cardiomyopathy During the Coronavirus Disease 2019 Pandemic. JAMA Netw Open. 2020 Jul 1;3(7):e2014780. doi: 10.1001/jamanetworkopen.2020.14780. PMID: 32644140; PMCID: PMC7348683.
6. Becker RC. Anticipating the long-term cardiovascular effects of COVID-19. J Thromb Thrombolysis. 2020 Sep 3;1–13. doi:10.1007/s11239-020-02266-6. PMID: 32880795; PMCID: PMC7467860.
7. Shakil MH, Munim ZH, Tasnia M, Sarowar S. COVID-19 and the environment: A critical review and research agenda. Sci Total Environ. 2020 Nov 25;745:141022. doi: 10.1016/j.scitotenv.2020.141022. Epub 2020 Jul 17. PMID: 32711074; PMCID: PMC7366970.
8. Paden CR, Tao Y, Queen K, Zhang J, Li Y, Uehara A, Tong S. Rapid, Sensitive, Full-Genome Sequencing of Severe Acute Respiratory Syndrome Coronavirus 2. Emerg

Infect Dis. 2020 Oct;26(10):2401-2405. doi: 10.3201/eid2610.201800. Epub 2020 Jul 1. PMID: 32610037; PMCID: PMC7510745.

9. US Food and Drug Administration. In Vitro Diagnostics EUAs. 2021 January 2.
10. US Food and Drug Administration. Pfizer-BioNTech COVID-19 Vaccine. 2021 January 4.
11. US Food and Drug Administration. Moderna COVID-19 Vaccine. 2021 January 2
12. US Food and Drug Administration. Coronavirus (COVID-19) Update: FDA Authorizes Monoclonal Antibodies for Treatment of COVID-19. 2021 January 4.
13. US Food and Drug Administration. FDA Approves First Treatment for COVID-19. 2020 December 21.
14. AstraZeneca's COVID-19 vaccine authorised for emergency supply in the UK. 2020 December 30.
15. Bio Covid-19 Therapeutic Development Tracker. 2021January 5.
16. Covid Resource Center. 2021 January 4.
17. Bragazzi NL, Dai H, Damiani G, Behzadifar M, Martini M, Wu J. How Big Data and Artificial Intelligence Can Help Better Manage the COVID-19 Pandemic. Int J Environ Res Public Health. 2020 May 2;17(9):3176. doi: 10.3390/ijerph17093176. PMID: 32370204; PMCID: PMC7246824.
18. Reeves JJ, Longhurst CA, San Miguel SJ, Juarez R, Behymer J, Ramotar KM, Maysent P, Scioscia AL, Millen M. Bringing student health and Well-Being onto a health system EHR: the benefits of integration in the COVID-19 era. J Am Coll Health. 2020 Nov 12;1-7. doi: 10.1080/07448481.2020.1843468. Epub ahead of print. PMID: 33180683.
19. Alkhowailed M, Shariq A, Alqossayir F, Alzahrani OA, Rasheed Z, Abdulmonem WAl. Impact of meteorological parameters on COVID-19 pandemic: A comprehensive study from Saudi Arabia. Informatics in Medicine Unlocked.2020;Volume 20:100418. doi: 10.1016/j.imu.2020.100418.
20. US Food and Drug Administration has cleared the use of behold.ai's red dot® algorithm for 'instant triage' in radiology. 2021 January 2.
21. BlueDot for Healthcare. We help protect frontline workers and patients, increase diagnostic acumen, and build organizational resilience. 2021 January 2.
22. Wu HJ, Wu E. The role of gut microbiota in immune homeostasis and autoimmunity. Gut Microbes. 2012 Jan-Feb;3(1):4-14. doi: 10.4161/gmic.19320. Epub 2012 Jan 1. PMID: 22356853; PMCID: PMC3337124.

How to cite this article: Vijay M. Multifaceted Medical and Scientific Approaches and the Role of the Public in Combating the COVID-19 Pandemic in the Digital Era. J Biomed Res Environ Sci. 2021 Jan 11; 2(1): 008-010. doi: 10.37871/jbres1179, Article ID: JBRES1179