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Editorial

COVID-19: a 21st century cataclysmic pandemic



“The Agony and Ecstasy of COVID-19” [1]

The Agony of the COVID-19 pandemic arises from the morbidity and mortality from SARS-CoV-2, including the death of more than four million people worldwide of which about 610,000 were in the United States. For many millions the ecstasy comes from the unprecedented rapid development of multiple vaccines [2,3] with some proving 90% effective in limiting morbidity and mortality [4]. Through this Virtual Special Issue of *Sleep Medicine* international authors summarize information relevant to sleep researchers and clinicians in hopes of advancing the understanding of the biology and pathology of COVID-19 and the response to its impact and threat.

COVID-19 is a highly contagious, airborne viral disease [5], which can spread by human-to-human transmission from asymptomatic to severe cases [6]. Bill Gates considers Covid-19 as a “Once in-a-Century Pandemic” [7]. This is reminiscent of the great 19th century influenza pandemic [8] with a mortality of 2% of the global population (an estimated >50 million people died), thus placing the current Covid-19 pandemic with about 1% [9] mortality between the 1918–1919 pandemic [8] and the influenza pandemic of 1957 [10] that had a mortality rate of 0.6%.

The ongoing COVID-19 pandemic is proving more dangerous than the epidemics of severe acute respiratory syndrome (SARS-CoV-1) of 2002–2003 [11], the Middle East Respiratory Syndrome (MERS) of 2012 [12] or the 2014 Ebola Virus epidemic [13]. An efficient vaccine against COVID-19 [2–4] and an effective specific antiviral therapy are expected to address the SARS-CoV-2 crisis, presuming viral variants do not forestall current progress in disease management. In the meantime, it is essential for all to follow the guidelines recommended by the World Health Organization (WHO) [14] and the Center for Disease Control and Prevention [15], such as properly fitted facial mask, social distancing of a preferred six feet, frequent hand washing, and forgoing unnecessary travel, sizeable indoor gatherings or packed outdoor events [16]. Unfortunately, the conflict between public safety and individual rights has led to political criticisms of these scientifically proven health measures and caused vaccine hesitancy [17]. Without cooperation and collaborations from each of us to contain and defeat this invisible viral enemy, we risk further disruption and potential decay of civilized society.

1. Abbreviated sequence of events of the ongoing pandemic

As highlighted by Li et al. and Peng et al. in this issue, the first case of pneumonia of uncertain etiology occurred sometime in

late 2019 in the city of Wuhan, located in the Hubei Province of China. COVID-19 then spread rapidly to Thailand on January 13, 2020 and later to other parts of Southeast Asia. Countries of Europe and the American continents soon followed [18]. The Chinese CDC first reported about infectivity on January 15, 2020. The International Committee on Taxonomy for Viruses (ICTV) named SARS-CoV-2. On January 15, 2020 the WHO declared the spread of viral pneumonia to be of serious international concern. On February 11, 2020 the WHO named the disease caused by SARS-CoV-2 as COVID-19. On March 11, 2020 the WHO labeled the outbreak a pandemic [18]. On March 16, 2020 the confirmed cases outside China surpassed the number of cases reported in China for the first time. Worldwide there are over 190 million reported cases with over 4 Million deaths and of this writing a resurgence of global cases from multiple variants.

The origin of the virus is still under investigation but was thought to have originated from bats, then transmitted to an unknown animal in Wuhan, and then transmitted to humans, followed by human-to-human spread [18]. It is notable that the great influenza pandemic (incorrectly labeled “Spanish Flu”) of the 19th century was thought to have originated in Romania around 1915–1918 then spreading worldwide. There are anecdotal reports that this viral disease may also have originated elsewhere and then spread by World War I soldiers [8,18].

COVID-19 is an emerging disease with many unknown aspects, including the specifics of its invasion of the body and the brain. As highlighted by the articles in this issue, further study is needed on its pathophysiological mechanisms [Fig. 1], the long-term natural history, factors of infectivity, the long-term immunity following an infection or vaccination as well as the question of recurrence following an initial infection, and the specificity of the positive reverse transcriptase –polymerase chain reaction (RT-PCR) test, particularly for viral variants [19]. The clinical manifestations in most of the cases are mild but the moderate-severe cases carried an early high mortality, particularly significant for the elderly with comorbidities [18–21]. We know that the virus gains access through the epithelium and vascular endothelium of organs that are rich in angiotensin converting enzyme receptor 2 (ACE-R2), creating controversy about the use of ACE inhibitors and angiotensin receptor blockers [18,22–24]. Another clinical question about the interrelationship between obstructive sleep apnea (OSA) and COVID-19 is discussed in the issue articles by Bhat and Chokroverty, Peng et al. and Labarca as has occurred by authors elsewhere [18,25–27]. In this issue Bruni et al. also describe the disturbed sleep in Italian children and adolescents, even as children seemed to be relatively immune to early variants of the

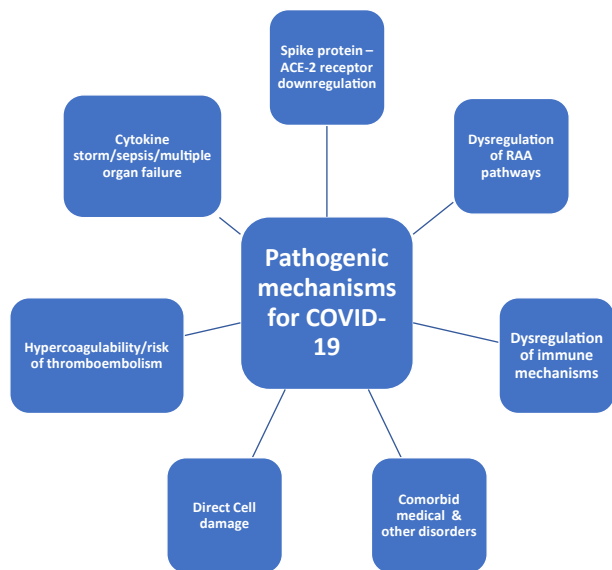


Fig. 1. Pathogenic mechanisms for COVID-19.

coronavirus. More understanding is needed of the very rare, yet potentially fatal, pediatric multisystem inflammatory syndrome that resembles Kawasaki syndrome [28,29].

The clinical manifestations of COVID-19 are protean, affecting predominantly the respiratory and gastrointestinal tracts but may involve multiple organs additionally affecting cardiovascular, renal, endocrine and dermatologic systems [30,31] as well as the central, peripheral and autonomic nervous systems as described by Bhat and Chokroverty and Khatoun, Prasad and Kumar in this issue. Barthorpe and Rogers also review neuropsychiatric manifestations from coronavirus infections between 2003 and 2020. Covered by many authors in this issue, sleep dysfunction is prominent in COVID-19 [see Fig. 2] and related psychobiological and lifestyle changes from the pandemic that include circadian disruption as discussed by Salehinejad and colleagues. The rates of insomnia symptoms have increased by 2-3-fold with reports of acute insomnia during the pandemic as high as 45% [32]. Frontline health care workers have experienced particularly high rates of sleep, depressive and anxiety symptoms [33] as herein discussed by Poppa et al. There is concern about long-term psychological consequences from COVID-19 and pandemic restrictions, potentially increasing rates of suicide and substance abuse [34]. Although

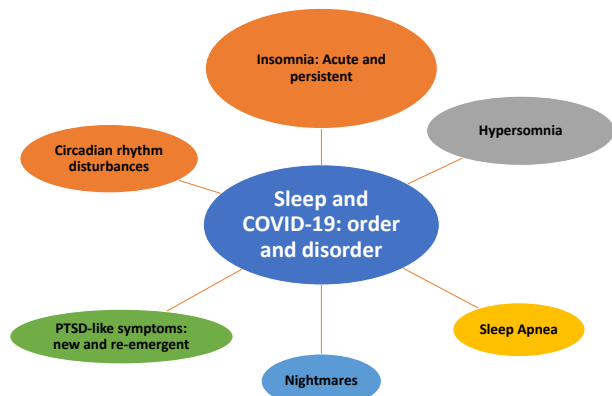


Fig. 2. Sleep and COVID-19: order and disorder.

studies are limited, Becker discusses management of sleep dysfunction during COVID-19.

In summary, this special issue on COVID-19 includes experts in the field who have investigated this novel coronavirus and its multisystem pathophysiology and diagnosis, including management with special emphasis on sleep and psychological dysfunction. The reader will note overlap among several chapters dealing with sleep, psychological and neurological aspects of COVID-19. The guest editors believe that some overlap is acceptable for this very important topic since different readers will focus on the body systems of interest. It is our hope that the issue proves useful to all clinicians dealing with COVID-19 patients whether sleep specialist, internist, family physician, pediatrician, pulmonologist, neurologist, or psychiatrist. Additionally, paramedical personal who are caring for patients may benefit. In addition to the papers by invited authors and introduction to the topic by the guest editors, we have included in this special issue many original sleep-related articles dealing with COVID-19 across the globe. It is our hope that this issue can be considered a comprehensive review of a cataclysmic pandemic with the hope to see it only once in a lifetime.

Conflict of interest

The ICMJE Uniform Disclosure Form for Potential Conflicts of Interest associated with this article can be viewed by clicking on the following link: <https://doi.org/10.1016/j.sleep.2021.08.019>.

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