

## **Long COVID: The Pandemic Aftermath**

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Dr. Rita Smith began her public health career in 1987 at a small, rural Florida County Health Department (CHD). Over the next 5 years, she was given several promotions and became a Family Nurse Practitioner, completing her MSN in 1991 from Florida State University (FSU). After a 25-year break in private practice, she returned to public health in 2017 by taking the position of sole healthcare provider for two small, rural CHDs. In February 2020, she was promoted to Statewide Nursing Director for the Florida Dept of Health (FDOH) where she was immediately activated to the State Emergency Operation Center for the COVID-19 pandemic response where she stayed for 14 months. In her position, she oversees and supports DONs at 67 CHDs in the largest integrated public health system in the nation. Dr. Smith earned a DNP from University of Alabama, Birmingham in 2012, and MPH from FSU in 2021. She is a member of several state and national nursing organizations, including the Association of Public Health Nurses – APHN, promoting and empowering nurses to become healthcare leaders. Along with the Florida Nurses' Association, she represents the FDOH as co-lead for the Nursing Action Coalition of Florida to operationalizes statewide the National Academy of Medicine's report "The Future of Nursing 2020-2030". She is also Adjunct Professor at FSU teaching the Masters level course "Leadership in the Public Health Fields".

## **Long COVID: The Pandemic Aftermath**

There is no single word that can fully describe the impact that COVID-19 has had upon nurses personally or professionally. When the Director of the World Health Organization (WHO) announced on March 11, 2020, that the SARS-CoV-2 (COVID-19) outbreak was the first coronavirus that resulted in a pandemic, he also declared that this public health crisis would touch every sector of individuals' lives (Organization, 2020). At the time, no one realized how prophetic his words would become. With the advent of COVID-19 vaccination, the pandemic direction has undeniably changed, and the sense of relief is almost palpable as people receive inoculation. But for those who still struggle with Long COVID, their battle continues.

Long COVID or Post-Acute Sequelae of SARS-CoV-2 infection (PASC) is receiving more attention from all levels including media, healthcare providers and national leaders. For nursing, especially in public health, the conversation is just beginning but will soon shift as the general public is vaccinated. To help put into perspective where the Long COVID conversation is leading, it is beneficial to reflect upon where we have come.

### **History of COVID-19**

1/5/20 - WHO announced that on December 31, 2019, China reported a cluster of 44 pneumonia cases (11 severely ill) with unknown etiology in Wuhan City (Organization, Pneumonia of unknown cause – China, 2020).

1/12/20 - WHO announced that a novel coronavirus had been identified, that no new cases had been reported, one death had occurred in a person who had underlying health conditions from the original cases (Organization, Novel Coronavirus – China, 2020).

1/20/20 – The first United States (US) case of SARS-CoV-2 infection was identified (Holshue, et al., 2020).

3/1/20 - Florida announces its first cases.

3/11/20 - WHO labels COVID-19 as a pandemic (Balkhair, 2020).

Within barely two months, the world was facing the worst public health crisis in 100 years. However, as a result of the ability to communicate scientific knowledge in a real-time manner, the WHO was able to provide a constantly updated bibliographic database of publications on COVID-19 with more than 5300 publications by April 9, 2020 (Balkhair, 2020). This rapid plethora of literature was a result of an outpouring in preprints (unrefereed manuscripts without peer review)

(Balkhair, 2020). The unparalleled use of preprints had a tremendous impact by fostering the rapid response to characterize the outbreak, identifying SARS-CoV-2 as the causative agent, sharing its genome, and developing diagnostics that were highly specific (Balkhair, 2020). This same method of real-time information sharing proved paramount for treatments, medications, and modalities. As early as mid-March 2020, treatment success was reported as well as suggestions for the introduction of convalescent plasma (Cunningham, Goh, & Koh, 2020).

### **History of Long COVID**

Early 3/2020 - Information concerning long term, persistent symptoms of COVID-19 arose from patients on social media platforms and the term “Long COVID” soon appeared thereafter (Callarda & Perego, 2021).

5/5/20 - The first article of Long COVID to appear in a medical journal, written by a professor of infectious diseases who describes his personal journey of the “constantly shifting, bizarre symptoms and their unpredictable course” (Garner, 2020).

5/11/20 - First research on Long COVID was published (COVID-19, 2020).

6/2020 - Theories concerning the causes of Long COVID surfaced (Iwasaki, 2021).

7/2020 - CDC reported that COVID-19 infections could result in prolonged illness which included young adults without underlying chronic medical conditions (Tenforde, et al., 2020). Fall 2020 - Medical journal articles appear describing Long COVID in a broad range of populations including pediatric patients (Coffey, 2021) and severe syndromes such as a potential persistent brainstem dysfunction was discussed (Yong, 2020).

### **Long COVID Definition**

The National Institute of Health (NIH) announced in February 2021 a major new initiative to study the causes, prevention, and treatment of Long COVID entitled the NIH PASC Initiative (Collins, 2021). The NIH defined “Long COVID” as symptoms that individuals have after a COVID infection which does not resolve fully after a few weeks that can persist for months, ranging from mild to incapacitating and new symptoms can occur after infection or evolve over time. The symptoms NIH listed include fatigue, fever, shortness of breath, sleep disorder, “brain fog”, anxiety, depression, and gastrointestinal symptoms (Collins, 2021). Impacted systems can be multiple and include hematologic, cardiovascular, neuropsychiatric, renal, endocrine, gastrointestinal, hepatobiliary, and dermatologic (Nalbandian, Sehgal, & Wan, 2021). The NIH proposed that this condition should be recognized as Post-Acute Sequelae of SARS-CoV-2 infection (PASC) (Collins, 2021).

Globally, 171 million cases of COVID-19 have been reported as of June 2, 2021 while the US leads with 33 million cases and Florida alone has reported 2.3 million (Center, 2021). It is estimated that approximately 10% of those with COVID-19 infections will have symptoms lasting more than 4 weeks (Greenhalgh, Knight, Court, Buxton, & Husain, 2020; Sudre, et al., 2020; Rajan, Khunti, Alwan, Steves, & Greenhalgh, 2021) while others project 25-35% are impacted (AMA, 2020), indicating millions alone in the US currently have Long COVID.

## **Impact**

In December 2020, a large study was published consisting of 3,762 respondents from 56 countries with self-reported Long COVID (illness lasting over 28 days) (Davis, et al., 2020). Results indicated that respondents reported 205 symptoms in 10 organ systems with 66 symptoms continuing over seven months while those with symptoms greater than six months reported an average of 14 symptoms. The three most frequently reported symptoms were fatigue, post-

exertional malaise, and cognitive dysfunction. Twenty-one percent reported having “severe” or “very severe” symptoms after month six. Eighty-five percent of respondents revealed they coped with cognitive dysfunction or memory loss which were the most persistent of the neurologic systems and were equally reported across all ages, impacting everyday life including decision making, conversation, following instructions and driving. Forty-five percent of respondents required reduced work hours compared to pre-illness and twenty-two percent were unable to work due to their symptoms. The study concluded that Long COVID involved prolonged multisystem effects with significant disability (Davis, et al., 2020).

Since Long COVID can impact multiple organ systems, healthcare providers for Long COVID patients will need to recognize the importance of multidisciplinary approach to treat and care for patients (Davis, et al., 2020; Rajan, Khunti, Alwan, Steves, & Greenhalgh, 2021). Specialists in the areas of Postural Orthostatic Tachycardia Syndrome or POTS, Myalgic Encephalomyelitis/Chronic Fatigue Syndrome and Mast Cell Activation Syndrome may be required since many of the study respondents were diagnosed with these conditions post-illness. The need for rehabilitation medicine experts in the areas of physical, cognitive, and emotional health have also been discussed by other researchers (Mendelson, et al., 2020; Yelin, Margalit, Yahav, Runold, & Bruchfeld, 2020).

The Davis, et al (2020) study indicates that the impact of Long COVID upon employment, selfcare and self-sufficiency can be overwhelming. The study respondents were from a relatively high socioeconomic status and the negative impact Long COVID had on employment and finances was considerable. For those not as fortunate, Long COVID can be devastating especially to ALICE (Asset Limited, Income Constrained, Employed) populations.

Long COVID will cause increase disparity among socioeconomic levels. Lower wage earners will experience inequity in financial stability as they tend to have jobs without sufficient sick leave or leave to care for sick family members, lack savings that can sustain them through difficult financial periods, and jobs that do not offer work accommodations or flexibility. As uninsured or underinsured, the lack of financial resources to seek adequate care coupled with the possibility of lengthy functional disability further decreases the capacity to recover financially from Long COVID. Access to specialist care for those living in medically underserved or rural areas will prove to have difficult barriers to achieve improved health outcomes. Often, lower wage jobs require manual labor instead of sedentary or desk jobs which will inhibit even more the ability to perform since fatigue from physical exertion is a common Long COVID symptom. Short-term disability claims for Long COVID will increase as workers are unable to reenter the workforce successfully or in a timely manner.

## **Future**

As a result of this impending public health crisis, the US Congress has provided the NIH with \$1.15 billion in funding over four years to support research for Long COVID (Collins, 2021). The goals of this research are to determine how SARS-CoV-2 infections led to such extensive and prolonged symptoms as well as to develop prevention and treatment of Long COVID. It is projected that as a result of further study, knowledge of how humans recover from infection will be enhanced and understanding of other chronic post-viral syndromes and autoimmune diseases will be improved (Collins, 2021). Also in February 2021, the WHO (Rajan, Khunti, Alwan, Steves, & Greenhalgh, 2021) produced a Health Systems and Policy Analysis urging the need for policy responses to consider the complexity of Long COVID.

Since the announcement of Long COVID's impact on public health from NIH and the WHO, the public and the medical community awareness has increased. Unfortunately, Long COVID patients often report that their symptoms and complications are not taken seriously (Rajan, Khunti, Alwan, Steves, & Greenhalgh, 2021). Although world and national organizations are looking at Long COVID as an impending public health issue, state and local public health entities' attention is currently focused on COVID prevention and vaccination. With limited financial and workforce resources, the emphasis and impact of Long COVID to public health has yet to be realized at state and local levels.

Prevention of disease is an elemental factor in public health. As the world focuses on vaccination, the message of Long COVID prevention by vaccination should be included and emphasized. Although online and social media support groups for Long COVID have existed for many months, relatively little has been heard in the media or from US public health officials on all levels concerning the potential severity of this condition. Vaccine hesitancy and refusal in the US continues to exist while politics and conflicting scientific views have eroded the population's confidence in public health officials at local, state, and national levels. As the nation embraces recovery, emphasis should shift to Long COVID prevention. Public awareness of Long COVID should focus on the knowledge that Long COVID can occur at any age, is not dependent upon level of infection and can be life altering. To mitigate Long COVID, messaging should also emphasize the continued public health measures of spread prevention and vaccination.

To date, Long COVID symptoms are complex and no concrete testing is available (Rajan, Khunti, Alwan, Steves, & Greenhalgh, 2021). Treatment options are just as allusive. But hope is on the horizon. March 2021 has seen internet articles reporting antidotally that some Long COVID patients are obtaining relief of Long COVID symptoms with the first dose of COVID-19 vaccine

(Fiore, 2021; Goodman, 2021). In December 2020, a biotech company was given permission to conduct phase II clinical trials in the US on a medication that specifically treats inflammation and fibrosis associated with severe Long COVID (McKenzie, 2020). As more research surfaces and understanding of this syndrome occurs, treatment options will soon be available which will decrease the public health burden.

## **Conclusion**

As SARS-CoV-2 burst onto the scene as a major pandemic, little thought was given to this public health crisis going beyond the acute phase. A year later, however, discussion now involves the millions who are now suffering from Long COVID and the lack of knowledge in the areas of etiology, surveillance, diagnosis, and treatment. Technology along with the scientific community's willingness to expand stringent research criteria and boundaries has led to information and therapeutics produced at historical speeds. As a result, international and national leaders in public health are paving the way for research in all areas of Long COVID. As states move from the emergency response in this pandemic to recovery, the issues of Long COVID must be realized as a potential public health issue.

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