



Research Article

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Long COVID-19 Syndrome in The Older Adult: A Review of The Literature

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Abstract

Background: Since its emergence in 2019, the Corona virus known as COVID-19 has continued to produce widespread and seemingly intractable negative impacts on the health and wellbeing of many older adults in all parts of the world.

Objective: This mini review sought to examine, summarize, synthesize, and report on the research base concerning the recently emergent syndrome among COVID-19 survivors termed long or post-acute COVID-19 disease. A second aim was to establish what has been advocated for either preventive or rehabilitation purposes in this regard.

Methods: To identify what is known in this regard, key words such as: Long COVID, COVID-19, Older Adults, Post-acute COVID-19 outcomes, and Elderly were entered into the PUBMED, PubMed Central, and Google Scholar data bases. After examining the available resources, those deemed relevant and meeting the review criteria were carefully read, and analyzed, and described in narrative form.

Results: Collectively, a sizeable percentage of COVID-19 survivors are found to suffer from multiple adverse post-acute COVID-19 health complications for up to a year, but few remedies to counteract these complications have been forthcoming to date.

Conclusion: In addition to continuing to prevent older adults from succumbing to COVID-19 infections, careful follow up of vulnerable older COVID surviving adults are strongly indicated for better addressing their diverse nutritional, physical, life quality, and mental health needs.

Keywords: Coronavirus; COVID -19; Long- COVID -19; Older adults; Prevention

Introduction

Three years ago, in December 2019, the world began to experience the onslaught of a novel Corona virus later termed COVID-19, such that a global pandemic and what has been termed the most profound 'health crisis' of the 21st century rapidly ensued [1]. Now, at the close of 2022, while somewhat attenuated, COVID-19 disease and its variants remain a serious global health concern despite months of study and investigation of its many possible causes, the mechanisms underlying its transmission, as well as effective strategies for its amelioration or prevention. At the same time, a subgroup of older as well as younger adults who

survived one or more acute bouts of COVID-19 disease have now been shown to remain variably impaired physically and mentally by the outcome of COVID-19 disease. now termed 'long or post-acute COVID-19' syndrome [2-4], which can persist for up to one year, and especially among cases in the higher age ranges [5].

This long term or post COVID-19 health condition or syndrome of multiple health complications that may involve multiple persistent residual symptoms and/or delayed or long-term complications beyond 4 weeks from the onset of symptoms, is not necessarily associated with the severity of the initial condition, but

possibly with behavioral or biopsychosocial factors [3], may thus be hard to predict. Although not initially anticipated in 2019 and thereafter, or well understood since its emergence, it appears the long COVID-19 syndrome is commonly associated with multiple symptoms of debility that include, but are not limited to: fatigue, shortness of breath, persistent coughing, joint and chest pain, muscle aches, headaches, and a cognitive condition situation known as 'brain fog' [1, 3, 5-8]. At the same time, although the organ specific COVID-19 disease targets are quite well established [6], why there are long-term effects on physical and leisure time function as well as mood, the symptoms of headaches and sleep disturbances, poor life quality, and worse mental health, and why this occurs among some cases and not others, is unclear and needs to be carefully studied [7, 8]. Moreover, how to anticipate this state and prevent it, as well as how to treat this state once it prevails, including possible symptoms of depression, anxiety, and concentration challenges [7, 8] is currently uncertain at best. However, among the various attributes or mechanisms underpinning the condition may be dietary status and the presence of various suboptimal levels of essential nutrients, the presence of diabetes and obesity, plus pre-clinical depression, and being middle-aged women [9, 10].

This narrative report focuses on what is known about long COVID-19 health attributes, in general, and focuses in particular, on what its presence might mean for many older adults.

Discussed is the 2022 evidence base that has emerged on this issue, and especially with respect to older adults, who are often those with chronic health conditions associated with COVID -19 infection risk. Drawn largely from the PUBMED database, it is hoped the present scoping review can provide the interested reader a general view of current observations as well as current trends in this regard that might be worthy of further consideration and study, as well as applications in the geriatric health care field.

Although a wealth of data now clearly shows that COVID-19 infections, which may occur independently or in conjunction with one or more chronic health conditions, remain of great concern at the end of 2022, especially among vulnerable older adults if they develop post-acute COVID-19 complications, it appears this pandemic outcome was not anticipated. It is thus a very important topic to study because it has now been shown in many instances that the exposure to an acute COVID-19 infection may well induce a variety of aversive long-term health consequences that can raise the risk for second or their COVID-19 infections and a highly disabling life. These include, but are not limited to, symptoms of acute or late-onset endocrine diseases or dysfunction wherein adrenal insufficiency and an accompanying cortisone excess may yet be risk factors for a worse than desired clinical progression and outcome [11]. At the same time, COVID-19 infection exposure also potentially sets the stage for heightening the progression of one or more of the individual's pre-existing clinical conditions [12], including obesity, depression, and anxiety. In turn, unresolved post-acute COVID-19 symptoms may likewise heighten the extent of any prevailing adverse life events and functional losses, that can have an immense bearing on life quality and overall physical and social mobility. While the world awaits the development of a uniformly

efficacious COVID-19 antidote, what can be done to offset the burden of suffering among a sizeable proportion of COVID-19 older surviving adults in the interim remains a key question [7, 13, 14].

Indeed, given that COVID-19 infection and death rates do appear to be notably higher in the older adult than in any other sub group, and long COVID-19 may be mediated in part by possible preexisting psychiatric and other health conditions [14], solutions that are cost effective and timely, as well as more unified research and agreement on the most suitable terminology for describing long COVID across the literature has been discussed [15, 16].

Clearly, very considerable human and economic and social costs can be realized if there is agreed upon evidence of how to improve the physical or mental health status of a high-risk older adult either before or after sustaining a COVID-19 infection.

Building on prior work in this regard, this current overview aimed to examine what if any approach, has the potential to advance the prevention and amelioration of its long-term impacts, especially among those older adults confined to their homes without consistent care. Its secondary aim was to identify gaps in our understanding and to offer recommendations for consideration by clinicians and researchers in the field based on these findings.

Materials and Methods

To obtain the data for this review, the electronic data sources PUBMED, PubMed Central, and Google Scholar were carefully searched. The time period searched ranged from January 1, 2020-December 30, 2022, and the key words included, COVID -19 [syndrome, symptoms, review], long COVID and its management, coronavirus, older adults, and post-acute COVID-19 syndrome. All forms of study or analysis were deemed acceptable. However, because this is an emerging topic, with few clinically sound prospective analyses, and most reports were review articles, no in depth or consistent intervention or clear deterministic approach or set of understandings concerning long term COVID disease could be readily identified. As a result, a scoping narrative summary of all available data including case studies, and uncontrolled observational studies was implemented. Selected material had to focus on facts relevant to long COVID-19 complications, and if possible, among the older adult, rather than children or adolescents. Excluded were articles that did not focus specifically on this set of issues and non-English based articles.

Results

General findings

Of the more than 316,175 publications on COVID -19, published as of December 13, 2022, a total of 21, 788 using the term Long COVID -19, 20, 881 articles potentially relevant to the current topic of long COVID, 5303 were listed using the terms long COVID syndrome, and 7,480 referred to long C OVID-19 symptoms, while 1,284 referred to aspects of rehabilitation when entered into the PUBMED data base. Very few additional articles were found on the additional web sites. Excluded were articles discussing future protocols of therapy or medication in the context of long COVID-19.

Research observations

As per a multitude of current reports detailing the emergence of a long or post-acute COVID-19 syndrome, a complicated array of diverse symptoms is now found to persist to varying degrees for up to one year beyond the acute COVID-19 phase of recovery. Among these symptoms are feelings of persistent fatigue and/or cognitive impairments of a debilitating nature [17-19]. In addition, as in the case of acute COVID-19, long COVID-19 can involve multiple organs and affect many body systems including, but not limited to, the respiratory, cardiovascular, neurological, gastrointestinal, and musculoskeletal systems. Unsurprisingly, Huang et al. [20] found that at six months after acute infection, COVID-19 survivors examined appeared to be most troubled by feelings of fatigue or muscle weakness, sleep difficulties, and anxiety or depression. Patients who were more severely ill during their COVID-19 hospital stay had more severely impaired pulmonary diffusion capacities and abnormal chest imaging manifestations. It has also been shown that COVID-19 survivors can experience residual significant clinical and biochemical alterations that necessitate comprehensive medical care and close follow-up for longer periods than was anticipated at the outset of the pandemic, including deficits in vitamin D levels [21].

Fillipo et al. [22] who updated the main evidence regarding the distinct components of acute and long COVID-19, found the latter characterized by a widespread acute calcium and vitamin D deficiency along with an impaired parathyroid hormone response, and a high prevalence of skeletal complications, such as vertebral fractures. Also reported is poor nutritional status and dynapenia [23].

Efforts to enhance physical health challenges, while seemingly holding potential, remain to be validated [24], may however, fail to impact any prevailing autonomic system complications that have appeared to emerge following a COVID-19 infection [25], along with an array of cognitive deficits, a lowered ability to participate in society, and life quality [26]. In addition, long COVID may foster the possible onset of inflammatory or oxidative stress processes, arthritis, lupus-like disease, muscle inflammation and vasculitis [27], and work and daily functioning limitations even after experiencing only mild COVID-19 [28]. Alterations in immune functioning, fatigue and mood disorders with lower levels of function, shortness of breath and coughing, are also evident among many COVID-19 survivors, even if they were originally healthy and under 60 years of age [29-30]. Factors implicated in the development and maintenance of long COVID complications include, obesity, socioeconomic deprivation, having a smoking history, being female, belonging to an ethnic minority, and having one or more comorbid health condition [31] plus a severe COVID-19 diagnosis [32]. Other reports show prolonged multi system systemic and neurological as well as cognitive health challenges and disability symptoms may prevail for many months after the incident event [33]. Vulnerable cases can also experience new forms of disability, as well as persisting ongoing disability, along with increased feelings of breathlessness, and a reduced life quality, even if they were previously in robust or good health [34].

State of the research

As noted above, the reports documented in this review, which are largely drawn from current reviews that originally stem from limited observational data that employ widely varying protocols, address differing research questions and employ diverse sampling strategies, syndrome definitions and nomenclature, and often small, limited sample sizes, should be viewed with caution, despite their overall consensus that this health issue is a salient topic for further study.

On the other hand, the data are hard to synthesize because some discuss 'brain fog', some quality of life, and others cardiovascular associated implications to name a few.

There are also few distinct articles that differentiate mild, moderate, and severe long-term post COVID health issues or how these correlates with varying degrees of COVID illness outcomes. Most understudied as well seem to be older adults, when one considers their high probable risk of long COVID-19 complications at the severe level for many if they survive an acute COVID or variant infection, and that neuro-psychological, and cardiovascular complications are major findings in most epidemiological studies. In addition, dysfunctional gastrointestinal, endocrine, and metabolic health are recent findings that are likely to exacerbate the health challenges of many post COVID older adult survivors [35]. Many needs of the older adult with this condition remain however to be identified before effective intervention approaches can be devised accordingly. As well, a role for the efficacy of vaccination, which may suggest vaccination before sustaining a COVID-19 infection could reduce the risk of subsequent long-COVID, the impact of vaccination in people with existing long-COVID symptoms remains controversial and is based on the type of vaccine used in the various limited low level study designs [2]. Although it had been reported that it is younger rather than older persons who are at risk for long COVID, perhaps older adults who are suffering from this complication do not recognize it as such because they already suffer from multiple age associated comparable conditions [36], or do not have the strength to visit outpatient services and or do not recognize long COVID as a separate disease entity because they already suffer from multiple age associated comparable conditions. Clearly much more carefully construed study is needed to disentangle the various COVID 19 long term complications that have been identified to date, while unifying terminology [that is, uniting the terms long COVID, COVID-19 syndrome, post-acute COVID-19 and others] and methodologies [currently based largely on low level study design approaches], and enacting rigor in all cases, regardless of approach [37, 38], if the recognized potential for long COVID to produce a second public health crisis on the heels of the pandemic itself is to be averted [39].

Implications

In terms of elder care, the presence of long COVID including its association with the symptom termed 'brain fog', along with excess fatigue, dizziness, muscle pain, a possible memory impairment, plus evidence pointing to a reduced grip strength, gait speed, and cognitive response times and its functional consequences is surely

of great concern to both the patient, their families, and providers, as well as policy makers and public health organizations and others. Consequently, concerted efforts to examine this issue further, and to prevent rather than treat it where possible, especially among vulnerable older adults, the most vulnerable COVID age group, has been consistently advocated [40]. To this end, it appears the current wealth of data that has been generated strongly implies more efforts to unify this body of knowledge and to apply this to the individual case using established models of practice as a guide, especially among females with those adults with preexisting or ongoing neuro-psychiatric diagnoses may be a helpful initial step [41, 42]. At the same time, more emphasis on educating the older adult and others, including community leaders, aging health care organizations, and public health policy makers about the persistent need to prevent COVID infections among the older population as an essential upstream strategy appears imperative [43].

In the meantime, it is apparent that the variously described long COVID-19 symptoms may also be limited or poorly categorized, despite their quite significant prevalence because groups studied include widespread age ranges and oftentimes unknown health status indicators [44]. Moreover, those older adults with a history of one or more preexisting comorbidities who have experienced severe COVID-19 illness manifestations and are deemed especially at risk for acquiring persistent long COVID neurological manifestations and other negative health correlates such as breathlessness, anxiety and fatigue, poor sleep, [45-47] have not been studied in any rigorous manner to date. Hence, it seems probable that the emergence of new long COVID cases will persist for some time, while the demand for long term follow up specialist assessments and early and persistent holistic support and rehabilitation interventions will not lessen in any tangible way if no concerted interdisciplinary global advancements are made in this realm.

At the same time, other possible negative outcomes of COVID-19 illness among older adults that have received limited attention, should not be overlooked, and may include post-acute COVID impacts on preventable falls, further infection risk, or adverse cardiovascular events [47, 48], especially given that individuals testing negative for COVID-19 can still acquire the long COVID symptoms. and what we know stems from responses entered smartphones or via telephone and may not include older adults with limited technical skills, access, language attributes, hearing impairments, and cognitive challenges. In addition, it cannot be assumed all older adults have the ability to articulate sensory and/or sub-acute musculoskeletal manifestations or symptoms found to be more prevalent with age [49-51] and among those with preexisting comorbidities [52], especially obesity [53].

Also at increased risk are those older COVID survivors facing socioeconomic inequities that may sustain worse mental health outcomes [54] plus reduced wellbeing, chronic pain, fatigue, multiple musculoskeletal challenges, and financial hardships. Most vulnerable here appear to be those older adults who live alone, are frail, or acquire frailty or excess body weight, rather than

demonstrating post-acute COVID-19 recovery and resilience [55-58].

Discussion

In addition to modern medicine being unable to eradicate COVID-19 disease to date, even more concerning in 2022 is the increasing evidence of a broad set of findings that recovery from acute COVID-19 disease is often attenuated and associated with multiple symptoms of ill health that may preside for up to one year after the initial infection. In particular, most vulnerable in this respect are older adults, especially those with preexisting health conditions. Moreover, even if they survive an acute COVID illness, they are still susceptible to the onset of one or more new comorbid health conditions [52]. However, unlike most common chronic conditions found in the older adult population, there are currently very limited means for ameliorating the multiple attributes and disabling signs associated with the immense burden of long COVID-19 distress that has been described.

At the same time, and even though this scoping review strove to include multiple data bases and earnestly tried to access articles that would provide insight in this regard, multiple searches revealed most articles were largely reviews of the prevailing limited clinical evidence collected from limited samples over a short-term period. Very few provided clinical data on the long COVID presence among older surviving populations in any realm and issues that would be expected to uniquely impact this large group of individuals, such as prior frailty, alcoholism, cardiovascular disease, asthma, diabetes, obesity, or chronic pain were largely missing from this body of emerging knowledge [59-61]. While this may be because the older surviving COVID adult is not able to attribute their lack or slow post-acute COVID recovery attributes to COVID disease readily, or may have limited ability to do this, especially if they suffer from 'brain fog' or inadvertently lack the ability to communicate technologically, among other factors, the need to continue to study all aspects of the condition is unquestionable [62].

Since there is no cure for COVID-19 to date, and vaccines that are universally efficacious may take years to develop and test, geriatric providers and others are currently urged to do all they can to work upstream to combat exposure to prevailing or emerging COVID variants among their older clients, as well as through their social networks and younger family members and service providers who may infect them inadvertently. In addition, helping all older clients in a tailored manner to initiate and maintain optimally healthy lifestyles, including helping them to access psychiatric services as needed, regardless of whether they have had COVID disease or not appears strongly indicated among those who cannot adapt readily to their life-changing circumstances, and possible intolerance of uncertainty, loneliness and absence of desired levels of social support that influence the mental health status of the older adult as well as their wellbeing to a higher degree than among controls who are not infected [63]. Those universities or colleges helping to train providers need to ensure that they are up to date on COVID mitigation approaches, as well as COVID illness consequences, including its impact on aging, as well as on its multiple biological

and social consequences. Establishing who is likely to be most at risk and what can be done to ensure effective primary, secondary, and tertiary prevention approaches for older adults of varying ages are put in place is currently essential in this regard given the immense social and societal costs of failing to do this effectively. Researchers, on the other hand, can play a very salient role here by electing to conduct long-term follow up studies of older adult populations with and without long COVID complications [beyond one year, for example], and to thereby highlight more ably what is needed and why, and especially to assist policy makers and aging societies and others to update their understandings of resource needs of the older adult in the post-acute COVID era.

Older adults themselves must be encouraged to be more proactive towards their own health and become educated about how they can help to minimize their health risks and COVID complications and foster their own health and possible independence rather than dependence, even if they did not acquire COVID illness symptoms to date [59]. For example, they may be deconditioned as a result of social isolation, anxious for many reasons. They may be frail or obese, and more physically challenged than desirable, and may have encountered possible ageist hospital policies and others, plus the allocation of resources to those requiring acute COVID care, rather than long term rehabilitation [59]. Authors here tend to agree that those older adults and others with persistent and diverse multiple long term post-acute COVID complications have multiple care needs that must be met holistically and optimally until a cure prevails [60, 61].

Humphrey [63], who examined the lived experiences of 18 COVID survivors that included some older adults found four themes to emerge, 1) how participants struggled with their drastically reduced physical function, compounded by the cognitive and psychological effects of their long COVID symptoms; 2) challenges associated with finding and interpreting advice about physical activity that was appropriately tailored; 3) individual barriers to managing symptoms including fatigue and 'brain fog'; and a battle with their self-concept and ability to accept their reduced level of function (even temporarily) and the fear of a permanent reduction in physical and cognitive ability, all implying much remains to be learned and carefully considered to avert excess health declines.

In sum, much work is urgently needed in the realm of caring for the older adult at risk for COVID disease and its possible adverse repercussions that threaten life quality and the limits of social resources that drive health care practices.

By contrast, until more concerted research and practice efforts are made, it appears safe to conclude that:

1. Many older adults may experience long COVID-19 complications that jeopardize their life quality.
2. More comprehensive case studies of both acute COVID-19 and its emergent diverse long COVID-19 symptoms and mechanisms are strongly desirable.
3. Efforts to isolate older adults socially or to alter health practices that unequally redirect funds and services they

require will yield hardship and immense overall social costs for all.

4. Carefully construed multi-pronged personalized evidence-based rehabilitation approaches and long term follow up of the older surviving COVID-19 disease, as well as continued public health measures and resources, are strongly warranted.

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Conflicts of Interest

None.

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