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Clinical Review Article

Examining the Mental Health Impact: Investigating the Association between Suicide and Long Covid Syndrome

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ABSTRACT

Since its emergence in late 2019, Covid-19 has had many devastating economic, social, mental, and physical health consequences and caused millions of deaths worldwide over the course of the pandemic. While most cases are mild and symptoms resolve within a couple of weeks, some Covid patients' symptoms can last for multiple weeks, months, or even years after contracting the virus, and these long-lasting symptoms have been identified as Long-Covid. Psychiatric symptoms have been associated with Long-Covid in addition to physical symptoms, and impaired cognitive functioning, sleep abnormalities, depression, anxiety, PTSD, and psychosis have been observed in Long-Covid patients. Given the ties between suicide and mental health, particularly during the Covid-19 pandemic, suicide should be a concern for patients with Long-Covid; however, there are limited studies focused on this issue. This review aims to elucidate the connection between Long-Covid and suicide risk and provide a helpful resource to providers treating Long-Covid patients.

INTRODUCTION

The coronavirus disease 2019, commonly referred to as Covid-19, was declared a global pandemic on March 11, 2020, by the World Health Organization. Since its emergence in Wuhan, China in December of 2019, it has had many devastating economic, as well as social, mental, and physical health effects. Although it is no longer in a global emergency state as of May 2023, there have been more than 760,000,000 confirmed cases worldwide and nearly 7 million deaths since the start of the pandemic.[1,2] This brief literature review aims to examine the connection between Long-Covid and suicide risk as well as act as a helpful resource to providers treating Long-Covid patients.

The virus had varied patient clinical presentations, ranging from patients who are completely asymptomatic to those with severe complications leading to death. Severe symptoms include pneumonia, respiratory failure, liver and kidney damage, acute heart failure, encephalopathy, and others; while more common, mild symptoms include fever, body aches, cough, dyspnea, and fatigue.[3] In addition to acute cases of Covid-19, some patients' symptoms were shown to last for weeks, months, or even years after contracting the virus. These long-lasting symptoms have been identified using several different terms, such as Long-Covid, long-haul Covid, Post-Covid-19 conditions, Chronic Covid, and post-acute sequelae of SARS-CoV-2 (PASC).[4] Long-Covid symptoms can appear even if the patient was asymptomatic to start, and Long-Covid symptoms might also differ from those presented at initial diagnosis of Covid-19.[4] Post-Covid symptoms are varied and have commonly included fatigue, headaches, dyspnea, chest pain, anxiety, and depression.[3]

Notable for this brief literature review are the psychiatric symptoms associated with Long-Covid. Impaired cognitive functioning, sleep abnormalities, depression, anxiety, post-traumatic stress dis-

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order (PTSD), and psychosis have been some of the clinical presentations observed in Long-Covid patients[3]. Given the ties between suicide and mental health, particularly during the Covid-19 pandemic, suicide is an important concern for patients with Long-Covid.[5-7] Numerous studies across the globe have looked at suicide rates in the context of the Covid-19 pandemic, analyzing both suicide rates amongst Covid-19 patients and amongst the general population, given the emotional and mental toll that preventative measures have taken on the community.[7] The purpose of this review is to focus specifically on Long-Covid and its association with suicide.

METHODS

For this brief literature review, a thorough database search was performed on June 12, 2023, using the PubMed and Google Scholar databases. The databases were used to query for terms including "long COVID-19", "post-COVID syndrome", "chronic COVID", and "suicide", which yielded a total of 290 search results.

Database articles were then screened for duplications and further assessed through their title and abstract to review the inclusion of these articles. Articles included in this review met the following inclusion criteria: 1) articles published in the English language with full text available, 2) articles published between March 2020 to June 2023, and 3) articles describing suicide related events such as suicide ideation and suicide attempts in association with Long-Covid-19. Studies were excluded when the study objective or inclusion criteria were not met. In addition, articles classified as book chapters, reviews, commentaries, and opinions were excluded from this review. The full texts of the remaining articles following the screening were further examined, and a final of six sources were chosen.

DISCUSSION

Diagnostic Criteria of Long-Covid

Long-Covid has emerged as a significant and complex health issue following the global Covid-19 pandemic. While the acute phase of Covid-19 primarily manifests as a respiratory illness, current evidence suggests that patients may continue to experience persistent symptoms and functional limitations even after the initial infection has resolved. Long-Covid reportedly involves a broad spectrum of symptoms that may affect multiple organ systems, indicating that there is a systemic rather than localized disease process.[4] Due to the absence of a universally accepted time frame for diagnosis, many studies have various definitions of Long-Covid. Most of the studies have defined Long-Covid as persistent symptoms lasting 3 or more months after first contracting the virus.[8] Thus, the chronic nature of Long-Covid has profound implications for healthcare resource allocation, patient management, and quality of life.

Long-Covid can affect individuals of all age groups; however, there are disagreements among studies regarding the identification of distinct age patterns associated with Long-Covid. For instance, one CDC study showed that older adults exhibit a lower likelihood of experiencing Long-Covid symptoms compared to younger adults. In addition, it was found that there are three times as many individuals with Long-Covid between the ages of 50 and 59 compared to those aged 80 and older.[9] Conversely, a separate study by Bull-Otterson found that the risk of Long-Covid increases with age where older adults have a higher probability of developing at least one long term health issue compared to younger adults.[10]

In addition, several factors have been found to potentially increase the risk of developing Long-Covid. Individuals who were hospitalized for severe acute Covid-19 were more likely to experience persistent symptoms during the post-acute phase. Other factors associated with increased risk of developing Long-Covid included female sex, pre-existing comorbidities such as obesity, diabetes, cardiovascular disease, and respiratory conditions, as well as not being fully vaccinated for COVID-19.[11-13]

Physical burden of Long-Covid increases Suicide

Two of the studies in this review quantified the physical burden of Long-Covid and drew similar conclusions. A greater number of physical Long-Covid symptoms were associated with higher suicide risk in patients, where suicide risk was evaluated with the Mini International Neuropsychiatric Interview (MINI).[14-15] In the study by Simonetti et al, the at-risk suicide group, those scoring on the MINI suicidal subscale, had an average of 6.05 Long-Covid symptoms compared to 3.70 in the non-risk group (SD ± 3.83 and ± 3.12 respectively, $p<0.001$).[14] The study by Gasnier et al. reached a similar conclusion utilizing the same MINI assessment. The number of long-covid symptoms was found to be significantly higher in patients with suicide risk, and significantly higher in patients with a psychiatric disorder, compared to those patients with no current psychiatric disorder nor psychiatric history, which included any suicidal ideations.[15]

The above association between large physical burden and suicide risk in Long-Covid patients aligns with experiences of patients suffering from other chronic

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illnesses. The physical limitations resulting from the disease, such as chronic pain, the inability to perform daily activities or enjoyed hobbies, and inability to work have been shown to increase the risk of suicide ideation and attempts.[16-18] Qualitative results from interviews with Long-Covid patients corroborate these findings. A study by Samper-Pardo et al. reported that due to their physically debilitating Long-Covid symptoms, patients often "mourn" the loss of their previous level of physical ability and activity, which has led to their suicidal ideations. The loss of a job due to physical limitations also contributed to feelings of depression and suicidal ideations.[19] These responses from Long-Covid patients match those from patients of other poorly understood chronic illnesses who also reported suicidal ideations, such as myalgic encephalomyelitis and chronic fatigue syndrome, and even show similarities to patients with more severe chronic diagnosis such as multiple sclerosis and stage 5 chronic kidney disease.[17-18] Covid-19 depressive symptoms are related to the inflammatory response to the viral infection and to the psychological burden of the infection.[20]

More studies will be needed concerning the relationship between the physical burden of Long-Covid and suicide risk and given the similarity to the existing literature on many other chronic illnesses and suicide risk. Initiation of a psychiatric evaluation as well as care of long-covid patients with multiple physical symptoms would be very important.

Long-Covid association with Depression and Anxiety increases suicide risk

Further exploring the link between Long-Covid and suicide, several papers in this review highlighted the links between Long-Covid and psychiatric conditions such as depression, anxiety, and PTSD. Goodman et al. showed that depression, anxiety and PTSD were significantly correlated to Long-Covid, and higher rates of these diagnoses were seen amongst Long-Covid patients compared to those patients who only had acute Covid-19. Of all participants (n = 655), 28.33% presented with both Long-Covid and depression ($p = 0.001$), 47.06% with Long-Covid and anxiety ($p<0.001$), and 38.7% with PTSD.[21] It has been previously established that these three psychiatric disorders are each independently associated with increased rates of suicide.[22-24] Goodman et al. reported a significant relationship between suicide risk and Long-Covid, with nearly a quarter of Long-Covid patients who were surveyed reporting suicidal ideations.[21]

Simonetti et al. were narrower in their focus and only included patients with Long-Covid; no comparisons were made to acute Covid-19 patients. Instead, they compared suicide risk (SUI) to no suicide risk (NON-SUI) in Long-Covid subjects using MINI examination and looked for differing rates of anxiety and depression. Out of 1588 subjects, 41 (2.6%) had suicidal risk. Within that SUI group, 87.8% had major depressive disorder (MDD). Comparing the SUI group to the non-risk group, the suicide risk group had significantly higher scores on the Hamilton anxiety scale (HAM-A), Hamilton rating scale for depression (HAM-D), and the Koukopoulos mixed depression rating scale (KMDRS).[14] Higher prevalence of depression and anxiety is observed in Long-Covid patients with quantitative suicide risk. Samper-Pardo et al. provided qualitative support for these findings. In interviews with participants still suffering from Long-Covid fifteen months after acute diagnosis, all patients attributed their subjective decrease in mental health and emotional well-being to Long-Covid. Anxiety and depression symptoms, as well as suicidal ideation, were expressed during group interviews.[19]

Psychiatric History as a Risk-Factor

Among the articles included in this review only two studies and two case reports included information on Long-Covid patients' psychiatric history, and with differing conclusions. One study conducted by Simonetti et al. shows a link between personal and family psychiatric history and suicide risk in individuals with Long-Covid. The investigators classified patients (n = 1588) as either SUI or NON-SUI, for suicide risk or no suicide risk, respectively. Amongst the SUI group, 31.7% had personal psychiatric history compared to 8.5% in the non-risk group (p-value <0.001). When looking at family psychiatric history the same disparity is observed, with the suicide risk group having a significantly higher prevalence of previous family psychiatric illness compared to the non-risk group (22% compared to 8.9%, p-value 0.004). The in-group differences were examined, but no significant differences were found in personal psychiatric history prevalence between subjects classified as "high risk" (n=22, MINI score $\geq$ 6) according to the study or "low risk" (n=19, MINI score < 5). It is important to note the small sample size of the SUI group (n=41) compared to the NON-SUI group (n=1547) when considering the data.[14]

The case report in this review contradicts the link between suicide risk and previous psychiatric history by highlighting an extreme case where a patient with no psychiatric history attempted suicide after being discharged from the hospital following acute Covid-19 treatment. The report details an individual

with Long-Covid symptoms of tinnitus, headaches, fatigue, and memory issues who developed suicidal ideations and eventually attempted violent suicide nearly a year after his Covid hospitalization.[25] While this case does not serve to contradict the first study's findings because it only represents one patient's personal experience, it does highlight that even individuals without the risk factor of psychiatric history are susceptible to delayed yet life threatening mental illness resulting from Covid-19.

Implications for Care and Future Research Directions

In terms of care, two studies in this review had findings that suggest psychotherapy is an effective treatment in lowering suicide risk in Long-Covid patients. Qualitative findings report improved mental health from depressed Long-Covid patients attending psychotherapy and data showed subjects with a low suicide risk were more likely to attend psychotherapy than those at high risk.[14,19] Based on these results, psychotherapy can be recommended to Long-Covid patients suffering with depression and to those already with suicidal ideation, plans, or attempts. As stated previously, this review found a correlation between an increased number of physical complaints due to Long-Covid and an increased risk of suicide. Therefore, it is recommended that psychiatric evaluation be prioritized for Long-Covid patients presenting with multiple physical symptoms.

Assessing this psychopathology and to provide treatment as soon as possible to reduce the disease burden and disability will be an important goal. However, there are very few studies that are available to show the outcomes of pharmacological intervention for post-Covid-19 depressive symptoms.[20] Patients living with Long-Covid for over a year reported experiencing social stigmatization, lack of understanding, and discrimination from peers and even from healthcare providers, which patients have perceived as contributing to their poorer mental health outcomes.[19]

Overall, as an increasing number of individuals are diagnosed with Long-Covid, more research should be focused on identifying effective treatments for these patients; particularly, in relation to improving their mental health outcomes. Further examination of the role of psychiatric history as a potential risk factor for suicidal ideation and attempts among those with Long-Covid may provide valuable insights into tailored risk assessments and intervention approaches. Investigating the efficacy of existing interventions such as pharmacotherapy and multidisciplinary rehabilitation programs can help in the development of evidence-based treatment guidelines for these patients. In addition, exploring alternative therapeutic modalities such as telemedicine may help expand access to needed care and support.

Limitations

While this brief literature review suggests an association between suicide risk and Long-Covid, it is necessary to discuss the limitations of this study which temper that conclusion. Firstly, when examining the relationship between Long-Covid and suicide, it is crucial to similarly consider the increased number of external stressors due to the COVID-19 pandemic that are identified to be potential risk factors for suicide. These factors include unemployment, financial insecurity, social isolation, loneliness, as well as increased incidence of domestic violence and alcohol consumption.[26-28] These multi-factorial risk factors for suicide make it harder to clearly define a relationship between Long-Covid illness and suicide risk.

Secondly, there were limitations concerning the studies themselves. A lack of a universal definition of Long-Covid makes it harder to confidently compare data across studies. The length of time that symptoms had to remain in order to be considered Long-Covid varied with each study included in this review. More studies concerning Long-Covid, and suicide would need to be done to determine the role that the duration of Long-Covid symptoms plays in suicide risk. Additionally, the limitation of small sample size pertains to all the data in this review concerning psychiatric history and so more studies would have to be done to define a link between psychiatric history and suicide risk in Long-Covid patients.

CONCLUSION

The negative mental health impact that Long-Covid has had on patients is starting to become more evident. Despite limitations in the sample sizes of current studies, as well as no standardized time frame for a Long-Covid diagnosis, the mental health consequences, including suicide risk, of Long-Covid are seen in the literature surrounding these patients. We recommend depression screening who have had a prolonged recovery from Covid. More studies should be conducted on a larger scale to further support the association between Long-Covid and suicide, as well as identify the trajectory of mental health outcomes of patients with this chronic condition. Long-Covid is an increasingly significant and complex issue where prioritizing the prevention, management, and treatment of its mental health consequences, especially suicide related occurrences, are crucial moving forward.

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