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# The Trilemma of Today's Aging Population in the Time of Pandemic – A Case Series of Pre-existing Psychiatric Illness and Cognitive Deficits, COVID-19, and Further Cognitive Decline

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## Abstract

Care for geriatric patients can be difficult due to the complex nature of age-related comorbidities, multiple medications, and cognitive decline-this hardship multiplies when psychiatric illness or dementia are present and often exacerbates existing issues. Millions of lives have been lost in the COVID pandemic, and it has also severely harmed our collective mental health and cognition. The elderly population has felt this impact the greatest as they are at the highest risk of isolation, cognitive inactivity, loneliness, and depression, all of which are risk factors for dementia. Studies associate loneliness with a 40% increase in the risk of dementia; thus, this pandemic and resulting isolation have likely caused an increase in cognition loss of the elderly. Further, there is a documented bidirectional relationship between COVID-19 and psychiatric illness, both of which increase the likelihood of the other and are associated with worsening mental cognition. We present a case series of two patients with pre-existing psychiatric illness and cognitive decline, both exacerbated by COVID-19 infection, causing further decline in cognition.

**Keywords:** COVID-19, Cognitive Deficits, Psychiatric Illness

## Introduction

According to the World Health Organization, as of March 19, 2022, COVID-19 has infected 464 million people worldwide and taken the lives of 6 million. This pandemic has ebbed and flowed for several years now and, despite our best efforts, continues to affect our lives in meaningful ways. Much attention and resources have been devoted to understanding this virus; we have developed novel treatments and vaccines in record time. However, we know that immunocompromised patients, older patients, and those with numerous co-morbidities are at the most significant risk of infection and death from COVID-19. This article presents a case series of patients already affected by chronic psychiatric illness with some baseline cognitive deficits who develop COVID-19 and the cognitive decline they face.

This trilemma of chronic psychosis with cognitive deficits, COVID-19, and the resulting damage-causing further cognitive decline is a scenario that is neither rare nor complicated. The CDC estimates that about 5.8 million people in the United States alone have Alzheimer's and related dementias, 5.6 million old er than age 65 [1]. Risk factors for dementia include diabetes, hypertension, obesity, depression, cognitive inactivity, and low educational attainment [2]. There exists a large market of pharmaceuticals for the treatment of dementia, some of which aim to slow down the progression of the disease, others that are pharmaceutical cognitive enhancers, or nootropics, that improve cognition [3], though there is no cure for dementia. It is easy to understand how this pandemic and the isolation endured could be linked to increased rates of depression and cognitive inactivity. In fact, some studies associate loneliness with a 40% increased risk of dementia [4]. We present two case studies that illustrate a COVID-19 infection resulting in cognitive decline in those with some level of cognitive impairment associated with chronic psychosis.

## Case Presentation

### Case Presentation 1

The patient is a morbidly obese 65-year-old Caucasian female with PMH of recurrent pulmonary embolism, hyperlipidemia, and asthma with a history of psychosis with prior inpatient hospitalization several years ago. She presented to the Emergency Department (ED) for a psychiatric eval from the local sheriff's office brought in by her family with complaints of confusion and inability to complete activities of daily life (ADLs). She had delusions of her family being dead and had been making remarks on social media that her sister had committed suicide. All of these were refuted by other family members, including her son. She has a family history of Alzheimer's dementia and bipolar disorder. While she was hospitalized for the treatment of psychosis, she tested positive for COVID-19. There was a significant worsening in her sensorium, and she became delirious and agitated. Further neurological evaluation was done, including EEG and MRI. EEG showed diffuse slowing suggestive of diffuse cerebral dysfunction or diffuse encephalopathy. MRI showed no appreciable disease, and the common causes of delirium were ruled out. She remained entirely confused, oriented only to name, and responding to internal stimuli through her 31 days stay at the hospital despite using multiple as-needed antipsychotics (haloperidol and ziprasidone). She was eventually discharged to a long-term care facility.

### Case Presentation 2

The patient is a 65-year-old Caucasian female with PMH of hypertension, hyperlipidemia, myasthenia gravis, COPD, and chronic schizophrenia who presented to the ED from a rehab facility due to recurrent falls. She was medically stabilized over three weeks and discharged only to return a day later due to aggressive and violent behaviors and to test positive for COVID-19. On this admission, she was delirious and incoherent, responding to internal stimuli and requiring soft physical restraints. She remained delirious and confused and began refusing to eat or take oral medications. She had evidence of cerebral atrophy on CT. She required the use of three antipsychotics (olanzapine, haloperidol, and clozapine) and valproic acid. Antipsychotics were given to her mostly intramuscularly because of severe agitation and refusal to take oral pills. She had severe executive dysfunction, disinhibited behavior throughout her stay, and mainly perseverated on religion and Jesus Christ. There was a subsequent decline in her functioning that accompanied poor oral intake. She required tube feeding and was briefly intubated due to respiratory collapse related to COVID-19. She had a prolonged recovery course but remained delirious, not being oriented to her situation and lacking any degree of insight and only some improvement in agitation. She was eventually discharged to long-term nursing care as her family was unable to take care of her. This case again highlights the worsening cognition leading to delirium in a patient who had pre-existing chronic psychosis and mild cognitive impairment.

## Discussion

Special attention is required when caring for geriatric patients as they commonly have multiple co-morbid conditions and are often treated with numerous medications. Care has been especially difficult during the COVID pandemic, as our elderly population was disproportionately affected. The mortality rate of COVID among the elderly was drastically higher globally. The SARS-CoV-2 virus has itself been linked to psychosis, particularly schizophrenia-like illnesses, though the underlying pathogenesis is unclear [5]. The virus alone is not responsible for the vast increase in mental illness diagnoses in our elderly, as this pandemic has caused damage economically and physically as well. This includes increased rates of unemployment, homelessness, relationship breakdowns, domestic abuse, and social isolation [6]. Many countries took herculean efforts to shield their elderly populations from the virus by isolation. Unfortunately, isolation, too, is associated with many physical and mental health issues, such as vascular and neurological diseases and premature mortality [7]. The factors above, and many more, show how complex and difficult it has been to balance public health and mental health during this pandemic. Though there are few FDA approved medications to treat the symptoms of Alzheimer's dementia such as the cholinesterase inhibitors galantamine, rivastigmine, and donepezil and the NMDA antagonist memantine [8], there are not any currently approved medications to stop the progression of the disease. The patients we present above give specific examples of this difficulty, and to how these mental and physical health conditions are interconnected.

The patients presented here had multiple medical co-morbidities, chronic psychosis, and some level of baseline cognitive decline or dementia. Both cases exemplify the effect of COVID-19 on both chronic psychosis and cognitive decline. They had a precipitous drop in further cognitive functioning, and we portend that this drop is associated with infection of SARS-CoV-2 causing COVID-19. There is some evidence that SARS CoV-2 virus can directly access and cause damage to the neurons in addition to the cascade of stress responses and activation of pro-inflammatory cytokines [9]. A bidirectional relationship exists between COVID 19 and psychiatric illnesses, as demonstrated in Figure 1. Depression and dementia are well-recognized risk factors associated with increased rates of COVID-19 hospitalizations and deaths [10]. Dementia and worsening functional status are associated with COVID-19; in fact, some have suggested that worsening dementia be considered an early sign of COVID-19 infection [11]. The incidence of psychiatric conditions is also increased in those infected with COVID-19 during the first 14-90 days at 18.1%, including 5.8% that was a first diagnosis [12]. Though our patients had baseline cognition issues, these rapidly worsened following COVID-19 infection.

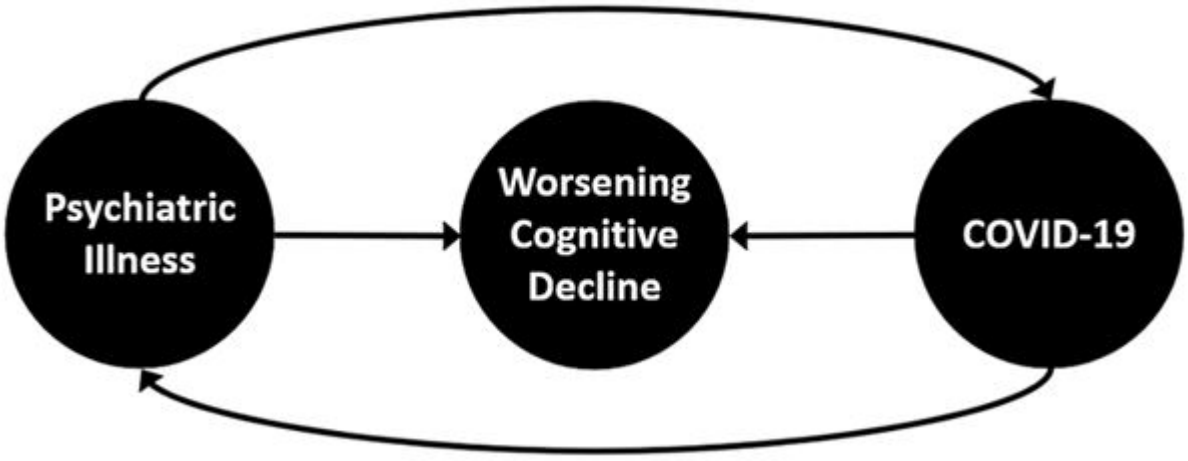


**Figure 1:** Example of the bidirectional relationship of psychiatric illness and COVID-19, both of which are associated with worsening cognitive decline

## Conclusions

Until the vaccination rate for all nations is high, there is no doubt that there will be more variants of the SARS-CoV-2 virus that causes COVID-19. We have learned many lessons during this time, but what remains clear is the vulnerability of the elderly. Infection of this virus has consequences, and it appears that mental cognition takes a significant and long lasting (if not permanent) loss. Dementia is a frustrating condition that causes financial, mental, and emotional stress for patients and for family members and healthcare staff. It has been challenging to balance isolation to protect from the virus against the mental health damage incurred from this isolation. As more variants inevitably arise, it is of the utmost importance that we begin to understand and identify how COVID-19 affects cognition in the elderly to narrow our focus on who is at the highest risk. These are compelling reasons to increase mental health outreach before the next wave of infections.

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