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**Treatment in Geriatric Mental Health:
Research in Action**

COVID-19 Associated Suicidal Ideation in Older Adults: Two Case Reports With a Review of the Literature

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ABSTRACT

The COVID-19 pandemic may profoundly harm the mental health and emotional well-being of many older adults. Public health interventions to minimize the spread of the virus have had the unintended consequences of worsening social isolation, financial stress, and unemployment. Results of early research efforts assessing the impact of these interventions on the mental health of older adults have been mixed. Available findings suggest that a subset of community-dwelling older adults have been less negatively impacted than younger adults, while people of color, the poor, residents of nursing homes and other communal living environments, and those living with dementia and their caregivers are more likely to suffer from COVID-related health problems. This manuscript describes two older adults for whom COVID-19 associated stresses caused significant worsening in their psychiatric illnesses, including the emergence of suicidal ideation, summarizes the literature on the impact of interactions between psychosocial stresses and biological factors on the mental health and well-being of older adults, and discusses interventions to help older adults whose mental health has worsened due to COVID-19. Timely and accurate diagnosis, prompt provision of individualized care using both pharmacologic and psychotherapeutic interventions, adoption of new technologies that permit care to be provided safely at a distance and which allow for virtual social interactions, coupled with ongoing advocacy for policy changes that address significant health care disparities and provide older adults continued access to health care and relief from financial hardship, will help older adults remaining as healthy as possible during the pandemic. (Am J Geriatr Psychiatry 2021; ■■■:■■■-■■■)

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INTRODUCTION

Global research efforts regarding the various effects that coronavirus disease (COVID-19) may have on physical health are rapidly expanding. There is also increasing awareness that COVID-19 also has the potential to profoundly harm mental health and emotional well-being. Scientific studies of prior major viral outbreaks, including the influenza pandemic of 1918 and the SARS epidemic in 2003, reveal a significant increase in suicide deaths during those time periods.^{1,2,3} Additional data regarding other large-scale disasters (e.g., natural disasters, incidents of mass violence) have also demonstrated subsequent increases in a variety of mental health conditions including depression, anxiety, post-traumatic stress disorder (PTSD), and substance use disorders.^{4,5}

The potential impact of COVID-19 on mental health may be just as serious as its potential effects on physical health. Public health interventions aimed at minimizing the spread of COVID-19, including quarantining, closure of businesses and community institutions, and physical distancing have had the unintended consequences of increasing social isolation, financial stress, and unemployment. Additional sources of stress specifically associated with the pandemic include the 24/7 media coverage of the pandemic, the disturbing images of people and communities in crisis, the mandates for physical distancing, other transmission risk reduction measures, and awareness that panic buying had depleted stores of essential items.

Given their significant baseline rates of social isolation and loneliness, dependence on caregivers, medical comorbidity and disability,^{6,7} older adults may be especially vulnerable to both the common and the unique stresses triggered by a large-scale national crisis. Emerging data suggests, however, that the impact of a public health crisis or other large-scale disaster on mental health may vary according to age group in an unexpected way. For example, a study conducted during the SARS epidemic by Yeung et al. (2007), found that older adults coped better with the stresses associated with the epidemic than those who were younger.⁸ A systematic review of the literature by Xiong et al. (2020) included the identification of risk factors associated with psychological distress during the COVID-19 pandemic and produced a similar

finding: younger rather than older age conveyed an increased risk.⁹ The risk factors identified were: female gender, frequent exposure to social media and/or news coverage concerning COVID-19, presence of chronic and/or psychiatric illnesses, student status, unemployment and younger age group defined as being 40 years of age or younger.⁹ A recently published opinion in JAMA summarizes three studies conducted during the COVID-19 pandemic of community-dwelling older adults all of which demonstrated older versus younger adults experienced lower rates of anxiety, depression and PTSD and less negative and more positive affect, as well as more positive daily events despite similar self-reported levels of stress.¹⁰ A study of older adults conducted in the Netherlands provided evidence that the pandemic increased loneliness but measurements of mental health remained unchanged.¹¹ Another recent study involving 73 older adults with a history of pre-existing major depressive disorder found that these individuals exhibited resilience to the stress associated with social isolation and were more concerned about the risk of contracting the virus.¹²

In this manuscript, the authors: 1) report two cases of older adults who experienced significant worsening in their pre-existing psychiatric illnesses, including the emergence of suicidal ideation (SI), as a result of common and COVID-19-specific stresses; 2) summarize the literature on the impact of interactions between psychosocial stresses and biological factors on the mental health and well-being of older adults and 3) discuss a spectrum of interventions to help older adults whose mental health has been impacted by COVID-19.

IMPACT OF COVID-19 TRANSMISSION RISK REDUCTION MANDATES ON THE OPERATION OF THE GEROPSYCHIATRY INPATIENT UNIT

Prior to the novel coronavirus pandemic, family members and friends, with rare exceptions, were encouraged to visit their loved ones hospitalized on the 14-bed, university-based, secured, geriatric psychiatry inpatient unit where the patients described in this manuscript received care. Students of various disciplines – medical, nursing, occupational therapy, psychology, social work – complete clinical rotations on the inpatient unit. Legal proceedings concerning

involuntary care take place on the unit, or in-person at the county courthouse.

As the CDC guidelines to reduce the transmission of COVID-19 evolved, leaders of the health system periodically revised COVID-19 transmission risk reduction policies and procedures. Among the first precautionary measures to limit COVID-19 exposure, all patients, staff and visitors were screened for typical symptoms of COVID-19 (e.g., cough, fever, shortness of breath, loss of sense of taste or smell) prior to entering the unit. As the number of cases in the local area escalated, in-person visitation was eliminated and clinical rotations for students and house staff were suspended. The care that had been previously been provided by these team members shifted to other team members and significantly lengthened their workday. As soon as sufficient COVID-19 testing supplies were available, only patients who obtained a negative COVID test result while receiving care in the emergency department were allowed admission to the geropsychiatry unit.

After implementation of the new policies and procedures, with three exceptions, patients could have live communications with their family members and friends only by telephone or by limited video conferencing and were unable to interact physically with them. In three instances, a hospitalized patient was allowed in person support from a friend or family member as long as the support person screened negative for COVID symptoms at the visitor's entrance to the hospital and was willing to wear personal protective equipment (PPE). The exceptions were: 1) a woman in labor; 2) a patient actively dying; and 3) a patient undergoing a same-day surgical procedure requiring general anesthesia which requires a chaperone due to potential lingering effects from anesthesia.

Separation from family members and friends while hospitalized heightened pre-existing feelings of loneliness, seclusion, and abandonment. Members of the interprofessional treatment team provided family meetings via conference calls and regularly updated family members using telephone calls and secure emails and text messages. Physician team members quickly learned how to conduct over the phone the often challenging, but necessary, conversations related to code status, end of life, goals of care and need for hospice services.

As access to PPE improved, all staff members were required to wear masks and face shields or protective eyeglasses. Patients were also encouraged, but not

required, to wear masks, especially if doing so triggered anxiety or agitation. PPE use by staff members presented new challenges in communicating with older patients living with hearing loss. In addition to muffling voices, wearing masks prevented the use of lip reading and facial expression when conversing and increased the frequency of requests for team members to speak more loudly, while requests to lower their masks could not be obliged. Wearing PPE also interfered with virtual communications with family members and friends of patients who were also living with hearing loss and whenever possible arranged to have these in locations where PPE was not required.

Treatment team meetings and legal proceedings that had previously been conducted as a large group in a conference room were converted to telephone or Zoom conferences with only the patient, physician and a member of the nursing staff physically present. This change in meeting format impeded communication among treatment team members. Similarly, the virtual legal proceedings were challenging for older patients who had difficulty communicating using the telephone or Zoom equipment, or had difficulty understanding the legal process, especially without a legally mandated advocate being physically present.

During their admission, several patients, like the two highlighted below, began ECT treatments, which take place in the post-anesthesia care unit. Members of the health system leadership included ECT among the services considered essential and needing to continue. As a precaution, COVID testing within 72 hours of the procedure was required for patients even if they had a negative COVID test immediately prior to admission. Robust COVID-19 screening via testing continues to be a critical component that has allowed resumption of care to continue. In addition to the mandatory testing in the ED prior to admission to the geropsychiatry inpatient unit, those patients who undergo ECT receive two additional COVID tests separated by 3 days. If all three tests are negative, then no additional testing is required during the inpatient portion of a patient's ECT course. If a patient continues ECT on an outpatient basis, documentation of a negative COVID test must be obtained within 72 hours of an ECT session. Arranging and confirming adherence to these testing procedures are now a routine step that occurs at the beginning of each patient's ECT session.

In addition, concurrent with the implementation of a mandatory state-wide shelter-in-place order, entry

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to the hospital was restricted to only two entrances, one exclusively for visitors and one exclusively for hospital staff and employees. At each entrance, individuals are actively screened for COVID symptoms. As soon as COVID testing supplies permitted, a mandatory weekly testing program for all staff and faculty members was implemented and remains ongoing.

Discharge planning was and continues to be impacted significantly by COVID-19 and, in turn, has increased the workload for team members, particularly for the unit social workers. By requirement, patients are retested for COVID-19 prior to placement. Some residential facilities altogether halted new admissions for an extended period after the pandemic began, and others required new admissions to be quarantined for fourteen days. In addition, many of the community resources to which patients would normally be referred were either unable to accommodate new patients, or provided only virtual programming. More recently, some of these practices have been discontinued or moderated but delays in post-hospital placements related to COVID-19 continue to prolong hospital stays, increasing the risk for persisting or worsening psychiatric illness and associated costs to the health system.

CASE DESCRIPTIONS

Case 1

Mr. A is a 66-year-old divorced man with a history of major depressive disorder admitted voluntarily for treatment of depression symptoms, including SI. He had been contemplating suicide by overdosing on medication, parking his car on train tracks or using a firearm to take his life. Since the onset of shelter-in-place precautions, he had become distressed by social isolation and feelings of loneliness and acknowledged misusing sedating medications such as tramadol and lorazepam. In addition, chronic knee and shoulder pain had worsened since his outpatient physical therapy appointments were cancelled due to COVID-19. For the previous approximately 10 years, his primary care provider had been treating him for depression with duloxetine 60 mg daily. He provided a history of one prior inpatient psychiatric admission 5 years ago after a suicide attempt by cutting his wrists.

Mr. A had been living alone and did not have close social contacts except he described good relationships with his sister and his two adult sons, each of whom

live more than a 1-hour drive from him. Due to physical distancing precautions, these family members stopped visiting him in person. He did not have the equipment (e.g., a webcam) necessary for any form of virtual interactions with video. His sister reported that he had been experiencing financial stress following the loss of his job as a grocery store clerk about 6 months previously. His chronic medical conditions (and associated treatment, if any) included: Type 1 diabetes mellitus (insulin pump); stage III chronic kidney disease; hypertension (lisinopril); iron deficiency (ferrous sulfate); and hyperlipidemia (atorvastatin).

A geriatric medicine consultant found no significant physical exam findings. On the Montreal Cognitive Assessment (MoCA) he scored 25 of 30 with deficits in delayed recall.¹³ Routine laboratory studies revealed iron deficiency anemia; an HbA1c elevated to 8.6%; and vitamin D insufficiency. He received an endocrinology consultation for optimization of his diabetes care, physical therapy (PT) to help with his chronic pain and the geriatric medicine consultant prescribed supplemental cholecalciferol. The patient's psychiatric treatment included incremental titration of duloxetine to 120 mg daily, augmentation with aripiprazole 5 mg daily, and nine ECT sessions. He was encouraged to keep in close contact with his family and he asked for them for help with his living expenses.

During his hospitalization, his physical pain improved, and his depressive symptoms, including his SI, completely resolved. His score on the Montgomery-Asberg Depression Rating Scale decreased from a pre-ECT score of 44 of 60 to a post ECT score 2 of 60 ECT.⁸ He declined the recommendation to enroll in an intensive outpatient program which had transitioned to only virtual services, but he did agree to a telepsychiatry outpatient clinic appointment scheduled for 3 days after discharge. When contacted by one of the authors (DDS), 30 days after his discharge, he stated that he was feeling "Fine. I feel like a whole different person. I feel like I have this big monkey off of my back." He had successfully moved to a less expensive apartment and his sister confirmed that he was not experiencing any problematic psychiatric symptoms.

Case 2

Ms. B is a 66-year-old woman with a history of schizoaffective disorder who was admitted for worsening depression and anxiety. She reported having SI

with thoughts of wanting to overdose on medications. These symptoms began worsening after her home health provider (who assisted with hygiene, housekeeping and meal preparation and was her primary social support) fell ill from COVID and was unable to see the patient for the several weeks which preceded this hospitalization. The patient was housebound due to limitations in her mobility related to severe osteoarthritis. She described feeling “trapped” after the COVID-19 shelter-in-place precautions worsened her isolation and prevented her from attending activities at her church. Ms. A had a history of numerous prior inpatient psychiatric hospitalizations for depression, several of which were associated with suicide attempts by medication overdose.

During one psychiatric hospitalization, a course of ECT was helpful. Following that hospitalization, she remained on a combination SSRI/SNRI, divalproex and haloperidol managed by her primary care physician. In 2019, due to concerns for akathisia, haloperidol was transitioned to risperidone and she was prescribed gabapentin for anxiety. Her medications at the time of the admission reported here were: risperidone 1 mg twice daily, mirtazapine 45 mg at bedtime, divalproex 500 mg twice daily, and gabapentin 300 mg three times daily.

The patient’s medical problems (current associated treatment) included supraventricular tachycardia and chronic diastolic heart failure (metoprolol), and osteoarthritis pain affecting the patient’s knees and lumbar spine (gabapentin). Ms. B had no family members living in the area, was estranged from her two sisters, and had very limited social support and had been receiving in-home supportive services for years.

A geriatric medicine consultant found no significant physical exam findings. During her mental status exam there was no evidence of delusions, hallucinations, or disorganized thought process. Routine laboratory studies showed hypophosphatemia, which corrected with oral supplementation but were otherwise all within normal limits. Her valproic acid level was within therapeutic range at 58 ug/mL [therapeutic range: 50–125 ug/mL]. Urinalysis revealed trace protein, 1+ ketones, no nitrites, 75 leuk/uL of leukocyte esterase, and 3-5 WBC/HPF.

Her initial treatment included continuation of her pre-admission psychiatric medication regimen and a 7-day course of cephalexin for an uncomplicated urinary tract infection. Shortly after admission, her SI

subsided. She attributed this to feeling safe in the hospital. She consented to ECT and after only three bitemporal ECT treatments – during each of which the patient had therapeutic seizures – she declined additional ECT treatments. Her MADRS score improved from 34 of 60 to 14 of 60. She discharged to her home with home health care provided by nurses wearing full PPE and with a virtual outpatient psychiatry appointment in two weeks. At this appointment, Ms. B did not endorse SI or other symptoms of depression. She did express concern about anxiety related to continued social isolation at home and feeling that she required additional assistance with activities of daily living (ADLs). Subsequently, she continued to keep virtual outpatient psychiatric visits securely arranged through her electronic medical record.

LITERATURE REVIEW AND DISCUSSION

There are a number of factors to suggest that COVID-19 may have a significant impact on mental health at a population level. Reger et al. notes that in 2018, age-adjusted suicide rates in the United States hit their highest level since 1941, and that COVID-19 is now occurring within this context.¹⁴ Additional factors identified that could exacerbate suicide risk include increased social isolation, economic stress, greater difficulty accessing mental healthcare, rising firearms sales, national anxiety partially driven by 24/7 media coverage, and closure of schools, religious institutions, and community centers to achieve physical distancing mandates.^{14,15} Although older adults may be especially vulnerable to a number of these stressors due to high baseline levels of social isolation and loneliness, medical comorbidity, physical disability, and dependence on caregivers,^{6,7} recently published research has found that COVID’s negative impact on the mental health of community-dwelling older adults is less than in younger adults.¹⁰

Psychosocial Factors

Social Isolation

Even before the COVID-19 pandemic emerged, social isolation and loneliness were known to be serious and pervasive issues for older adults, with

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profound impacts on emotional, physical, and functional health. Pre-existing limited social engagement and loneliness, magnified by COVID-19, contributed to the development of symptoms in both of the patients presented here. Mr. A decompensated after five weeks of social isolation from his family members. COVID-19 resulted in the loss of Ms. B's access to a caregiver and to her local church group meetings which were her only sources of regular social interactions.

Older adults are uniquely vulnerable to the unintended, but potentially harmful, mental health consequences of social distancing and quarantining during COVID-19.¹⁶ Approximately 29% of community-dwelling (approximately 13.3 million) older adults currently live alone.¹⁷ Additionally, up to 53%–57% of adults greater than the age of 60 report regularly experiencing loneliness.¹⁸ In addition to support from volunteers and social service programs, many older adults rely on professional caregivers for both healthcare and social needs. For some older adults, their primary social contacts may be outside their homes at local community centers, houses of worship, doctors' offices or daycare centers, as was also the case for Ms. B. Older adults experiencing chronic loneliness were found to attend physician visits to a significantly greater extent than older adults who were not. For this group of patients, healthcare appointments may be a primary source of social interactions and support.¹⁸ Although the availability of COVID-19 vaccinations and lower rates of new COVID-19 infections have recently led to easing of physical distancing and shelter-in-place orders, the persisting closure of, or reduced access to, these and other similar venues because of physical distancing orders, are likely to exacerbate social isolation and loneliness among older adults.¹⁶

Loneliness and social isolation have been shown to be key predictors of perceived stress and late-life depressive symptoms in older adults.^{19,20} In a longitudinal analysis of data collected from 3005 participants in the National Social Life, Health, and Aging Project (NSHAP), Santini et al. found that in adults aged 57 to 85 years, social disconnectedness and perceived isolation were significantly associated with higher risk of depressive and anxiety symptoms.²¹ Loneliness has also been significantly associated with poorer functional status, lower self-efficacy beliefs, and cognitive deficits.^{22,23} In addition, loneliness has been linked to a variety of adverse physical health

outcomes, including impaired sleep and daytime dysfunction, increased vascular resistance and blood pressure, greater physical decline and functional limitations, and an even higher mortality risk.²⁴ An estimated 162,000 deaths in the United States annually can be attributed to social isolation and low social support.^{25,26}

Worsening of depressive symptoms in older adults during the COVID-19 pandemic may have potentially deadly consequences. After five weeks of social isolation, Mr. A presented with acutely decompensated depression and active SI with several potential plans. Prior data from the SARS viral epidemic in 2003 found that in older adults above the age of 65, suicide rates increased by 31.7% compared to the previous year, with the peak of suicide deaths coinciding with the majority of the SARS cases in April 2003.¹ Compared to younger populations, older adults are significantly more likely to act on suicidal thoughts and complete suicide. The ratio of suicide attempts to completed suicides in older adults is 4:1, while in the general population the ratio ranges from 8:1 to 33:1, and is 200:1 in adolescents.²⁰ Previous literature has found that older adults with suicidal thoughts were found to use more lethal means, and suicidal deaths in older patients reflected greater levels of planning and intent compared to younger patients.²⁷

Financial Stress

Financial strain has been identified as one of the most robust predictors of perceived stress in older adults¹⁹ and decline in financial security has been one of the most frequently cited stressful life events in the older adult population.²⁷ These factors were especially pertinent for Mr. A, whose mental health began deteriorating soon after losing his job, and who reported significant anxiety and stress from his uncertain financial situation. His fears that COVID-19 would make it even more difficult to find a new job compounded his symptoms of anxiety and depression.

Up to 30.1 to 42.0% of older Americans live 200% or more below the poverty level, which amounts to approximately 15 to 21 million older adults.²⁸ Research studies have revealed that older adults with financial strain are at a higher risk of persistent depressive symptoms, lower self-rated health, and higher levels of functional impairment.²⁹ In fact, it has been demonstrated that in adults above the age of

50, higher frequency of financial hardship was a significant predictor of higher mortality rates.³⁰ Lower incomes in older adults increase the risk of various forms of hardship, including food insecurity and skipped meals, difficulty paying bills, and needing to ration medications.³¹

The COVID-19 pandemic has had a profoundly negative impact on the United States economy. Prior to the significant spread of COVID-19 in the United States, the unemployment rate in January 2020 was less than 4%. Over the course of the COVID-19 pandemic, however, the unemployment rate increased to 14.7% in April 2020 with 20.5 million jobs lost that month, resulting in the highest unemployment rate recorded by the United States. Bureau of Labor Statistics since 1948.³² In February 2021, both the unemployment rate of 6.2%, and the number of unemployed persons (10.0 million) were both much lower than their April 2020 highs, but remain well above their prepandemic levels in February 2020 of 3.5% and 5.7 million, respectively.³³

Although many older adults are retired, a significant percentage of older Americans continue to participate in the workforce, including 26.8% of adults between the ages of 65–74, and the labor force participation rate (LFPR) among older adults has been consistently increasing since the 1990s. For adults between the ages of 65–74 for example, the LFPR is projected to increase to 30.2% by 2026. Possible reasons for this include the desire to accumulate more savings, less availability of defined-benefit pensions, and decline in availability of employer-sponsored retiree health insurance.^{34,35}

Older adults also depend on retirement savings for income, however, it is estimated that the value of retirement account balances have decreased significantly in the context of the COVID-19 pandemic, including a reduction of 10.1% for adults in their 60s. The financial hardship brought on by COVID-19 is significant enough that up to 1 in 4 retired older adults have reported an increased risk of needing to return to the workforce.³⁶ Research has additionally found that economic recessions can have significant impacts on mental health, increasing the risk of symptoms of depression, generalized anxiety, panic, and substance use disorders.³⁷ Moreover, a preponderance of literature suggests that unemployment is associated with increased suicide rates, and that rates of suicide are higher during times of economic

recession, including the Great Recession of 2007–2009 in the United States.^{38,39,40,41}

Resilience to Psychosocial Stress in Older Adults

A potential protective factor for older adults during the COVID-19 pandemic is possibly having greater inherent resilience to psychosocial stressors compared with younger adults.

Resilience is generally considered in the literature to be the capacity to withstand and recover from significant stressors. There is an established body of evidence indicating that older adults may have more well-developed social and emotional regulation, due to accrued life experiences and greater experience resolving negative stressors and managing daily social problems.⁴²

Research shows that overall emotional well-being consistently increases with age in patients through their sixties, and that compared to younger adults, older adults have lower rates of anxiety and depressive disorders, lower levels of anger and distress, and increased levels of life satisfaction. Additionally, studies have found that older adults show an age-related shift in focus towards positive information called the "positivity effect," where they appraise and remember events more positively, and are less likely to dwell on negative information compared to younger adults.^{42,43} Possible explanations for these findings include socioemotional selectivity theory, which posits that as adults age and awareness of time horizons increases, they discard peripheral social ties, favor smaller, but more intimate and meaningful social networks, and place greater value on emotional well-being. This shift in priorities appears to have mental health benefits and leads to higher levels of life satisfaction in older adults.⁴²

There is also evidence that in response to disasters, older adults may display greater levels of resilience. Studies have found that in the aftermath of disasters, older adults experienced less distress, maintained higher levels of psychological, social, and emotional well-being, and scored higher on measures of resilience.^{44,45} Possible explanatory theories for these findings include *maturation theory*, which argues that older adults are less reactive to stressful life events due to more mature coping skills they have developed through life experiences, which protect them from emotional distress.⁴⁴ Another relevant explanation is

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inoculation theory, which argues that for older adults, previous live experience with disasters provides inoculation against strong emotional reactions to other disasters.^{44,45}

There is conflicting evidence, however, with some research arguing that older adults may actually be more vulnerable to psychosocial stress from major events like disasters.

Resource theory argues that older adults have weaker functional capacity and generally lower socioeconomic status, which may make it more difficult for them to recover from stressful life events.⁴³ To this point, a meta-analysis conducted by Parker et al. found that in the aftermath of natural disasters, older adults were more than twice as likely to experience PTSD symptoms and at a significantly elevated risk of adjustment disorders compared to younger adults.⁴⁶ In addition, research has shown that age-related advantages for older adults in social and emotional functioning may not be accessible in situations with unavoidable negative events and prolonged exposure to stressors, primarily because they may be unable to employ their usual means of managing distress, such as engaging in thoughts and behaviors that help them navigate around high, sustained levels of emotional arousal. Social isolation, in particular, has been identified as causing major disruption to the mental health of older adults in situations associated with inescapable and prolonged stress.⁴²

With regard to the COVID-19 pandemic specifically, research regarding its impact on geriatric mental health is ongoing. Hamm and colleagues recently performed a mixed-methods study assessing the impact of COVID-19 on older adults with pre-existing depression both qualitatively and quantitatively. During the first two months of the pandemic, interviews of 73 community-dwelling older adults found that many displayed a resilient response and reported coping well, and that PHQ-9 scores⁴⁷ were not significantly different from pre-pandemic levels. This study, however, also found that the majority of patients did report decreased quality of life and many reported worry that their mental health would suffer with continued isolation. Hamm et al. noted that their findings may represent a “honeymoon phase” of disaster response, and that long-term mental health follow-up is critical given that the COVID-19 pandemic has been impacting older adults in the United States for over a year and its end is not yet certain.¹²

Given the scope and length of the ongoing COVID-19 health crisis, the psychosocial stress imparted upon older adults may be significant and prolonged enough to overcome mechanisms of resilience in these patients. For Mr. A, although he benefited from having a number of positive relationships with his adult children and sister, prolonged social isolation eventually contributed to the onset of depressive symptoms. For Ms. B, her social network prior to the pandemic was already limited as she relied greatly on her caregiver and church activities for social support. When COVID-19 eliminated these opportunities, her mental health deteriorated.

One possible explanation for the divergent findings regarding the impact of COVID-19, and other similar national crises, on the health and well-being of older adults may be found in attempts to assess the impact of variables like community versus communal living environments (e.g., nursing homes), the presence or absence of pre-existing psychiatric illness including dementia, socioeconomic status and other health disparities. The CDC has reported that the better than expected mental health impact that has so far been observed, notwithstanding, members of under-represented minorities or households with lower incomes, and those who are unpaid caregivers are at increased risk of negative health outcomes.⁴⁸

Biological Factors

A growing body of published research has demonstrated that stress is associated with a variety of biological changes that may increase the risk of depression, and that older adults may be more vulnerable to these physiologic changes.

Stress-Induced Neuroinflammation

Stress can cause neuronal atrophy, decreased synaptic density, decreased neurogenesis, and loss of glia in the medial prefrontal cortex (mPFC) and hippocampus, the brain regions that help control emotion, mood, and cognition. Moreover, these neurobiological changes have been shown to be associated with core symptoms of depression.⁴⁹

One possible mechanism by which stress may induce neuronal atrophy in the mPFC is through the activation of innate immune receptors including Toll-like receptors 2 and 4, which, in turn, induce

proinflammatory cytokines IL-1 α and TNF- α in mPFC microglia and lead to subsequent neuronal atrophy. This process is significantly associated with stress-induced behaviors characteristic of depression, including social avoidance and anhedonia.⁵⁰

Additional mechanisms through which stress may increase the risk of depressive symptoms on a neurobiological level include increasing levels of additional proinflammatory cytokines including IL-6 and IFN- γ , dysregulation of other brain regions related to emotion circuitry such as the amygdala and dorsal anterior cingulate cortex, and excess activation of the hypothalamic-pituitary-adrenal (HPA) axis.⁵¹ Notably, research has shown that, when young, stress-induced changes in the structure and function of the PFC may not be permanent, but aging has been associated with decreased plasticity and decreased neuronal resilience to potentially harmful stress-induced changes in the PFC, including shrinkage and decreased synaptic density through loss of dendritic spines.⁵² This evidence suggests that stress-induced neurobiological changes are more likely to have a lasting impact in older patients.

The Influence of Comorbid Neurodegenerative Disease

Neither of the patients described here demonstrated signs of cognitive impairment or dementia during their respective admissions, however, the prevalence of neurodegenerative disorders increases with advancing age and, when present, have the potential to significantly impact the ability of an older adult to adapt to the stress, anxiety and changes arising from the COVID-19 pandemic. Neurodegenerative diseases, such as Alzheimer's disease (AD), can disrupt neural circuits involved in mediating and regulating stress responses, an outcome that can in turn influence emotion and behavior.⁵³ Depression has been noted to be a prevalent symptom in a variety of neurodegenerative diseases, including AD, Parkinson's disease, and Huntington's disease. It is hypothesized that disruption of the HPA axis may play a causative role in mediating depression in patients with neurodegenerative diseases. Studies have found that in AD, an increased concentration of beta amyloid plaques induces HPA axis hyperactivation, which has been well-documented to be associated with depression.⁵⁴

The relationship between depression and dementia may be bidirectional. Barnes et al. found in a retrospective cohort study of over thirteen thousand patients that late-life depressive symptoms were associated with a two-fold increase in AD risk and 3-fold increase in vascular dementia risk.⁵⁵ It has also been hypothesized that depressed mood may represent a prodromal neuropsychiatric symptom in patients that are progressing towards dementia.^{54,55}

The Influence of Comorbid Medical Illness

Both of the patients described in this article had chronic medical illnesses. Mr. A had a history of type I diabetes. A growing body of literature suggests that metabolic and cardiovascular disease may be associated with an increased risk of depression. Anderson et al. performed a meta-analysis in which they found that the odds of depression in patients with diabetes was double that of nondiabetic patients.⁵⁶ Additional evidence supports that metabolic syndrome is associated with an increased likelihood of affective disorders such as depression and anxiety.^{57,58} Concurrently, mental health disorders such as depression, bipolar disorder, and schizophrenia have been associated with an increased risk of metabolic syndrome, likely due to side effects secondary to medications such as first and second generation antipsychotics.⁵⁸

Whether a causal relationship exists between metabolic disorders such as diabetes and depression is an area of active research, although increasing evidence suggests that type 2 diabetes and depression may share certain etiologic mechanisms, including chronic inflammation and dysfunction of the HPA axis. Type 2 diabetes is associated with an approximately 20% increased risk of depression. Elevated levels of proinflammatory cytokines such as IL-1, IL-6, and TNF have been associated with increased insulin resistance in type 2 diabetes, as well as increased oxidative stress in the brain, reduced serotonin production, and depression. Additionally, dysfunctional hyperactivity of the HPA axis has been associated with hypercortisolemia-induced insulin resistance, metabolic syndrome, and type 2 diabetes as well as decreased neurogenesis in the hippocampus and depression. Although research has found that patients with type 1 diabetes can have worsened depressive symptoms, research regarding a potential shared biological mechanism remains limited.⁵⁹

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Ms. B had a history of chronic heart failure and supraventricular tachycardia. Evidence of a causal relationship between heart failure and depression has yet to be demonstrated. The prevalence of depression in heart failure patients, however, is higher than in the general population, and increases with New York Heart Association (NYHA) functional class, ranging from 11% in NYHA class I to 42% in NYHA class IV. Additionally, clinical outcomes in heart failure patients with depression are worse, and there is evidence of biological interrelationships between depression and heart failure. Depression may be associated with increased dysregulation of the autonomic system, increased circulation of stress hormones such as cortisol, and as previously noted, increased levels of pro-inflammatory cytokines such as IL-6 and TNF, all of which may have an adverse effect on heart failure.⁶⁰

The Influence of Pre-Existing Mental Health Conditions

The presence of pre-existing mental health conditions can potentially influence a patient's vulnerabilities to the negative impacts of COVID-19. Both Mr. A and Ms. B had a history of depression prior to the episode that led to the hospitalizations. Some evidence suggests that patients with mental health conditions may have an even higher risk of COVID-19 infection than the general population due to factors including greater difficulty accessing healthcare services, cognitive impairment, diminished efforts regarding personal protection, and the confined conditions of psychiatric wards.⁶¹ as well as other communal living environments like multi-level senior communities, skilled nursing facilities, state hospitals, jails and prisons, all places where patients with serious mental illness are overrepresented. Some, but not all, available evidence suggests that patients with pre-existing mental health conditions are likely to be more vulnerable to the adverse mental health effects of the COVID-19 pandemic, including increased fear and anxiety, as well as decreased human contact due to social isolation.^{15,61} A recent notable exception to this finding is represented by work completed in the Netherlands involving 1181 individuals with and 336 without depressive, anxiety or obsessive-compulsive disorders (OCD). Pan et al. (2021) found that the individuals without a history of these disorders showed a greater increase in symptoms during the COVID-19

pandemic while the individuals with pre-existing mental illness showed a small decrease in psychiatric symptoms.⁶²

Possible Therapeutic Interventions

There are a number of established and emerging therapeutic interventions to mitigate the potential mental health impacts that COVID-19 may have on older adults. For Mr. A, due to the absence of side effects and yet the emergence of depression symptoms on his admission dose of 60 mg daily, his duloxetine was incrementally increased to 120 mg daily and he was started on augmentation with aripiprazole 5 mg daily. Additionally, given the presence of SI, his history of several unsuccessful trials of antidepressant medications and never before receiving a trial of ECT, the patient was treated with ECT and responded well. Ms. B was continued on her home medication regimen, and given her history of prior successful treatment with ECT, she also underwent a course of ECT. Beyond individualized medication management of the patient's psychiatric problems, there are additional approaches that may be beneficial in addressing geriatric mental health concerns during the COVID-19 pandemic.

Telehealth and Videoconferencing Technology

As long as physical distancing mandates and quarantine orders remain, the use of technology platforms will be needed for both the provision of clinical services and for socialization. A year after the onset of the pandemic, it has been well demonstrated that many older adults are able to successfully use telephone and televideo appointments to connect with clinicians, caregivers, friends, and family members. Already over 50 major United States health systems utilize telemedicine programs, including Kaiser Permanente, Cleveland Clinic, and Mount Sinai.⁶³ Since the onset of the COVID-19 pandemic, utilization of telemedicine and video technology to address patient care issues has been increasing dramatically. For example, at UC San Diego prior to the COVID-19 pandemic all outpatient psychiatry visits took place in person. Within a 1-week timespan, however, approximately 85% of visits were converted to telepsychiatry video visits, while the remaining 15% were done over the telephone or in person.

Older adults have demonstrated different levels of ability and comfort with the use of these new technologies. Contrary to commonly held ageist beliefs, empirical studies have found telehealth to be effective in treating and managing chronic diseases, depression, and improving quality of life among older patients.^{64,65,66} A systematic review of 68 studies assessing use of telemedicine in the care of older patients found predominantly positive effects with better results regarding behavioral endpoints including adherence to medications or diet and measures of self-efficacy.⁶⁷

Telehealth technologies may present certain limitations, however, when integrated into the care of older adults. The presence of hearing loss, cognitive impairment, and lack of familiarity with the technology, if present, need to be addressed. Enlisting the help of family members or caregivers to assist older adults in getting familiar with the possibly unfamiliar technology, and utilizing home health nursing program staff members may be ways to address these barriers.⁶⁸ One important potential role for family members is to help the older adult acquire and learn to use the necessary equipment required for telehealth visits such as a webcam for their computer.

Social and Psychological Interventions

There are a number of social and psychological interventions clinicians have found anecdotally to benefit older adults during the COVID-19 pandemic. These interventions include:

- 1) Clinicians initiating regular contact with patients
- 2) Informing patients of the plans regarding future appointments
- 3) Encouraging older patients to reach out to their relatives for socialization opportunities and encouraging younger patients to reach out to their older family members⁶⁹
- 4) Recommending that older patients use online and video technologies to stay in touch with family members, attend clubs or classes, play virtual games with loved ones, and use social media to stay in touch with friends as well as to do other things like obtaining necessary supplies from online services.^{70,71} Reminders may be needed that physical distancing does not necessarily mean social distancing. When encouraging an older adult to try a new technology, it may be helpful to explore whether preconceived notions about being "bad" with technology may be the reason for any hesitation about trying these new experiences. Repeated exposure to negative stereotypes may cause an older adult to believe inaccurately that their age prevents them from mastering new technologies. Providing reassurance that they are actually capable of learning new things in older age may be very helpful.⁷²
- 5) Recommending specific activities and activity programs. There are a number of activities and interventions that can be practiced at home to improve psychological well-being in older adults. Recommending that patients spend less time looking at fearful images on TV and setting reasonable limits on how often they check for new information about the pandemic could reduce distress and anxiety.⁷⁰ Additional strategies include recommending that caregivers help patients establish and maintain routines composed of a variety of daily activities, which are intellectually stimulating and enjoyable such as reading, doing puzzles, and pursuing creative projects, all of which may be rewarding ways to stay engaged mentally.⁷² The pandemic has made it more important than ever to recommend that patients continue regular physical exercise, with a goal of at least 30 minutes a day. Exercises can include taking brisk walks around one's residence, doing previously prescribed physical therapy exercises, or walking a pet.^{71,72}
- 6) Referring patients to mindfulness training and exercises may be particularly beneficial for older adults during the COVID-19 pandemic. Relaxation techniques such as breathing exercises and meditation may be helpful. Additionally, using mindfulness to recognize potentially troubling thoughts as they arise and training patients to recognize these as just thoughts, may help patients cope with and avoid distressing emotions.⁷¹ Starting the day with mindfulness practices such as yoga, meditation, and stretching may reduce anxiety and stress and improve cognitive function.⁷² Mindfulness training has been shown to increase behavioral and neural correlates of attentional performance and increase overall psychological well-being,⁷³ to reduce stress and impairment associated with physical health problems

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including arthritis, pain and cancer, and to improve certain aspects memory and executive function.⁷⁴

Van Order et al. have developed a method for helping older adults reduce loneliness and social isolation which incorporates many of the above strategies and whose conceptual structure is borrowed from the approach used when helping a patient at risk for suicide develop a "Safety Plan." The intervention can be provided during a 30-minute phone call, may include cognitive therapy, mindfulness, distress tolerance skills from Dialectical Behavior Therapy, and culminates with the creation of a "Connections Plan."⁷⁵

Special consideration is required for older adults suffering with cognitive decline or dementia, who may experience greater levels of anxiety, suspiciousness, and agitation from pandemic inspired mandates such as wearing masks and the need to quarantine or to shelter-in-place. For these patients, sharing simple and clear information about the situation and providing understandable instructions for how to reduce risk of infection and use protective equipment may be beneficial. This is particularly relevant for patients residing in assisted living facilities or nursing homes, where contact with their family members has been very limited during the first year of the pandemic. If the recent loosening in transmission risk reduction measures triggers a rise in infections and the subsequent need to return to stricter public health measures, the associated distress from this reversal may be worse for older patients.⁷⁰

Volunteering and Outreach

Volunteer and outreach programs could greatly benefit older adults, especially those with disabilities and mobility impairments, and also may benefit the volunteer by adding structure, meaning, and purpose to an individual's life. Activities can include checking in regularly on older neighbors and offering to assist with daily errands such as shopping for groceries and medical supplies. Volunteering with local meal delivery programs could be another way to get involved. Scheduling phone calls or virtual visits with older adults can also reduce feelings of social isolation, giving older adults something to look forward to.

Additionally, family members or volunteers could work in programs to write letters or send care packages to older adults as sources of reassurance and support.^{76,77} On an institutional level, volunteering and outreach programs can also be implemented with meaningful success. For instance, at UC San Diego Health, the Population Health Services organized a program called The Wellness Project, where a team of volunteers including nurses, care navigators, residents, and students called high-risk older patients regularly and used structured surveys to assess patient needs in terms of medications, food security, and social support.⁷⁸

Caregiver Support

COVID-19 has made the work of caregiving even more challenging. Many caregivers have an increased risk of COVID-19 infection due to factors such as older age, the presence of at least one chronic illness, the presence of chronic stress prior to COVID-19, and additional stress due to COVID-19. The potential negative impacts of COVID-19 on caregivers, especially those caring for individuals living with dementia are numerous. Due to the changes in life that the COVID-19 pandemic has caused, every aspect of the daily life of caregivers is now more complicated and demanding of time and energy. [Table 1](#) lists some of the new challenges that caregivers are facing during the COVID-19 pandemic.

[Table 2](#) lists 12 strategies for mitigating the impact of COVID-19 on individuals living with dementia and their caregivers.

Policy Interventions and Advocacy

Some policy interventions aimed at improving access to healthcare and addressing financial strain associated with COVID-19 have already occurred and more are needed. Importantly, in April 2020, the Center for Medicare and Medicaid Services (CMS) approved a waiver to increase payments for audio-only telephone visits.⁷⁹ This has important implications for providers caring for older patients who may have limited access or ability to use video technology. The Coronavirus Aid, Relief, and Economic Security (CARES) Act provided \$425 million for community-based behavioral healthcare and suicide prevention, as well as economic stimulus payments to Americans,

TABLE 1. The Impact of COVID-19 on Dementia Family Caregivers

- All care may now need to be provided at home (every lunch must be made, every activity must be planned and executed)
- -
- Arranging for vaccinations may be difficult and vaccine responses may cause both the patient and caregiver transient uncomfortable symptoms
- Caregivers and individuals living with dementia do not have the equipment for or are unable to adapt to telehealth/virtual appointments
- Caregivers for hire are more difficult to find
- Caregivers for hire may not be conscientious about COVID-19 transmission risk reduction measures and require additional supervision
- -
- Community resources such as adult day healthcare programs are less reliably available
- Completion of and cleaning and sanitizing activities is more difficult
- Every trip to the store requires more planning and more time
- Individuals living with dementia do not remember and/or refuse to follow CDC guidelines like wearing PPE
- Media coverage of the pandemic is ubiquitous and disturbing
- Members of an informal caregiving team may not have as much time as they did before (e.g. adult children who must supervise children who are not in school)
- Newly hired caregivers may not be well received
- Purchasing scarce items may be more difficult

including Social Security beneficiaries.^{80,81} In March 2020, the Older American Act reauthorization included a 35% funding increase over the next five years, including increased funding for meal delivery and transportation services for older adults in light of the COVID-19 pandemic.^{81,82}

The Coronavirus Relief for Seniors and People with Disabilities Act (H.R. 6305), which was introduced into the House of Representatives in March 2020 did not succeed.⁸³ On March 13, 2021, however, President Biden signed a \$1.9 trillion coronavirus-aid bill. This legislation offers a \$1,400 check to many Americans, an extension of a \$300 weekly jobless-aid supplement, and included money for schools, vaccine distribution efforts, and state and local governments. In addition, the bill provides support to struggling multiemployer pensions, and makes the biggest changes to the Affordable Care Act since its passage in 2010.⁸⁴

CONCLUSION

In summary, the authors described two cases of older patients who presented with worsening

TABLE 2. Twelve Strategies for Mitigating the Impact of COVID-19 on Individuals Living With Dementia and Their Caregivers

1. Build (or rebuild) a caregiving team
2. Create an optimal environment that includes structure, activities and a quiet zone
3. Demonstrate thorough hand-washing and use alcohol-based hand sanitizer as an alternative when hand-washing is not possible
4. Follow the CDC guidelines for preventing COVID-19 transmission
5. Learn and utilize optimal communication approaches (e.g., relaxed posture; short, simple statements; sustained eye contact)
6. Place signs in the bathroom and elsewhere about proper hand washing (e.g., using warm water and soap for 20 seconds).
7. Provide extra written reminders regarding important hygienic practices (e.g., "Remember to wear your mask when going out.")
8. Request prescriptions for a greater amount and/or number of days than usual to reduce phone calls and trips to the pharmacy phone
9. Seek prompt evaluation and treatment of behavioral symptoms. (This is even more important than ever because doing so will help protect caregivers from burn out.)
10. Create contingency plans for care management for when the primary caregiver becomes ill and unable to help
11. Think ahead and make alternative plans for the person with dementia should adult daycare, respite, etc. be modified or cancelled in response to COVID-19
12. Use community and online resources and other technologies to their fullest, remembering that some community resources never went away (e.g., online learning modules) and some went away temporarily but are coming back (e.g., assisted living communities are once again admitting residents, home health)

depressive symptoms and SI in the context of social isolation due the COVID-19 pandemic. Both patients had been receiving treatment on an outpatient basis for mood disorders. Even prior to the COVID-19 pandemic, social isolation was a prominent and potentially debilitating issue for many older adults due to limited social networks, as was the case for both Mr. A and Ms. B. These cases exemplify how the increase in social isolation and loneliness associated with physical distancing and quarantining measures may cause worsening of mood and anxiety symptoms, especially for those who are older. Additionally, COVID-19's catastrophic impact on the economy is straining the budgets of many older adults already coping with limited income and creating another source of stress that could trigger the emergence of new problematic symptoms of depression and anxiety or worsen symptoms related to pre-existing psychiatric illness.

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Potential underlying mechanisms responsible for symptom worsening in the context of the COVID-19 pandemic identified by our review of the literature include: stress-induced neuroinflammation and the role of comorbid medical illnesses such as diabetes and neurocognitive disorders such as AD. The impact of COVID-19 associated stress on older adults, with and without pre-existing psychiatric illness, can be mitigated by clinicians being attentive to the possible worsening of symptoms caused by COVID-19, the careful assessment of each patient so that an accurate diagnosis is possible, and the combined use of both pharmacologic and psychotherapeutic interventions. Utilization of telemedicine and video technologies are ways to provide ongoing care with minimal risks

related to COVID-19 exposure and to maintain social contact. Caregivers, especially family caregivers of individuals living with dementia, are at an even higher risk of medical and psychiatric morbidity and mortality due to the added stresses associated with caregiving during the COVID-19 pandemic and may benefit from special education and support to address the additional challenges related to COVID-19. In addition, advocacy for additional policy interventions targeting the unique and significant financial and healthcare access challenges faced by older adults will be helpful.

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