

# The Impact of COVID-19 on the Mental Health of the Western Populace: A Model for the Examination of the Virus's Global Impacts on Mental Health

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## Abstract

COVID-19 has had lasting impacts on the physical and mental health of the global community. These impacts are multifaceted and spring from a range of physiological, psychological, economic origins. This review sought to demonstrate evidence of the damaging consequences that COVID-19 and its related effects have had on mental health. The findings showed significant increases in numbers of individuals seeking mental health care, experiencing negative mental health symptoms, and opting for medication management of mental health symptoms. In this review, we explore logistical aspects of both present and prospective zoonotic disease spillover events, as this information is key to mitigating future pandemic events. Furthermore, we summarize current knowledge of the impact of COVID-19 on mental health of the populations of Western countries such as the United States, the United Kingdom, and Italy. Moreover, we discuss the influence of racial disparities in delivery of healthcare in the United States and their effects on the quality of, access to, and awareness of mental health care. Our awareness of these issues has the potential to inform further research, aid, and funding to the populations where it is most needed. Finally, we make recommendations for the direction of further research based on the findings of this article.

## Introduction

In our collective generational memory, a force that impacts the public consciousness in a ubiquitous manner is rare. In December 2019, such a force manifested upon the screens, tongues, and minds of global civilization and quickly became all-encompassing. This juggernaut that carried such a giant impact on the human psyche is, itself, a microscopic being that straddles the realm between life and non-life. The entity named Severe Acute Respiratory Syndrome CoV 2 (SARS-CoV-2), colloquially referred to as the catch-all "COVID," began causing a disease in human beings, a pathology which was coined COVID-19 (Khan, 2020)<sup>1</sup>. Such a devastating blow from an enemy that is invisible to the naked eye can have psychological consequences that are multifaceted, ill-defined, and omnipresent in the lives of many. The facts associated with infectious disease have historically been misunderstood by those with loud media bullhorns and those misunderstandings have been passed along to a largely ill-equipped and anxious public (Groshek, 2018)<sup>2</sup>. The details of the SARS-CoV-2 pandemic necessarily involve complex topics from medicine, epidemiology, microbiology, pharmacology, psychiatry, and public health communication. While these noble professions engaged in tireless hours of excellent work, the uncertainty of the

developing pandemic doggedly exacerbated an existing gap between health literacy and media literacy, producing negative mental health consequences in the process (Ratzan, 2020)<sup>3</sup>.

Since its introduction to humans as a host, this virus has caused the death of nearly 6 million people, with hundreds of millions of infections confirmed in the global population (Myoung, 2022)<sup>4</sup>. Hospitalizations for respiratory difficulties and associated increases in death and complication rates were overwhelming medical facilities, while family members' access to loved ones was restricted while they struggled for their lives. These viewing restriction policies were shown to have significant physical and mental health consequences for both patients and their families (Hugelius, 2021)<sup>5</sup>. Provider fatigue and burnout were regular discussions in news media, a welcome highlight to some, that mirrors a reality persisting to this day. While the symptoms associated with the colloquial syndrome "burnout" are not new to hospitalists, requests for Americans with Disabilities Act time off and Family and Medical Leave Act utilization increased dramatically in many hospital systems at the outset of the pandemic, suggesting an upward trend (Sasangohar, 2020)<sup>6</sup>. Interestingly, this burnout is not felt predictably or evenly across frontline workers. Providers responsible for staffing oncology wards of uninfected patients were shown to experience higher levels of stress than those caring directly for patients with COVID-19 in a study performed in Wuhan, China (Wu, 2020)<sup>7</sup>. All the while, the news media was broadcasting grim predictions and dramatic imagery of patients while others spread misinformation rampantly across the internet. Much to the world's dismay, American politicians charged with legislating and leading the United States through a response to the pandemic were shown to be the largest single contributor of misinformation concerning the virus in the United States (Evanega, 2020)<sup>8</sup>. While the medical implications of this pandemic are vast, an often neglected facet of the global contagion surrounds the mental health of those living under restrictions, those surviving after contracting the virus, those who lost loved ones to infection, and those simply living with "the new normal" of an acute physical threat inherent in every social interaction (Jamaludin, 2020)<sup>9</sup>. Understanding these impacts and their implications are of vast importance to societies and public health organizations as they consider strategies to mitigate mortality and morbidity related to this, and future, pandemics. In the future, efforts to manage these albeit important aspects of a pandemic that do not include sufficient sensitivity to mental health considerations can have broad, significant public health impacts. These potential consequences have been borne out in our current experience in the form of increased clinical and subclinical psychological symptoms, an increase in use of employment safety resources like ADA and FMLA, and an

increase in negative physical health outcomes as a result of extraneous psychological stress.

These public health concerns do not solely stem from health care related concerns. Unfortunately, the response to the public health crisis necessarily involved isolation and the shuttering of many areas of human socialization and cohabitation. A very large percentage of industry is concerned with meeting this demand, and many individuals who maintain these businesses were forced to shutter by governmental regulations. This undoubtedly worsened the blow of the public health crisis for those struggling to make ends meet. It was shown that Canadian citizens that were younger, unmarried, and labored in occupations that represented greater viral risk were also the most financially impacted by governmental closure mandates and suffered exaggerated negative mental health outcomes as a result (Beland, 2020)<sup>10</sup>. These economic factors are an essential element when considering mental health status and outcomes, but it is only one facet of this pervasive virus and the regulatory response to it.

This review paper will attempt to educate the reader on the origin and current state of the SARS-CoV-2 pandemic, the implications of its existence and effects on global mental health, and the resultant exacerbation of existing mental health care disparities and limitations. This review paper will attempt to provide a path toward further study to genuinely understand the depth of the impact of both the virus itself and governmental efforts to mitigate its spread. The author hopes to illuminate the importance of mental health considerations in efforts to manage viral fallout, as well as provide a realistic survey of the consequences of this disaster. Additionally, it is expected that the exposure of the depth of these implications will allow the reader to come to terms with the ubiquitous nature of mental health disturbances resulting from before, during, and after the pandemic. Finally, this review paper will posit ways of improving mental health suggestions for further research, especially within underrepresented populations, who are established to be at a greater risk of health complications, including SARS-CoV-2 (Figueroa, 2020)<sup>11</sup>.

## Zoonoses and Spillover Events

While this pandemic has garnered the attention of the entire globe, it is not a unique phenomenon. Humanity has experienced many pandemics throughout its history, and even some in recent memory, although these recent pandemics did not share the vast psychosocial impact of SARS-CoV-2 (Fineberg, 2014)<sup>12</sup>. Recent history has demonstrated that the potential for zoonotic viral infections to reach pandemic status has increased, largely due to the increased frequency with which these infections occur and the innate difficulty of regulatory public health management (Fineberg, 2014)<sup>12</sup>. The most recent example was the outbreak of the H1N1 influenza pandemic in 2009,

which was coined "swine flu" due to its zoonotic spread from pigs to humans (Fineberg, 2014)<sup>12</sup>. This influenza virus has a substantially different morphology, character, and virulence when compared to SARS-CoV-2. Nonetheless, it demonstrates the most recent public health response to a viral pandemic threat, a response which was fraught with many of the same issues of governmental responsibility, supply shortages of rapidly developed vaccinations, and inconsistent public health messaging (Fineberg, 2014)<sup>12</sup>. Prior to that, in 2003, a close relative of SARS-Cov-2 caused a syndrome that was termed SARS, or severe acute respiratory syndrome. This virus, although closely related to the virus that causes COVID-19, had a lower rate of transmission and a higher mortality rate. These factors, along with stringent application of infection control measures among healthcare workers in the affected countries lead to containment of this deadly infection (Shaw, 2006)<sup>13</sup>. The emergence of SARS-CoV-2 and these other viral pandemics shows that the potential for widespread infection from novel viruses is very real and they often result from the perfect storm of zoonoses. These two incidents also emphasize how vital effective public health response is to the outcome of an emerging infectious disease.

The prevalence of zoonoses and their potential to cause pandemic-level disease in the human population has been the subject of increasing research due to the increase in prevalence of spillover events (Faust, 2018)<sup>14</sup>. Spillover events are defined as an event in which a pathogen successfully infects a new host through contact with a reservoir host (Faust, 2018)<sup>14</sup>. The fact that these events are increasingly likely to occur underscores the importance of understanding the mental health consequences associated with the current pandemic, as this knowledge potentiates more effective responses in the future.

## Background

The disease COVID-19, which rapidly became a pressing concern in every healthcare setting in the developed world, is caused by a virus that was coined SARS-CoV-2. The SARS-CoV-2 virus is an enveloped, positive-sense RNA virus (Yuki, 2020)<sup>15</sup>. Commonly, infection with the SARS-CoV-2 virus produces outward symptoms that are closely mirror those of infection with an influenza virus. However, infection with SARS-CoV-2 does not necessarily lead to classical flu-like symptoms of COVID-19, which are "fatigue, muscle pain, sneezing, sore throat, dry cough, high fever, respiratory problems... with some severe cases having pneumonia, serious respiratory syndrome, kidney failure and even death" (Ali, 2020)<sup>16</sup>. Even in the absence of symptoms, computerized tomography (CT) scans can indicate details of viral impacts on infected persons. The bulk of the attempts to medically manage the virus have been preventative in nature, like social distancing and masking, as well as vaccination and an emphasis on

vaccinating enough of the population to reach the sorely sought herd immunity required to prevent community spread (Ali, 2020)<sup>16</sup>. COVID-19 treatment largely rests on supportive care and limited pharmaceutical options, but some medications, including hydroxychloroquine and remdesivir have been indicated (Ali, 2020)<sup>16</sup>. This research is still ongoing, and epidemiologists are acutely interested in the clinical data that is available regarding treatment modalities.

On December 12 of 2019, a small cluster of individuals in Wuhan, China began displaying shortness of breath and fever and were transported to local hospitals. When healthcare professionals there noticed the similarity of cases, the WHO office was informed of the emergence of a "pneumonia of unknown etiology" (CDC, n.d.)<sup>17</sup>. By January 7<sup>th</sup>, 2020, the viral genome had been sequenced and the virus had been isolated in a laboratory, confirming that a novel coronavirus was the cause of the syndrome experienced by the patients in Wuhan. During this time, the infection was spreading throughout the globe. The first case in the United States was confirmed on January 20<sup>th</sup>. In the following month, biochemical tests that screened for segments of viral DNA were developed and approved for use with Emergency Use Authorization (EUA) from the Food and Drug Administration (FDA). On March 13<sup>th</sup>, 2020, the President of the United States declared a state of emergency, and states began mandating social distancing and the shutdown of non-essential businesses (CDC, n.d.)<sup>17</sup>. This was the moment where the reality of the situation dawned on many Americans and was also one of the major impetuses of the mental health issues associated with the virus in the country. On March 17<sup>th</sup>, 2020, the first human trials of a vaccine for SARS-CoV-2 began at Kaiser Permanente research facility, which was testing the efficacy and safety of the Moderna Therapeutics biotechnology companies' mRNA vaccine (CDC, n.d.)<sup>17</sup>.

On April 3<sup>rd</sup>, 2020, the United States federal government issued the first masking recommendations, recommending that everyone wear masks outside of the home, spurring yet another abnormal condition for those already suffering from the strain of the virus and social distancing. Seemingly all at once, things every American took for granted were obscured. It was at approximately this time, the existing state of healthcare disparities in the country became the focus of acute media attention as facilities and their providers were pushed to their limits. On April 6<sup>th</sup>, 2020, a Chicago Tribune report illuminated some stark statistics: that 68% of the city's population that was deceased due to COVID-19 were members of the African American community, a drastic demographic overrepresentation. By the end of that month, the President declared that the United States was pulling funding from the World Health Organization, which showed cracks in the unified global response to humanity's most pressing threat, damaging

confidence in leadership, and sowing anxiety. Additionally, Operation Warp Speed was initiated to remove obstacles to vaccine development (CDC, n.d.)<sup>17</sup>.

On May 9<sup>th</sup>, 2020, the unemployment rate in the United States reached 14.7%, which represented 20.5 million people without work, mostly in service and hospitality industries (CDC, n.d.)<sup>17</sup>. This reality affected low-income and minority populations most severely and represented the greatest labor crisis in the country since the Great Depression (CDC, n.d.)<sup>17</sup>. The stress of this economic shuttering was palpable, complete with round-the clock news coverage of the health crisis that had become an economic time bomb for many Americans. In this month, researchers demonstrated a substantial increase in alcohol consumption, approximately 60% of respondents reporting an increase since the beginning of the pandemic and reporting stress as the primary cause (Grossman, 2020)<sup>18</sup>. This increase in alcohol consumption was shown to correlate with poorer overall mental health outcomes, worsening an already stressful state of affairs (Jacob, 2021)<sup>19</sup>. On May 25<sup>th</sup>, 2020, George Floyd was murdered by a police officer on a street corner in Minneapolis for the entire planet to see. This event had an incendiary effect on an already seething cauldron of racial injustice, likely exacerbated by the stress of the virus. Protests erupted across the country in response to this "collective moral injury" (Barbot, 2020)<sup>20</sup>. A racial reckoning was at hand and, although long overdue, was a significant contributor to stress in the country, particularly for many in the African American population. The reality of excessive violence and killings at the hand of the police for Black people has been correlated with significant negative impacts on mental health for this population (Bor, 2018)<sup>21</sup>. This, combined with the collective stress of the nation due to COVID-19 and the public health measures in place, converged to create a deeper disparity in the existing state of mental health equity of the nation (CDC, n.d.)<sup>17</sup>.

In the final weeks of 2020, the FDA approved Emergency Use Authorizations (EUAs) for both the Pfizer Bio-N-Tech and Moderna vaccines (CDC, n.d.)<sup>17</sup>. Both vaccines are based on a cutting-edge technology involving "lipid nanoparticle-formulated, nucleoside-modified RNA vaccine that encodes a prefusion stabilized, membrane-anchored SARS-CoV-2 full-length spike protein" (Polack, 2020)<sup>22</sup>. Essentially, the vaccines contain mRNA that encodes for a full SARS-CoV-2 spike protein analog, which allows the immune system to develop adaptive immunity to the virus' mechanism of adherence to host receptors. Troublingly, the first genetic variants of SARS-CoV-2 were beginning to emerge, creating concern that the brand-new vaccines may not be effective against the variants. Other vaccines have been approved since this time, and new vaccinations are currently being developed (CDC, n.d.)<sup>17</sup>. This is essentially the place that we

find ourselves in now. Of particular concern to authorities at the writing of this review are the Omicron and Delta variants of SARS-CoV-2. These variants seem to be associated with milder disease but a much higher transmission rate, as well as some ability to cause infection despite immunity conferred from previous infection, vaccination, or both (Myoung, 2022)<sup>4</sup>. This represents a pivotal point in our journey with SARS-CoV-2, and ostensibly, with its relationship to our mental health, particularly if a return to public infection control measures becomes operative.

## Mental Health Definitions and Disparities

Even prior to the forced adaptation of new methods of delivery and novel stressors related to COVID-19, the system of psychological treatment in the United States is still in a very nascent state when compared to the medical system. This review will largely focus on the United States and disparities between Caucasian and African American populations, primarily due to the limited nature of available literature. The authors hope that the awareness of these disparities might be the impetus to look elsewhere for similar patterns. It has been shown that those who suffer from severe psychological distress are less likely to have health insurance or to seek psychological care through typical channels. Often, these individuals use emergency departments at hospitals in attempts to initiate this care (Pearson, 2009)<sup>23</sup>. The emergency department can often refer these patients to definitive, long-term mental health providers, but this necessarily occupies temporal, material, and staff resources. This dynamic leaves the potential for overcrowding and delay of care during an acute influx of people seeking mental health care. Overcrowding, defined as a census of patients that exceeds reasonable capacity of department resources and staff, has been shown to be correlated with poorer outcomes, inflated mortality rates up to 30%, and an increased likelihood of readmission (Yarmohammadian, 2017)<sup>27</sup>. This position is rendered additionally acute because patients with mental health complaints tend to be lowest on the list when patient triage takes place in the emergency department setting (Clarke, 2014)<sup>28</sup>. Additionally, these populations experience greater insecurity related to housing and work environments, which has the potential to further limit access to care for new and existing health conditions, mental or otherwise. Diminished access to essential services which were designed to assist these individuals socioeconomically have a deleterious physical and mental health effect (McKnight-Eily, 2021)<sup>24</sup>. While efforts are increasing in recent years to pivot to a more holistic treatment modality that does not separate the mind and body into discrete units, but rather treats them as parts of a cohesive system, Western thought still has some distance to travel towards perceiving psychological care as valuable and necessary, akin to an annual visit to ones' primary care physician. In 2019, prior to the onset of

the pandemic, it was shown that approximately 19.2% of Americans sought some type of mental health care in the previous year with 15.8% reporting taking some form of medication for a mental health issue (Terlizzi, 2019)<sup>25</sup>. This study demonstrated that Caucasians were nearly twice as likely to have sought mental health care than those of other races (Terlizzi, 2019)<sup>25</sup>. The mechanisms established to care for the mental health of the country are fraught with racial and ethnic disparities, the chronic under-serving of low-income individuals who would likely benefit most from treatment, as well as a public misunderstanding of the professions' role and the methods by which care is delivered. Prior to the emergence of SARS-CoV-2, it has been revealed that minority populations, particularly those of African descent, experience poorer outcomes in treatment for psychiatric disorders, such as bipolar II. These disparities run extremely deep. This population is misdiagnosed at an exaggerated rate and underrepresented in biological and genomic studies, thereby compounding the issue, and perpetuating the disparity (Akinhanmi, 2018)<sup>26</sup>. This data serves as a representative point of a larger trend, a foreboding harbinger that is both ancient and contemporary. While these disparities are rooted deeply in global, and particularly American, history, the implications of this disparity affect everyone when a pathogen is involved. This point is made at the outset with the understanding that these populations are underrepresented in research and treatment, therefore one must be cautious in generalizing outcomes to these populations, as history has proven them to be more affected than the data might suggest.

One aspect of mental health care that shifted drastically as a result of COVID-19 was the mode of delivery of psychological services. The age of telemedicine was thrust forward with little natural progression and many industries adapted to shutdowns in a hurried manner (Pierce, 2021)<sup>29</sup>. The psychological profession was no different. One study demonstrated a 12-fold increase among psychologists surveyed during the onset of the pandemic, boosting from approximately 7% to approximately 85% utilization (Pierce, 2021)<sup>29</sup>. Those who practiced primarily in outpatient settings, particularly those within Veterans Affairs offices reported a 24-fold increase, with approximately 35% stating that they would continue using the modality in the future (Pierce, 2021)<sup>29</sup>. While this might seem like progressivism and a natural consequence of more accessible technology, it bears some of the same blemishes that of inequity that plagued the profession in its previous iteration. Essentially, access to required internet services and technology is a requisite and those who are on the lowest income spectrum do not have consistent access to the technology required for telehealth (Pierce, 2021)<sup>29</sup>. As we have shown previously, these are typically the individuals most at risk for severe psychological distress, potentially limiting access to vital care in an additional way

(Pearson, 2009)<sup>23</sup>. Furthermore, the people that have lesser access to technological innovations that could mediate the necessity to report in person to high-risk environments are more likely to use public transportation, providing yet more routes of exposure and extra helpings of anxiety related to contracting the virus (Purtle, 2020)<sup>30</sup>.

Mental health is a wildly variant concept with nebulous edges and facets that tend to defy a true definition. In scholarly literature, the term "health disparity" is often used to describe a particular difference, especially one that is deemed morally repugnant or that inspires a push for social and political awareness. Generally, "a health disparity/inequality is a particular type of difference in health (or in the most important influences on health that could potentially be shaped by policies); it is a difference in which disadvantaged social groups, such as the poor, racial/ethnic minorities, women, or other groups who have persistently experienced social disadvantage or discrimination, systematically experience worse health or greater health risks than more advantaged social groups" (Braveman, 2006)<sup>31</sup>. Defining mental health is a more dubious proposition, as those who suffer from mental health disorders are often lacking the capacity to objectively assess themselves, yet so much of an objective assessment is based on their subjective experiences. Therefore, mental health has at least two definitions: one stemming from the first-person view that is associated with feelings of wellbeing and behaviors that are congruent with that state, and the second stemming from a third-person evaluation of behavior and speech (Palumbo, 2020)<sup>32</sup>. For the purposes of this discussion, the operative definition of mental health describes a condition free of disturbances by obtrusive, compulsive, or otherwise aberrant thoughts or behaviors. The term recovery is defined as a return to this state of mental health after some period of deviation. The SARS-CoV-2 virus itself, the governmental response to its spread, and the residual effects of these factors' interplay have had a profound effect on the mental health of many people. As we will show below, this reality has far-reaching consequences that are personal, sociological, economic, and political.

### **Mental Health Effects and Outcomes Related to COVID-19 and Containment Measures**

One can safely assume a functioning and balanced neurological physiology is a prerequisite to optimal mental health. There is a plethora of conditions that cause neurological symptoms, and it has been shown that SARS-CoV-2 can gain direct access to the neurological system of infected humans, although the number of cases where the virus was detectable in cerebrospinal fluid is exceedingly low. Additionally, infection has been shown to cause non-specific neurological symptoms such as headache, dizziness, taste and smell dysfunction, and cognitive disturbances (Chen,

2021)<sup>33</sup>. Autopsy findings of patients who have succumbed to severe COVID-19 have demonstrated clear indications of neuropathology. These findings have been recapitulated in animal studies using non-human primates (NHPs) (Rutkai, 2022)<sup>34</sup>. It was demonstrated that NHPs experimentally infected with SARS-CoV-2 suffered similar neuropathology, whose primary characteristic is hypoxic-ischemic damage with microhemorrhage and neuroinflammation of the vasculature in the brain. Perhaps most importantly, it was demonstrated that NHPs did not necessarily suffer extreme respiratory symptoms to display the neuropathology. This finding could be pertinent in explaining the phenomenon of long-COVID, where patients report lingering neurological symptoms long after respiratory symptoms have abated (Rutkai, 2022)<sup>34</sup>. Very troublingly, those who survived the acute phase of COVID-19 were demonstrated to suffer an increased incidence of many types of mental health disturbance including, opioid use disorder, sleep disorders, depressive disorders, stress and adjustment disorders, and various forms of cognitive decline (Xie, 2022)<sup>35</sup>. Additionally, these individuals were more likely to procure prescriptions for antidepressants and opioid medications after infection than the control group (Xie, 2022)<sup>35</sup>. The findings of neurological change as a result of infection demonstrate one of the many avenues by which this crisis has affected the mental health of those who suffer from it.

Perhaps less pronounced, but undoubtedly more universal are the mental health effects related to public health measures taken to stop the spread of the virus, which limited a great deal of normal human activity for a protracted period of time. A study in the United Kingdom, using a 12-question General Health Questionnaire, demonstrated a 13.5% increase in the prevalence of mental health problems when compared to 2017-2019. The questionnaire was imprecise concerning the root of mental health problems, therefore differentiating a definitive cause of stress among the participants was not possible. However, it represents a statistically significant increase in a very large population, with 18- to 35-year-old participants showing the most drastic increase in mental health issues (Daly, 2020)<sup>36</sup>. A concurrent study in the UK used a different scale to assess the specific symptoms of concern among the cohort. Disturbingly, during the initial phase of the lockdown in the UK (March 31<sup>st</sup> to April 9<sup>th</sup>, 2020), there was a significant increase in suicidal ideation, feelings of defeat, anxiety, and entrapment. These findings were most pronounced in individuals aged 18 to 29 (O'Connor, 2021)<sup>37</sup>. The symptoms, especially those surrounding possibility for self-harm, are evidence of the chilling, potentially lethal, effect that social isolation can have on individuals, especially those who are young. Additionally, these findings were not isolated to the UK, as these containment measures were taken, to some extent, globally (CDC, n.d.)<sup>17</sup>. For instance, a large study

in Spain indicated that certain demographic aspects of a population predisposed them to increased symptoms as a result of isolation measures, particularly if the respondent was female with a current psychiatric diagnosis (García-Álvarez, 2020)<sup>39</sup>. It has been demonstrated that there is significant neurobiological change associated with feelings of loneliness. In a recent systemic review of brain imaging studies revealed significant changes in gray matter volume and white matter connective character in patients reporting feelings of loneliness (Lam, 2021)<sup>40</sup>. These studies utilized computerized tomography (CT) scans, structural magnetic resonance imaging (MRI), functional MRI (fMRI), and more to identify the density and character of regions of the brain using individuals with known lesions or self-report of feelings of loneliness against healthy controls (Lam, 2021)<sup>40</sup>. It was reliably reported that diminished gray matter volume and white matter tract connectivity were present in the hippocampus and posterior superior temporal cortex with other brain regions being implicated with less consistency (Lam, 2021)<sup>40</sup>. These findings provide an avenue of research into the mechanistic underpinnings of feelings of loneliness and their potential correlation to psychiatric symptoms. Without hyperbole, one can posit that the exposure to lockdowns and forced social isolation had both mental and physical effects on those subjected to them.

On April 10<sup>th</sup>, 2020, the United States became the country with the highest incidence of the SARS-CoV-2 infection. By this time, most states were enforcing lockdown orders and a federal mask mandate was in place (CDC, n.d.)<sup>17</sup>. As one might imagine, the mental health of the people in the US suffered greatly as a result. Very early in the pandemic's progression in the United States (between March 18<sup>th</sup> and April 18<sup>th</sup>, 2020), a positive correlation was demonstrated between levels of acute stress or depressive symptoms and the number of deaths due to COVID-19 in the United States (Holman, 2020)<sup>38</sup>. This was one of the first portents of a trend that would prove to continue throughout the progression of the pandemic. A very large retrospective study that compared the incidence of onset of new psychiatric problems following infection with several various pathogens and subsequent recovery found preliminary data that suggests that contraction of COVID-19 increases one's chance of developing a psychiatric disorder after infection has subsided. Curiously, this study also found that a previous diagnosis with a psychiatric disorder could act as an independent risk factor for later contraction of COVID-19 (Taquet, 2021)<sup>41</sup>.

An interesting phenomenon occurred during the early months of 2020 that provides context on the desperation and fear that presently gripped the populace. It was demonstrated that the initial diagnosis of common mental health ailments decreased 50% in primary care clinics

that were surveyed (Williams, 2020)<sup>42</sup>. Curiously, this effect extended to other forms of initial diagnoses as well. The same study found a 43.3% reduction in initial diagnoses of circulatory system issues, a 49% reduction in the initial diagnosis of type II diabetes mellitus, and a 16% reduction in the expected initial diagnosis of cancer (Williams, 2020)<sup>42</sup>. While the finding that fewer people were seeking care for mental health problems might appear, in isolation, like a positive result, when considered in the context of the drastic reduction in diagnoses of physical health conditions, a clearer picture began to form. People opted to forgo diagnosis and treatment of life-threatening ailments during this period, most likely out of fear of infection (Williams, 2020)<sup>42</sup>. The role of media and social media both in perpetrating and combating this type of fear was indispensable. Social media was seen as the primary perpetrator of misinformation that was fueling the flames of fear. Conversely, social media has been demonstrated, in certain populations, to be an effective tool in disseminating factual evidence in an effort to dispel fear and misinformation (Abbas, 2021)<sup>43</sup>.

### Recommendations for Future Research

While a significant number of researchers have set out to demonstrate and describe the mental health effects of this pandemic and the public health measures intended to contain it, there is room for more robust research that could illuminate the extent of the impact. This is valuable, because this knowledge could help direct funding, resources, and further research toward those populations and areas most affected. The authors advocate for more robust retroactive studies, using either pre-existing surveys, intake forms, assessments, brain imaging, or evaluations by practitioners concerning psychological states prior to the pandemic and following up with these individuals now. The data considered could be questionnaires, diagnoses, radiology reports, medications prescribed, subjective and narrative research, as well as data concerning intake frequency or volume related to psychological distress in primary care offices and emergency departments.

The authors acknowledge that this strategy inherently includes flawed sampling, as those seeking care prior to the pandemic are likely to have continued searching for care, or at least continued to experience the symptoms that drove them to seek care initially. However, this data is still valuable. As this review has demonstrated, those who are most at risk for psychological disorders are more likely to have negative outcomes related to infection with SARS-CoV-2 and more likely to have suffered worsened psychological stress during the onset of the pandemic. This data could provide invaluable information about the depth of the problem and direct solutions for programs designed to lead mental health patients to definitive care. When applied correctly, such programs could have an alleviating effect on overcrowding

and delayed access to care. Additionally, the authors advocate for further neurobiological assessments of both structure and biochemical makeup, where ethically possible, related to the effects of loneliness, isolation, and other depressive symptoms. The authors also acknowledge the challenges associated with gathering retrospective data, as the psychological and health practices are not necessarily structurally or technologically intertwined and it was demonstrated that individuals delayed seeking care, especially at the beginning of the pandemic (Williams, 2020)<sup>42</sup>. However, the answers to these questions will prove invaluable to our understanding of the problems and will inevitably spur further investigation into interventions to address them.

### Conclusion

It has been a difficult journey since this virus became a household concern, and many people have lost loved ones, become sick themselves, been forced into isolation, and operated apart from what comes naturally for a lingering length of time. While vaccination has become more normalized and restrictions are lifted, we are still in the presence of this virus, and it continues to evolve with us. Across the globe, we have suffered threats to our mental health as a result of the pandemic, and those most at risk are still bearing the brunt of the crisis. Those who have been infected and developed COVID-19 are more likely to encounter a psychiatric issue afterwards. Even those who avoided infection are likely to have experienced an increase in acute stress and depressive symptoms, and some have turned to substances to manage these feelings. Perhaps even more troubling, the reality of increased incidence of spillover events presents us with the potential to deal with yet another pandemic, perhaps one more lethal than SARS-CoV-2. This awareness is sobering, and certainly has radical implications for mental health. That said, adaptations to the delivery of psychological care have made it more accessible for most. Anecdotally, the amount of people who have suffered these symptoms have allowed us, as a society, to witness their normality and to accept and encourage those who would seek help.

Further research is needed to assess the full impact of this crisis on our societies' mental health and its ongoing effects as the pandemic unfolds. Without a genuine knowledge of what has happened, where we are, and what is needed to mitigate the damage, we will be attempting to paddle forward without a boat. Undoubtedly, psychological treatment will have an important place in the management of this, and hopefully, any forthcoming crisis. One hopes that it has been irrevocably demonstrated that we cannot separate the mind and the body, that our mental health comes with us in every step we take, and this fact makes it worth fighting for.

### Conflict of Interest

The authors of this manuscript have no financial,

personal, or professional conflict of interest to disclose.

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