




Past Epidemics, Natural Disasters, COVID19, and Mental Health: Learning from History as we Deal with the Present and Prepare for the Future

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Abstract

As cases of the coronavirus disease (COVID-19) continue to rise, psychological endurance is a challenge many people will face. For mental health, heightened stress responses to the pandemic, is likely to manifest in three ways: 1) development of a new episode of a disorder in those with a predisposition to a major psychiatric disorder or an acute exacerbation in those who already have such a disorder, 2) development of a trauma or stressor related disorder, such as acute stress disorder, Post Traumatic Stress Disorder (PTSD), or adjustment disorders, and 3) development of a symptomatic stress response that does not meet the diagnostic criteria of a psychiatric disorder. The authors reviewed existing literature on past epidemics, natural disasters, and COVID-19 with a focus on psychiatry and mental health. Psychological effects of past epidemics (Severe Acute Respiratory Syndrome CoV-1, Ebola, Middle East Respiratory Syndrome, the Anthrax threat), past natural disasters, and current COVID-19 data suggest numerous psychological effects following the pandemic. Alcohol use, PTSD, anxiety, anger, fear of contagion, perceived risk, uncertainty, and distrust are a few of the immediate and long-term effects that are likely to result from the COVID-19 pandemic. Identifying people in need of mental health care and determining the appropriate psychiatric services and therapy needed will be important. Increasing the use and availability of telehealth, group meetings, and online resources are some ways that health care workers can prepare for the increasing demand of psychiatric services during and following the pandemic.

Keywords COVID-19 · SARS-CoV-2 · Stress response · Psychiatry · Mental health

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Introduction

The coronavirus disease 19 (COVID-19) pandemic has impacted lives globally, posing unique challenges in all walks of life and for all fields of medicine. As of July 21, 2020, more than 14.7 million confirmed cases of COVID-19 have been reported worldwide [1]. The United States being the most affected country, reported 3.8 million confirmed cases [1]. With the pandemic impacting our lives in so many ways, psychological endurance is a challenge that many will continue to face in the coming months. Physical and social isolation, the disruption of daily routines, financial stress, food insecurity, and numerous other potential triggers for stress response have all been intensified due to this pandemic, setting up a situation in which the mental well-being and stability of individuals is likely to be threatened. The uncertain environment is likely to increase the frequency and/or severity of mental health problems worldwide. It has also been widely discussed by professional organizations that there is likely to be a surge in mental health and substance use disorder patients both during the pandemic and in its aftermath [2]. A national poll released by APA in late March found that more than 36% of Americans say that coronavirus is having a serious impact on their mental health [3]. Once the crisis is over, we will also need to ensure that time is made available to reflect on and learn from the extraordinarily difficult experiences to create a meaningful rather than traumatic narrative. The National Institute for Health and Care Excellence has recommended “active monitoring” of staff to ensure that the minority who become unwell are identified and assisted to access evidence-based care [4].

The COVID-19 pandemic has put healthcare professionals across the world in an unprecedented situation, having to make impossible decisions and work under extreme pressures. These decisions may include how to allocate scant resources to equally needy patients, how to balance their own physical and mental healthcare needs with those of patients, how to align their desire and duty to patients with those to family and friends, and how to provide care for all severely unwell patients with constrained or inadequate resources. This may cause some to experience moral injury or mental health problems. For example, a cross-sectional study of 1257 health care workers in 34 hospitals equipped with fever clinics or wards for patients with COVID-19 in multiple regions of China, a considerable proportion of health care workers reported experiencing symptoms of depression, anxiety, insomnia, and distress, especially women, nurses, those in Wuhan, and front-line health care workers directly engaged in diagnosing, treating, or providing nursing care to patients with suspected or confirmed COVID-19 [5]. These findings suggest that health care workers exposed to COVID-19 have a high risk of developing unfavorable mental health outcomes and may need psychological support or interventions.

Of the varying emotional responses to COVID-19, extreme fear and uncertainty are two that have become more evident in society. Both of these responses contribute to a heightened stress response that is likely to manifest as follows:

1. Stress is likely to precipitate an acute exacerbation of an existing mental disorder or precipitate a first-time episode of a mental disorder in those who are predisposed to it due to a biological or genetic vulnerability (stress-diathesis model)
2. Trauma or stressor related disorder (e.g. acute stress disorder, Posttraumatic Stress Disorder, or an adjustment disorders)
3. Symptomatic stress response that does not meet the diagnostic criteria of a formal psychiatric disorder

During and after this pandemic, individuals with existing mental illness, those with a predisposition, and those who are at high risk of developing mental illness are all likely to present with mental health concerns including insomnia, anger, extreme fear of illness, increased health risk behaviors (e.g. substance use and social isolation), new onset of mental health disorders (post-traumatic stress disorder, anxiety disorders, depression, and somatization), and lowered perceived health [6].

In this paper we review literature on the effect that past disease outbreaks and natural disasters have had on mental well-being. Our hope is that such a review can help us better predict the psychological effects of the COVID-19 pandemic. Specifically, the aim of this review is to:

1. review literature on the effect past disease outbreaks and natural disasters have had on mental health,
2. predict what might happen during and after this pandemic based on events in the past,
3. highlight patient populations that may need novel or increased psychiatric services following the COVID-19 pandemic
4. propose how to best manage new or exacerbated psychiatric symptoms, and
5. discuss how to prepare for the increased demand for psychiatric services following the pandemic.

Methods

As this is a preliminary review, the top 25 highly cited articles were utilized for each search. A sub selection of literature covering mental health implications of past pandemics were reviewed. Search terms included “mental health,” “psychiatry,” “epidemics,” “natural disasters,” “COVID-19,” and “SARSCoV2.” Google scholar and PubMed were used to search for primary and review articles pertaining to the search terms listed. Additionally, the World Health Organization, Centers for Disease Control, John Hopkins Resource Center, and the American Psychiatric Associations COVID-19 data and publications were reviewed in order to obtain a wider breadth of understanding when assessing the literature reviewed in this paper.

Impact of Stress on Mental Health and Well Being

People with Pre-Existing Mental Illness

Individuals with pre-existing mental illnesses already have a fragile and purposefully balanced lifestyle. Coping strategies and routines are built around challenges in everyday life in order to maintain a degree of certainty and control over personal emotional and mental stability. During and after pandemics, individual coping strategies, routines, and support systems can be disrupted. The role of stress in precipitating a psychotic episode in vulnerable individuals is well documented [7]. Similarly, the role of stress in producing an acute exacerbation in currently stable patients with a known diagnosis of a psychotic disorder is also well documented. Individuals with a mental disorder involving psychotic features represents an example of patients at particular risk of becoming unstable. Patients who have experienced psychosis commonly experience biased cognitive processes [8]. These include oversensitivity to threat,

threat anticipation, and tendency to perceive others as threatening [8]. Patients with existing mental illnesses with or without psychosis are likely to have experienced, to some degree, one of these biased cognitive processes. Bi directionality is hypothesized to exist between stress and biased cognitive processes, so that not only does perceived threat increase stress, but stress also increases the tendency of patients to look for threat [8]. The risk of mental instability and positive feedback cycles in this population is likely to occur during this pandemic, where stress is heightened, and threat is likely to be fueled by fear of illness and changing of routines.

In addition to cognitive biases being present, the type of coping strategies used influences the mental fortitude of individuals. Those with existing mental illnesses who have not developed adaptive coping strategies are particularly at risk of becoming unstable. Maladaptive coping strategies, such as distraction seeking and emotion-oriented coping is likely to cause an even higher level of threat sensitivity, aggravating psychotic symptoms [8].

Individuals experiencing symptoms of depression represent another example of patients who are at an increased risk of being negatively affected. While task oriented coping methods were found to be protective against perceived threats and levels of heightened stress, clinically depressed patients are less likely to have the motivation to engage in protective coping strategies [9]. Maladaptive coping strategies used by this population may exacerbate symptoms.

The COVID-19 crisis and all challenges associated, pose considerable disruption to the fragile balance, or the lack thereof, of daily life for individuals with pre-existing mental illnesses.

People with a Predisposition for Developing a Mental Illness

Individuals who have an underlying predisposition for developing a mental illness are also at an increased risk of becoming mentally unstable during and after the pandemic. The stress-vulnerability model suggests that mental illness manifests when an individual's threshold for tolerating elicited stress is exceeded [10]. In other words, there is a genetic predisposition and intrinsic vulnerability that with the addition of psychosocial stressors leads to the development of a mental illness [11]. Goh and Agius discuss how stress may lead to the development of disease at a cellular level [11]. Our body experiences stress through the release of cortisol. Increased cortisol acts on areas of the brain including the hippocampus and hypothalamic-pituitary-adrenal (HPA) axis to alter intracellular levels of trophic factors such as BDNF in neurons. Ultimately affecting neurogenesis and plasticity in the brain [11]. In addition to a genetic predisposition, the ability of stress to change the neural signaling within the brain, there is a biological balance that is important for individuals to maintain during times of crisis. Not everyone who has a genetic predisposition for a disease develops that disease, however, it is important to identify this population with an aim to decrease the additional psychosocial stressors vulnerable populations experience. Preventing individual thresholds for stress from being overwhelmed and identifying when these thresholds are overwhelmed will be two important aspects in preventing and managing disease.

Trauma and Stressor-Related Disorders

A direct threat to one's life, e.g. serious physical injury, sexual violence, witnessing an unexpected death, immediate threat to life, etc. can result in psychological trauma. Reactions to a psychological trauma can include intrusive thoughts, nightmares, avoidance of reminders

of the trauma, self-blame, being “on edge,” concern for safety, irritability, and concentration problems. In some cases, psychological trauma can lead to a diagnosable psychiatric disorder such as acute stress reaction, an adjustment disorder, or PTSD. The COVID-19 pandemic has created stressful working environments for many people. Having regular contact with people who experience severe symptoms of COVID-19 or die from it may become traumatic over time. Frontline hospital staff and other key workers have a [higher chance](#) of experiencing mental health conditions during the pandemic [12]. A study published in *medRxiv* reported that Chinese citizens showed acute posttraumatic stress symptoms (PTSS) during the outbreak of the novel coronavirus COVID-19 [13]. PTSD was also the most common psychiatric disorder to arise after the Severe Acute Respiratory Syndrome (SARS) outbreak, with medical staff being significantly affected [13].

People with Symptoms but Who Do Not Meet Diagnostic Criteria for Psychiatric Disorder

The stress-vulnerability model above discussed how additional stressors experienced by individuals with an intrinsic vulnerability, or lower threshold for stress, develop mental illnesses. On the other hand, the stress adaptation model is a strategy that potentially raises the threshold of stress needed to develop a mental illness. The stress adaptation model is practiced when the experience of stress is understood as a universally experienced response to extraordinary circumstances [14], normalizing the experience of stress in order to adapt to the stressor.

Constructive coping mechanisms are also used to develop adaptive responses. When stressors overwhelm coping mechanisms and the experiences of stress overwhelm the ability to normalize experienced stress, individuals can experience mental distress. While the response to stress may still be in the realm of a normal reaction and may not meet diagnostic criteria for a mental illness, it is vital to address and help this population. Healthcare workers represent an example of this population. Healthcare workers may face an enormous amount of stress in the workplace and from people outside the workforce due to stigmatization and avoidance behaviors [15]. The coping mechanisms and stress adaptations that allow normal responses, may be overwhelmed by the continued exposures to the numerous stressors.

While the pandemic is a growing source of direct traumatization for front line health care workers, it is also a growing source of vicarious traumatization for non-front-line health care workers and the general public [16]. It has been suggested that non-front-line health care workers experience more vicarious traumatization as a result of COVID-19 for a few reasons [16]. Non-front-line nurses may not have been as prepared limiting the psychological endurance and preparation, they may experience more uncertainty due to having less direct knowledge and experience, and they may experience more worry and sympathy for their frontline colleagues [16]. Even when healthcare workers, non-front-line workers and other vulnerable populations may not meet criteria for a psychiatric diagnosis, they will still need support in order to maintain mental stability and sense of well-being.

Overview of Literature

There has not been an infectious disease outbreak similar to the COVID-19 pandemic in recent history. However, by reviewing literature from outbreaks in the past such as the SARS CoV-1,

MERS, Ebola, the Anthrax threat in the U.S., and various natural disasters, it is possible to propose what might happen based on similar events in the past.

SARS CoV-1

The SARS CoV-1 was first reported in Asia in 2003, spreading to countries in North America, South America, Europe, and Asia, infecting more than 8000 people as described by the Centers for Disease Control [17].

A few studies regarding healthcare worker's experiences following SARS CoV-1 have been reported. Healthcare workers represent a unique group of people who have experienced numerous stressful events throughout the pandemic. While there may not be a clinical psychiatric diagnosis that manifests, it is important to identify post-traumatic stress symptoms, and increased health risk behaviors such as alcohol and tobacco use [18]. Three years after the SARS CoV-1 outbreak in Beijing, it was found that among certain subcategories of health care workers, there were higher mean alcohol abuse/dependence symptoms [18]. These subcategories included men ages 36–50, lower educational levels, upper-middle level family income levels, those who worked in units with high levels of exposure, and those who had been quarantined [18].

In addition to increased alcohol abuse/dependence in healthcare workers, it might also be important to screen for depressive symptoms [19]. Following the SARS CoV-1 outbreak having been quarantined and pre-SARS trauma exposure were predictors of high levels of depressive symptoms three years after the outbreak [19]. While specific groups of healthcare workers may be affected differently during this pandemic, this highlights the long-term effects the COVID-19 pandemic is likely to have on healthcare workers.

MERS

In 2015 there was an outbreak of Middle Eastern Respiratory Syndrome (MERS) in Korea resulting in a 20% mortality rate [20]. Much like COVID-19, preventive vaccine and treatment options were not clearly established. During the MERS epidemic 80.2% of the general public reported fear of being infected, and 46% reported emotional distress [21]. Risk factors associated with the fear among the general public included public transportation use, difficulty going outside, perception that the state is not protecting people, helplessness in situations that cannot be controlled, and fear of infection [21]. In many ways the nature of the MERS epidemic was similar to the COVID-19 pandemic in the sense that fear of being infected and many of the risk factors contributing to that fear are felt today.

Anxiety and anger are two emotions commonly expressed in times of uncertainty. MERS patients and those thought to have come in contact with MERS patients isolated for an average of two weeks. During isolation, 47.2% of MERS patients reported symptoms of anxiety, and 19.4% reported these symptoms persisted 4 to 6 months later [21]. This represents the lasting effects that experience anxiety can have on people during isolation.

Anger, as a temporary feeling, was also assessed in those without anger disorders [21]. During isolation, 16.6% of individuals who were isolated and 28.1% of MERS patients who were isolated reported persistent anger four to six months later [21]. With the similarities between the MERS epidemic and the COVID-19 pandemic, this information can be useful in how we assess individuals during and after isolation. It is important to identify symptoms of

anxiety, anger and aggression during and after isolation and quarantine to prevent these symptoms from evolving into long-term PTSD.

Ebola

The Ebola outbreak in 2014, with the virus' highly infectious and virulent nature, rapid progression, and high fatality rate resulted in extraordinary levels of fear [22]. Heightened anxiety throughout the United States was experienced indirectly through ongoing and widespread media coverage of the few cases of Ebola reported in the United States. The Ebola outbreak developed as a "contagion of fear" representing behavioral health effects that are not directly related to or limited by the proximity to the infectious outbreak [22]. Resulting fear-based decisions to quarantine, against medical advice, may have influenced the general public's distrust, as well as increasing confusion and anxiety.

Anthrax Threat

In 2001, following the 9/11 terrorist attacks, the U.S. experienced its first bioterrorism incident. Letters filled with anthrax were delivered to political officials on Capitol Hill. While bioterrorism is different in many ways from an epidemic, the psychological distress is similar. Much like the effects of COVID-19, the magnitude and effect of the anthrax attacks were delayed and uncertain. This uncertainty commonly leads to fear and can manifest and exacerbate mental instability and illnesses. The anthrax threat demonstrated a time that stress was not only experienced by those directly exposed, but also in those that believed they were exposed [23]. Individuals who incorrectly believed they were exposed, were shown to be at increased risk of being very upset, losing trust in health authorities, and having concerns about mortality [23]. Losing trust in health authorities is an important implication that should be identified early. During an outbreak trusting and following recommendations set by healthcare officials is the way that the outbreak is controlled. The risk of individuals changing their healthcare behavior based on distrust in authorities is an important risk that can be translated to the COVID-19 pandemic. Whether an individual was exposed or not, the beliefs about their exposure may be a more powerful predictor of mental health outcomes [23]. With constantly changing and differing policies between countries and states surrounding COVID-19, steps taken to control the spread of disease, and the vast amount of misinformation distributed among the general public, the belief of exposure is likely to widely vary among individuals.

Natural Disasters

While pandemics represent a unique form of natural disaster resulting in both adverse psychological and behavioral responses, the psychological effects of natural disasters represent another area that can be investigated to conclude how human behavior changes in response to disasters and crises.

Natural disasters commonly result in distress reactions, increased health risk behaviors, and exacerbation or manifestation of psychiatric disorders [22]. The psychological effects of natural disasters can last for a significant period of time. Following the Wenchuan earthquake in 2008, 38.3% of adolescents reported sleep disturbances 12 months after the event with no significant reduction at 24 months after the event [22]. Because sleep is an integral part of physical and mental health, the lasting effects that this natural disaster had on adolescent's

sleep represents a distress reaction that increases the risk of developing mental and physical health problems in the future.

The Japan triple disaster, on March 11, 2011 in which an earthquake, tsunami, and a meltdown at a nuclear power plant represented a severe natural disaster [24]. A study assessing health risk behaviors following the event identified a significant increase in alcohol use following the disaster [25]. In this study out of 37,867 individuals who did not drink prior to the Japan triple disaster, 9.6% reported drinking in 2012, and 53.8% reported continued drinking in 2013 [25]. This is an example of health risk behaviors that may be long lasting following a crisis. Similar to decreased sleep, increased alcohol use over time can have deleterious effects on the mind and body.

Another high-risk group of people who might experience long term effects of the experiences surrounding the pandemic are children. Experiencing a natural disaster by age 5 has been shown to significantly increase the risk of mental health and substance use disorders in adults [26]. In addition to the direct experience of the natural disaster, this response is also likely due to changing parenting styles [26]. Parenting styles during natural disasters demonstrated increases in maltreatment behaviors and emotional support [26]. This highlights the importance of identifying children and parents that may be experiencing greater amounts of stress or are unable to cope with new stressors.

While there are many different aspects to how an infectious disease outbreak and a natural disaster affect mental health, there are also similarities. An abrupt change in daily life, a sense of uncertainty about the future, resource limitations, fear for personal well-being, increased use of media and spread of misinformation represent a few of the similar experiences felt during a pandemic and natural disaster.

Anticipated Psychiatric Effects of COVID-19

In the last week of March 2020, there were over 3 million unemployment claims in the U.S [27]. In addition to the fear and uncertainty surrounding control of the spread of disease; unemployment; potential threat to meeting physiological needs of self and loved ones; and the numerous other biopsychosocial stressors experienced are all likely to pose a threat to mental well-being. This can manifest as acute exacerbations of known disorders in stable patients, new onset of mental disorders in vulnerable patients, stressor-related disorders, and a host of other psychiatric symptoms. This is likely to necessitate a system-readiness for providing psychological support and for making sure that appropriate resources to provide evidence-based interventions are in place.

One of the widespread methods to control spread of disease during the COVID-19 outbreak is the use of quarantine. A review published on the psychological impact of quarantine in past pandemics identified resulting post-traumatic stress symptoms, confusion, and anger as commonly experienced negative psychological effects [28]. Stressors during quarantine included infection fear, frustration, boredom, inadequate supplies, inadequate information, financial loss, stigma, and increasing quarantine duration [28]. The numerous psychological effects and additional stressors demonstrated by past quarantines are likely to reappear.

While the psychological distress during and following COVID-19 is an enormous threat to mental well-being in communities across the globe, the human central nervous system may also be directly affected by the immunologic response of the virus itself [29]. While neuropsychiatric sequelae may only be experienced by a fraction of cases, given the global burden of COVID-19 infection the implications of any delayed complication will be significant. With

neuropsychiatric symptoms as a result of viral infection in the past being noted, they have largely been unexplored. Troyer et. al. suggest that the psychoneuroimmunology perspective following the COVID-19 pandemic will be an important aspect in the developing effects of the current pandemic [29].

Implications for the Future

Past epidemics including the outbreak of SARS CoV-1 in 2003, Ebola in 2014, and MERS in 2015, the Anthrax threat in 2001, responses to past natural disasters, and articles already published on COVID-19, suggest the potential for numerous psychological effects during and following the COVID-19 pandemic.

Alcohol use disorder, PTSD, anxiety, anger, fear of contagion, perceived risk, uncertainty, and distrust are just a few of the immediate and long-term effects that will likely result from the COVID-19 pandemic. In addition, long-term health risk behaviors, distress reactions, and inappropriate coping mechanisms pose a risk of exacerbating mental disorders and threatening mental stability.

Patients with existing mental illnesses, such as schizophrenia, depression, anxiety, and bipolar disorder are likely to have a difficult time coping with the effects of a pandemic. There is also an increased risk of acute exacerbations in patients who may be stable on maintenance treatments. The stressors that have been seen following past times of crisis pose a difficult barrier for patients to overcome.

Individuals who have an intrinsic vulnerability to develop a mental disorder, represent another vulnerable population. The stressors posed by the COVID-19 pandemic may be what threatens their mental stability, resulting in the manifestation of diseases, such as PTSD, depression, new-onset psychosis, anxiety, or substance use disorders.

Lastly, individuals such as healthcare workers, family members of infected individuals, and those quarantined who are exposed to an abnormal amount of stress represent a vulnerable population. While this last group may not develop criteria for a mental disorder, they are potentially at risk of needing psychological services to overcome the exorbitant amount of stress they have experienced.

What Steps Should Be Taken

The long-term impact of COVID-19 on mental health and well-being is likely to take months before it becomes fully apparent. In the meantime, managing this impact will require a concerted effort from the health care system at large, not just from mental health care providers. It will be important to identify patients with existing illnesses who present in acute crisis, to catch new cases of mental illness in individuals not previously diagnosed, and to provide support for those who do not meet criteria for a mental disorder but will need therapy. In order for these three groups to be identified and services made available, there will need to be an increased amount of screening performed.

Once patients have been identified, the appropriate psychiatric services and therapy will need to be tailored to presenting problems. This includes education on coping mechanisms, stress adaptation, cognitive behavioral therapy, and pharmacotherapy to name a few.

With this surge in psychiatric disorders, increasing pharmacotherapy will need to be monitored for adverse effects and drug interactions. For therapy-based services, patients will need to be assessed adequately to identify which therapies are indicated and available.

For individuals who do not meet criteria for a medical diagnosis, coping strategies, support, and resources should be provided.

There is a need for further research to assess the impact of the pandemic; to design or identify instruments that can screen for varied presentations as discussed above; to determine effective and efficient care delivery models; and to assess the impact of COVID-19 on vulnerable populations, such as children and adolescents, those who face barriers in accessing health care, and those belonging to lower socio-economic strata. Another line of research will be needed to determine the mental health consequences of social isolation for vulnerable groups, and how can these be mitigated under pandemic conditions.

Additionally, the neuropsychiatric impact of Covid-19 is still largely unexplored and research that evaluates the direct neuropsychiatric consequences will also be needed to improve treatment, mental health care planning and for preventive measures during potential subsequent pandemics [30].

Conclusions: Safeguarding Mental Health and Well-Being in an Already Saturated Area of Health Care

With the national workforce shortage of psychiatrists, primary care physicians, and mental health providers prior to COVID-19, it is imperative to discuss how the health care field will manage the increase in patients in need of psychiatric services.

One way that mental health care providers can accommodate an increasing demand for mental health services is through telehealth. With social distancing guidelines, telehealth has become a much more commonly used resource, gaining familiarity among providers, physicians, and patients.

With a limited number of mental health care professionals and a growing number of people in need of services, group therapy may also prove to be beneficial.

In addition to telehealth and group therapy, online resources will be crucial for patients and individuals in need of mental health resources. Cognitive behavioral therapy, meditation, and other online modules that people can do at home on their own time could be beneficial for those that are not able to schedule a face-to-face meeting with either a therapist, psychiatrist, or other mental health provider. During the pandemic, we'll also need to find ways to create physical and social supports to ensure mental health during these times of social distancing.

The pandemic also provides us with an opportunity to develop population level approaches to provide prevention-focused and evidence-based mental health care that is efficient and effective and to emerge from this pandemic with new ways of doing so. We must recognize that the global Covid-19 pandemic will most likely be followed by another pandemic of mental and behavioral illness and we need to implement the steps needed to mitigate it [31].

Clear communication and secure services from a multidisciplinary mental health care team will need to be established in order to adequately manage rising psychiatric demands. The field of medicine is being challenged in unprecedented ways, necessitating change. The experiences of the COVID-19 pandemic will affect each individual in drastically different ways and will

have lasting effects. It is crucial to address the issue of mental health during and after this pandemic.

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Compliance with Ethical Standards Authors have included the following statements regarding:

Disclosure of Potential Conflicts of Interest Attached.

Research Involving Human Participants and/or Animals This work did not involve Human Participants and/or Animals.

Informed Consent Not applicable.

Conflicts of Interest/Competing Interests (Include Appropriate Disclosures) None. COI form is attached.

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