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COVID-19: Embracing Mental Health Upshot from the Coronavirus Pandemic Crisis

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Abstract

The ongoing coronavirus disease-2019 (COVID-19) pandemic hails plenty of containment measures, such as lockdown, physical distancing, quarantine, and isolation. Together, these measures in general have been exerting a detrimental impact on global mental health. Thus, tackling this psychological impact is a top priority. To date, since December 2019, many studies in different countries have been conducted to mount these impacts, including acute stress disorder, generalized anxiety disorder, depressive disorder and post-traumatic stress disorders. We reviewed current literature on COVID-19 to evaluate its impact on mental health according to age, physical condition (i.e., pregnancy, prior chronic disorders, previous mental disorders), period, social stigma. Particularly, we put a special focus on the psychological reactions during the stages of this pandemic among the general and affected population. Perceiving the pathophysiology of mental health impacts of COVID-19, their risk factors, and their outcomes in

society (e.g., suicide, domestic violence, and subsequent mental health problems) will have tremendous value to direct the management strategy and tailor interventions.

Categories: Psychiatry; Psychology; Public Health

Keywords: COVID-19; Global mental health; Frontline workers; Lockdown; Anxiety; Suicide; Domestic violence

1. Introduction

The SARS-CoV-2, also known as severe acute respiratory syndrome coronavirus 2, had its first outbreak in Wuhan, China in December, 2019 and has rapidly spread throughout the entire world. In March 2020, the World Health Organization called this outbreak a pandemic, and the United States (US) declared the outbreak as a national emergency, with New York City as its epicenter [1]. This tragic occurrence and such immense loss of valuable lives have definitely created fear and anxiety among the general population. As a result, multiple regulations and rules have been implemented to protect the nations from the contagious coronavirus disease-2019 (COVID-19).

The imposed rules were majorly recommendations for all individuals to follow in their daily life, which brought about a tremendous psychosocial impact and added more to the pre-existing stress. Measures such as lockdown, limited gathering, social distancing, and wearing masks almost all the time in public have changed the entire infrastructure of many nations [2]. Some individuals are essential workers and have had to manage the risk of being infected with COVID-19, while others have had to work from home. Moreover, many people have also lost their jobs due to economic loss and shut down of several industries and facilities.

It has been nearly 6 months, dealing with COVID-19 and its physical, social, and mental effects. Some of its consequences and issues have been addressed, while many problems are presently dealt with through trial and error and others are still evolving [3]. While people are coping up with the new norm, many research studies have been conducted on the impacts of COVID-19 on mental health and its psychosocial effects on various societies, essential workers, and different age groups in different countries [4]. In our study, we have reviewed the current literature on COVID-19 with a special focus on the most common psychological effects of COVID-19 which are still prevailing to date. The findings of our study would provide future researchers with insights into mental health challenges associated with the COVID-19 pandemic.

2. Background

The COVID-19 outbreak has warranted a significant influence on our mental health. Hence, monitoring and tackling this issue is a top priority. It is essential to protect our mental health and develop appropriate interventions to preserve our psychological health during this global pandemic crisis. Along with different measures to contain the

rapid spread of COVID-19, immediate attention to taking care of mental health is our urgent call now. Our study is aimed to analyze the existing literature on COVID-19 and to outline the psychological impacts of the COVID-19 pandemic.

3. Epidemiology

SARS-CoV-2 is the third zoonotic coronavirus, after Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS), that seems to have major pandemic potential. At the end of 2019, a cluster of pneumonia cases caused by unknown origin was divulged at Wuhan City of Hubei Province in China. After Wuhan, the disease rapidly spreads throughout the whole of China and later to other parts of the world. People contracting COVID-19 have been experiencing a wide variety of mental issues starting from unusual acute stress, generalized anxiety disorder, depressive disorder, panic attack, and post-traumatic stress disorder (PTSD) to a wide spectrum of emotional disturbance. In addition to social and demographic attributes, pre-morbid physical and mental health conditions, and access to health communication, different coping mechanisms and top of that psychosocial support are closely related to it [5].

4. Pathophysiology

To this date, various pathological entities have been explored by researchers to explain the psychiatric effects of COVID-19. These effects are being compared to previous psychiatric effects experienced by SARS or MERS patients [6]. Several studies conducted on patients affected by the acute phase of SARS and MERS infection showed increased stress levels with signs of major depressive disorder, anxiety, PTSD, and psychoses with suicidal behavior. Long-term follow up on SARS patients also demonstrated persistence of memory impairment, sleep disturbance with stress, anxiety, depression, and PTSD [7]. Yet, few studies have been carried out to assess the long-term affliction on the mental health status of COVID-19 affected patients. Nevertheless, several factors have been reported to affect the mental health status of COVID-19 patients. These factors include, 1) close involvement with health care, 2) family history or previous history of psychiatric illness, 3) Little to no social support, 4) elderly, 5) isolation due to COVID-19, and 6) use of high-dose steroids [8].

McCray et al. [9] reported that significant levels of proinflammatory cytokines, particularly IL-1, IL-6, and IFN-γ, affect the CNS of K18-hACE2 transgenic mice infected by SARS-CoV. Cheng et al. [10], in a case series study conducted in China, proposed that a key mechanism affecting the mental health of the patients is the "Cytokine Storm," which results in elevated levels of IL-1, IL-6, and IFN-γ through down-regulation of angiotensin-converting enzyme-2 (ACE2). Down-regulation of ACE2 leads to dysregulation of renin-angiotensin-aldosterone-system, thus reducing Mas receptors and activating bradykinin and complement levels, including C5-C9 components [10, 11]. In a meta-analysis of 18 studies, Raony et al. [8] have depicted the involvement of intricate neurohormonal networks in developing severe psychiatric disorders. Proinflammatory cytokines that are soluble have been shown to reach the

brain and influence the level of neurotransmitters such as dopamine, serotonin, and norepinephrine. Alteration of these neurotransmitters levels is responsible for several psychiatric disorders such as major depressive disorder, anxiety disorder, and PTSD [12]. Multiple studies have shown cytokines to be responsible for causing memory deficits [13], behavioral deficits, and psychological impairment. Individuals with specific biological characteristics, such as obesity, pregnancy, aging, poor nutrition, and sedentary lifestyles, are hypothesized to be more affected by COVID-19 [8, 14, 15]. The effect of down-regulation of hypothalamic ACE-2 levels has also been considered a potential mechanism by which SARS-CoV-2 cause hyperactivity of the hypothalamic-pituitary-adrenal axis, leading to increased glucocorticoid production and consequently causing increased stress and psychiatric disturbances [16].

5. Discussion

COVID-19 has significant impacts on the global population, including the general public, patients and their families, and health-care workers. In this section, we discuss the mental health effect and outcomes of COVID-19 in society. We demonstrate the mental health effects of COVID-19 on the general population according to different age groups (who are affected or not affected by COVID-19), health status, and the duration of effect (long term and short term). Additionally, we shed light on the effects of COVID-19 on the mental health of health-care workers. The overall effect upon society also grabs attention in our discussion.

5.1 Mental health effects of COVID-19

5.1.1 Mental health effects on the general population according to different age group

5.1.1.1 On adult (>19 years)

i) Adults who are not infected by COVID-19: Many mental issues and significant consequences regarding mental wellness, including stress, anxiety, depression, frustration, and uncertainty, developed progressively during the outbreak [4, 2]. Generalized fear and pervasive community anxiety are typically associated with the outbreak and expanded with heightening of new cases. Mass quarantine and inadequate, anxiety-provoking information provided by the media have played a key role in developing such fear and anxiety [4]. Studies reported a higher incidence of various psychological symptoms as psychological responses to quarantine, social isolation, financial security, and being at higher risk of contracting COVID-19 [4, 2, 17, 18]. The reported psychological symptoms involve emotional disturbance, mood alterations, irritability, post-traumatic stress symptoms, anger, fear, insomnia, confusion, grief, and numbness. A recent review by Luo et al. [2] showed that social distancing and loneliness are strongly correlated with depression and stress. Also, populations with worse health or social inequality are more vulnerable to the psychological distress of COVID-19 [2]. Ustun [19], in a cross-sectional study in Turkey, found that depression levels in female participants (aged 18–29 years, single, student, and had income lower than their expenses) were higher than others. Moreover, participants who had to change their place of residence during the COVID-19 quarantine suffered from loneliness, death anxiety, hopelessness, and sleep disturbances, felt useless and

worthless, started to smoke and drink alcohol, and experienced depression at moderate levels [19] (Table.1). An online survey performed during the COVID-19 pandemic in Australia also proved the association between these psychological symptoms and the COVID-19 measures [20] (Table.1). In India, Verma and Mishra [21], in their cross-sectional survey, revealed that the average score of DASS-21 (Depression Anxiety Stress Scale-21) was 8.39 for depression subscale, 6.53 for anxiety subscale, and 8.83 for stress subscale [21]. Almost one-fourth (25.1%) of the participants were depressed, 99 participants (28%) were anxious, and 41 (11.6%) were stressed over the period [21] (Table.1). Vindegaard and Benros [22] found that the overall general population had lower mental prosperity and higher levels of anxiety and depression as compared to before the outbreak. There was, however, no change in these manifestations after a month from the initial phase of the outbreak. In the study of Wang et al. [23], respondents reported higher levels of stress, anxiety, and depression due to the impact of the COVID-19 outbreak in China. Nonetheless, Wang et al. [23] argued that accurate COVID-19 information and preventative measures such as wearing masks, regardless of the presence or absence of symptoms, were correlated with decreased levels of anxiety and depression [23] (Table.1).

ii) Adults who are infected by COVID-19: Luo et al. conducted a systematic review and meta-analysis on studies evaluating the psychological and mental impact of COVID-19 from November 1, 2019, to May 25, 2020, as well as WHO COVID-19 database to evaluate the psychological impacts of COVID-19 [2]. Their findings showed that the prevalence of anxiety, depression, and post-traumatic stress symptoms/disorders among patients with COVID-19 was the higher than that reported in health-care workers and the general public (prevalence ranged 3% [2%-4%] to 16% [15%-17%]) [2]. The Italian "COVID-IT-mental health trial," conducted by Giallonardo et al. [3], reflected that the effects of COVID-19 on the emotional wellbeing of isolated patients (directly or indirectly exposed to SARS-CoV-2) have been mostly neglected during the acute emergency phase. This has been attributed to the fact that COVID-19 is potentially life-threatening, which has been supported by the increased number of patients admitted to intensive care units. The experience of being isolated in the hospital, the perceived danger, uncertainty about own physical conditions, and the fear of dying alone can be considered risk factors for the advancement of post-traumatic, anxiety, and depressive symptoms [3]. In China, a survey over 285 residents in Wuhan, China revealed the COVID-19 pandemic has had a high commonness of post-traumatic stress symptoms (PTSS) in COVID-19 positive patients which were 7% [24]. Most importantly, females were commonly experiencing alteration in cognition, mood, and hyper-arousal agitation [24]. Further, Vindegaard and Benros [22] found that COVID-19 patients had high levels of PTSS (96.2%) and depressive symptoms.

5.1.1.2 On children (<18 years) and pregnant women

During the acute phase of the outbreak, there has been an increase in children's depressive symptoms probably because of serious infections, social distancing measures, reduced access to support services, financial downturn, consequences of anxiety, stress, and violence exposure [25, 26]. Loades et al. [27] reviewed 63 studies with 51, 576

participants (children, adolescents, and young adults) and discovered a reasonable association between loneliness and psychological wellness issues in kids and youths. Loneliness has been also associated with future mental health problems up to nine years later. Loades et al. [27] also explained that loneliness was associated with elevated depression in girls and elevated social anxiety in boys. The length of loneliness is a significant predictor since the period that schools should remain closed is expected to be long and the social distancing within schools would last for extended periods of time [27]. The pilot data shared by the London Hospital suggest that maternal levels of anxiety at the tail end of the pandemic in the UK appear low, with depression levels following a similar pattern. This is likely to be due to increased available information and reassurance through social media, health-care professionals, and primary care [28, 29].

5.1.2 Effect on adults with other chronic disorders

The older adults and those with multimorbidities, poor health status, and no formal education experienced a psychological impact of the outbreak and more significant levels of stress, anxiety, and depression [23]. Social isolation, loneliness, end of life care, and bereavement may be exacerbated in this patient population because of their pre-existing comorbidities [1, 18].

Table 1: Several studies have examined the psychological effect among subjects during the COVID-19 pandemic. The table illustrates a summary of these studies.

Author(s) of the publication	Study design	Sample of the study	Social distance or lockdown encouraged by the local authority during the study period?	Summary of study results	Limitations of the study	Conclusion of the study
Ustun [19]	Cross-Sectional	1115 Turkish adult citizens aged between 18 and 65 years participated in an online survey.	Yes	Single females had significantly higher depression levels than other participants. The depression levels were higher in 18–29-year-olds (compared to other age groups), students (compared to public employees), and financially struggling individuals. Participants who had to relocate during the quarantine experienced moderate depression. Depression scores of individuals who spent time with their family members, self-care, or productive activity were lower compared to others.	(i) As the samples were collected via the Internet, the number of samples from the elderly population (50–65 years) was limited. (ii) Because of irregular representation, more participants were from the Black Sea region of Turkey. (iii) With the absence of a control group, it was uncertain whether the variables were affected by the quarantine process or by previously diagnosed depression.	The COVID-19 pandemic caused mild-level depression in Turkish society.
Verma and Mishra [21]	Cross-sectional	354 participants from India were recruited by convenience sampling using an electronic self-reported questionnaire.	Yes	25% of the respondents showed moderate to severe depression. Twenty-eight percent of them indicated they felt more anxious. Employment and binge drinking were	(i) The results of this study could not assign causal nature because of its cross-sectional nature. (ii) Results from convenience sampling could not represent the general population. (iii)	Depression, anxiety, and stress among the Indian population during the lockdown were prevalent.

				significantly associated with both depression and anxiety. Males were more than two times likely to be anxious than females (no gender association for depression).	Reporting bias.	
Wang et al. [23]	Cross-sectional	1210 respondents from 194 cities in China through an online survey using snowball sampling techniques.	Yes	53.8% of respondents indicated having a moderate or severe psychological impact from the COVID-19 outbreak. 6.5% had moderate to severe depressive symptoms; 28.8% reported moderate to severe anxiety symptoms, and 8.1% mentioned having moderate to severe stress levels. Female gender, student status, and specific physical symptoms showed an association with a greater psychological impact of the outbreak. Timely, proper, accurate, and up to date and health information along with specific preemptive measures were associated with a lower psychological impact.	(i) The study populace did not mirror the genuine pattern of the general population in the absence of random sampling. (ii) As contact details were not preserved, a follow-up prospective study is not possible. (iii) Actual mental health assessment by health professionals in the same populace may not be aligned with self-reported levels of psychological impact, anxiety, depression, and stress.	The authors suggest the formulation of psychological interventions to improve mental wellbeing and mental versatility during the COVID-19 outbreak.

Stanton et al. [20]	Cross-Sectional	1491 Australian adults were recruited using an online anonymous survey.	Yes	Respondents indicated negative changes to several of their habits including physical activity (48.9%), sleep (40.7%), alcohol (26.6%), and smoking (6.9%) since the beginning of the COVID-19 pandemic. These negative changes were associated with higher depression, anxiety, and stress symptoms. Singles, females, lowest-income category individuals, 18-45-year-olds, and persons with chronic illnesses had significantly higher scores in one or more psychological distress states	(i) Recall bias as all responses were self-reported. (ii) Cross-sectional study cannot infer causality. (iii) Generalizability to other populations outside the study was not confirmed, especially with those with different characteristics.	Attempts to reduce the acute and chronic increase in psychological distress due to the COVID-19 pandemic can be done through effective and frequently evaluated, health-promotion strategies directed towards maintaining positive health-related behaviors.
Xie et al. [26]	Cross-Sectional	With the parents' consent, an online survey collected responses of 1784 students from grade 2 through 6 in 2 primary schools in two cities (Wuhan and Huangshi) in Hubei Province, China.	Yes	22.6% of students indicated having depressive symptoms, which is greater than other investigations in primary schools of China (17.2%). 18.9% of students responded to having anxiety symptoms, which is higher than the prevalence in other studies. Students in Wuhan had significantly higher Children's Depression Inventory - Short Form (CDI-S) scores than	(i) The study could not assess whether these outcomes will be long-lasting after the COVID-19 outbreak.	The findings from this study as well as research during the 2003 SARS outbreak suggest that serious infectious diseases may influence the mental health of children similar to other traumatic experiences.

				those in Huangshi, with a greater risk of depressive symptoms		
Fitzpatrick et al. [30]	Cross-Sectional	10,368 adults from the USA through an online survey.	Variable	Data analysis shows clear spatial diffusion of COVID-19 fear which is concentrated in regions that had the highest reported COVID-19 cases. Fear from COVID-19 was significantly associated with gender (female), race (Asian, Hispanic), and other socially vulnerable respondents. These groups also showed more depressive and anxiety symptoms. On average, depressive symptoms were high, and more than 25% of the sample showed moderate to severe anxiety symptoms	(i) Because the survey was collected online, there is a probable over-representation of urban, middle-class residents and underrepresentation of rural, lower-class residents in the data. (ii) In the absence of longitudinal analysis, the study does not show cause and effect. In the absence of longitudinal analysis, the study does not show cause and effect.	Extensive psychosocial research with nationally representative samples is required to identify potential mental health risks, as well as to construct specific mental health interventions.

5.1.3 COVID-19 effect on individuals with pre-existing mental disorders

In China, during the initial phase of the pandemic, people with mental health disorders were generally more prone to infections for several reasons. First, cognitive impairment, little awareness of risk, diminished efforts regarding personal protection in patients, and confined conditions have increased the risk of infections including pneumonia. Second, once people with mental disorders contracted COVID-19, they could be exposed to more barriers associated with mental ill-health in health-care settings and outpatient visits due to nationwide regulations on travel and quarantine [31]. This hampers accessing timely health services and the comorbidities to COVID-19 make the treatment more challenging for these patients. Third, as people with mental health conditions are highly susceptible to stress than the general population, they could be more substantially influenced by the emotional responses (e.g., fear, anxiety, and depression) brought on by the COVID-19 outbreak. These findings indicate relapsing or worsening of an already existing mental health condition [1, 4, 22, 31].

5.1.4 Effect on health-care workers

Health-care workers are more prone to psychiatric morbidities because of dread of getting infected with the virus, having increased risk of exposure and transmission of COVID to their families resulting in isolation [1, 32]. The review found that female nurses have had higher psychological distress compared to men because they are more vulnerable to stress. In China, a cross-sectional study of 1257 health-care workers in 34 hospitals and a review of articles concerning mental health related to COVID-19 found that clinical workers [16] in their fight against COVID-19 have been managing intense pressure due to the high risk of infection and insufficient protection against contamination as well as overwork, frustration, discrimination, isolation, patients with negative, and lack of contact with their families and exhaustion. This enormous pressure has resulted in stress, anxiety, depressive symptoms, insomnia, denial, anger, and fear [14, 17]. A study conducted upon a total of 120 surgical medical staff of Baoshan Branch of Shanghai Shuguang Hospital found that the anxiety score of the surgical staff during the outbreak period was significantly higher than that of the surgical staff during the non-outbreak period (t = 6.432, P <0.001) [33]. The depression score of surgical staff during the outbreak was higher than that during the non-outbreak (t = 4.531, P <0.001). At the same time, the dream anxiety score and SF-36 of the surgical staff during the outbreak were significantly higher than that during the non-outbreak (t = 17.365, P <0.001; t = 1.974, P <0.001) [33]. Another study conducted upon health-care workers from two major tertiary institutions in Singapore showed that overall mean DASS-21 and IES-R scores among medical workers were lower than those in the published literature from previous disease outbreaks. The frontline nurses had fundamentally lower vicarious traumatization scores than non-frontline nurses and the general public. There has been a higher prevalence of anxiety among nonmedical health-care workers probably due to insufficient knowledge regarding personal protective equipment and contamination control measures [34].

5.1.5 Mental health effects of COVID-19 according to duration

a. Short term effect of COVID-19

A large study of 40,469 patients diagnosed with the COVID-19 infection [35] showed that 22.5% of them expressed neuropsychiatric symptoms, including headache (3.7%), insomnia (3.4%), encephalopathy (2.3%), and depression (3.8%). There were case reports of first-episode psychosis in people with SARS-CoV-2 infection. Although the etiology is related to the virus itself, to the stress related to the pandemic, or to the treatment with corticosteroids or hydroxychloroquine, unfavorable mental health outcomes were reported as one of the first signs of the novel coronavirus infection in patients with acute manic episodes. Another paper showed four cases of delirium in older patients, as the only clinical manifestation of the COVID-19 [35].

b. The long-term effect of COVID-19

A significant adverse outcome of the COVID-19 pandemic is probably social detachment and loneliness which are firmly connected with long haul mental impact, persistence of memory impairment, sleep disturbance with stress,

anxiety, depression, and PTSD [1]. Among the health-care workers, these psychological issues not only influence attention, comprehension, and decision-making capacity but also could affect their long-term wellbeing [17]. Long-term behavioral changes such as vigilant handwashing, avoidance of crowds, and the delayed return to normality even after the quarantine were additionally reported [4].

Our knowledge of biology and long-term clinical outcomes of the SARS-CoV-2 infection is largely limited. Therefore, approaching the pandemic based on lessons learned from previous outbreaks of infectious diseases and biology of other coronaviruses could provide the only available grounds for developing public mental health strategies. Longitudinal studies would also be the basis for further insights into the potential consequences of the outbreak of SARS-CoV-2 [35].

6. Outcomes in Society

Psychological responses ranging from panic behavior or collective hysteria to pervasive feelings of hopelessness and desperation are associated with negative consequences in the society including self-harm and suicidal behavior [4]. The risk of suicide may also increase secondary to social distancing, economic stress, barriers to mental health treatment, illness, and medical complications related to COVID-19 [36]. For example, in India, 72 suicide cases from 69 newspaper reports from March 2020 to May 2020 showed most of the suicide cases were males in the age range 19–65 years. Most causal factors reported include COVID-19 infection has been followed by financial crisis, loneliness, COVID-19 work-related stress, social boycott, pressure to be quarantined, lockdown, and unavailability of alcohol [5, 37]. In the UK, the closure of pubs and restaurants due to the pandemic provoked alcohol dependency which is strongly associated with domestic violence. An early feature during the quarantine was an increase in calls to domestic violence charities [38].

7. Conclusion

The COVID-19 pandemic, caused by SARS-CoV-2, is an increasing worldwide concern since December 2019. SARS-CoV-2 has a noteworthy psychological impact on the general population. Moreover, it impacts patients with chronic illnesses, mental disorders (especially those with serious mental illness and psychological impedance), and health-care workers. The most common mental issues caused by COVID-19 include anxiety, depression, PTSD, and other findings that were generally consistent with severity. The inconsistency of prevalence of different psychological responses could be due to different methodologies and variations in the study population, profession, disease positivity, female gender, youthful age, and homelessness. Although many of these psychological reactions need further investigation and explanation, a body of evidence supports the connection between psychological instability and the COVID-19 pandemic, lockdown, and its financial effect. Researchers are recommended to explore the mental outcomes that influence individuals confronting the COVID-19. Further research should be

committed to the improvement of protective, management, rehabilitation strategies to tackle the global wellbeing crisis associated with this pandemic.

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