

## Global health disparities in vulnerable populations of psychiatric patients during the COVID-19 pandemic

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### Abstract

The coronavirus disease 2019 pandemic affects psychiatric patients disproportionately compared to the general population. In this narrative review, we examine the impact of the pandemic on significant global health disparities affecting vulnerable populations of psychiatric patients: People of diverse ethnic background and color, children with disabilities, sexual and gender minorities, pregnant women, mature adults, and those patients living in urban and rural communities. The identified disparities cause worsened mental health outcomes placing psychiatric patients at higher risk for depression, anxiety and posttraumatic stress disorder symptoms. Those psychiatric patients who are ethnic minorities display barriers to care, including collective trauma and structural racism. Sexual and gender minorities with mental illness face discrimination and limited access to treatment. Pregnant women with psychiatric diagnoses show higher exposure to domestic violence. Children with disabilities face a higher risk of worsening behavior. Mature adults with psychiatric problems show depression due to social isolation. Psychiatric patients who live in urban communities face pollutants and overcrowding compared to those living in rural communities, which face limited access to telehealth services. We suggest that social programs that decrease discrimination, enhance communal resilience, and help overcome systemic barriers of care should be developed to decrease global health disparities in vulnerable population.

**Key Words:** COVID-19; Pandemic; Health disparities; Global disparities; Mental health disparities; Access to care

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**Core Tip:** During the coronavirus disease 2019 (COVID-19) pandemic, many psychiatric patients encounter limited access to care due to major health disparities. In this minireview, we examine the impact of the COVID-19 pandemic on vulnerable psychiatric populations due to ethnic-racial disparities, disparities involving children with disabilities, the role of sex and gender trauma in the mental health in sexual and gender minorities, disparities among pregnant women, disparities among mature adults, and the impact in urban vs rural populations.

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## INTRODUCTION

Amid the coronavirus disease 2019 (COVID-19) pandemic, vulnerable populations are the most affected medically, resulting in limited access to care and worsened health outcomes, including death<sup>[1]</sup>. Identified vulnerable populations include children with developmental disabilities, mature adults, pregnant women, sexual and gender minorities, and Black, Indigenous and People of Color communities<sup>[2-6]</sup>. Health outcomes differ in vulnerable populations than the general public since there is a disproportionate exposure to risk factors that cause disease<sup>[7]</sup>. Among these vulnerable groups, patients with pre-existing psychiatric conditions pose an increased risk of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection, which causes the respiratory state known as COVID-19 illness<sup>[8]</sup>. Psychiatric patients tend to have higher comorbid medical conditions, such as diabetes mellitus and hypertension, which predispose to disease<sup>[8,9]</sup>. Isolation and small social networks limit support from friends and families during prolonged periods of quarantine<sup>[10,11]</sup>. Psychiatric patients may display inadequate social space and limited adherence to personal protection strategies such as handwashing or the use of a mask on a consistent basis<sup>[12]</sup>.

Unprecedented financial stressors due to loss of jobs, limited access to adequate housing, and a higher risk of homelessness can further affect mental health care access<sup>[13]</sup>. In an ongoing study by the Center for Disease Control and Prevention in the United States, up to 12% of individuals in the general population responded that they needed counseling and medication for mental health but could not receive it during the pandemic<sup>[14]</sup>. Delays in treatment affected primarily unemployed individuals due to fears of contamination with COVID-19 when assisting appointments<sup>[15]</sup>. Most importantly, the COVID-19 pandemic disrupted mental health services globally. The World Health Organization surveyed 130 countries and over 60% reported impacts in mental health care services, including children (72%), older adults (70%), and women requiring prenatal and postnatal services (61%)<sup>[16]</sup>.

Psychiatric patients in vulnerable populations are also at increased risk for mitochondrial stress, which potentially can result in an altered immune response to COVID-19 illness<sup>[17]</sup>. Mitochondria are particularly susceptible to dysfunction affected by nutrition and viral disease exposure<sup>[17]</sup>. It is posited that mitochondrial stress can eventually widen the health disparity since many vulnerable populations live in urban environments affected by toxic metal pollution<sup>[17]</sup>. Overcrowded housing, inadequate nutrition, socioeconomic stressors, age, and metabolic syndrome can further potentiate the effect of mitochondrial stress in vulnerable populations affected by COVID-19 illness<sup>[17,18]</sup>.

The disparity of vulnerable populations can further be attributed to immune perturbations associated with stress that precede pro-inflammatory responses, especially in Black, Indigenous and People of Color<sup>[19]</sup>. Before the COVID-19 pandemic, these vulnerable populations lived in a heightened state of physiological stress and awareness complicated by psychological stress due to socioeconomic and environmental stressors<sup>[19]</sup>. The mechanism in which SARS-CoV-2 extends to the central nervous system is binding to peripheral nerve terminals and through retrograde transport reaching the brain<sup>[12,20,21]</sup>. The SARS-CoV-2 can also impact the central nervous system through a systemic cytokine response resulting in further

chronic inflammation and, in some cases, brain damage and even death<sup>[20,21]</sup>. Among psychiatric patients, the immune response triggered by COVID-19 may lead to depressed mood, severe anxiety, and suicidal ideations<sup>[9]</sup>.

Apart from COVID-19 causing neurotropism and disarray of reactive immune responses, there is an increased risk for collective trauma in vulnerable populations<sup>[12,22]</sup>. COVID-19 is most likely to impact the mental health of psychiatric patients compared to healthy controls with a higher incidence of posttraumatic stress disorder (PTSD) (31.6% *vs* 13.8% controls)<sup>[9]</sup>. The collective trauma response is multilayered and consists of three components: Further fears of infection, prevalent economic difficulties, and disruption of established routines with isolation<sup>[22,23]</sup>. COVID-19 disproportionately affects vulnerable ethnic populations contributing to an accumulation of trauma through experiences of racism, discrimination, and social inequalities<sup>[22,24]</sup>. The COVID-19 pandemic forms a feedback loop between viral illness and disparities, leading to the accumulation of further inequities comprising a collective trauma<sup>[22]</sup>.

Preceding the COVID-19 pandemic, the average untreated global rates of schizophrenia, major depressive disorder, and alcohol use disorder were 32.2%, 56.3%, and 78.1%, respectively<sup>[25]</sup>. These untreated psychiatric illnesses could potentially overburden an existing overwhelmed health care system, further increasing the inequalities in health between groups of people in countries, thus causing global health disparities<sup>[26]</sup>. Although there is a growing body of evidence of the mental health impact on the global population during the COVID-19 pandemic<sup>[27]</sup>, little is known about the effects of COVID-19 in vulnerable psychiatric patients. In this minireview, we highlight the global health disparities affecting vulnerable psychiatric populations (Table 1) and examine the social barriers influencing global mental health care during the COVID-19 pandemic.

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## METHODS

Search engines through PubMed, Google Scholar, and PsychINFO were used with the following keywords: COVID-19, global health disparities, global mental health disparities, social barriers, social determinants of health, ethnic health disparities, sexual gender minorities, pregnant women, psychiatric patients, children, mature adults, developmental disabilities, urban and rural population. Articles in English and articles translated in English were reviewed from January 2020 to March 2021.

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## ETHNIC DISPARITIES

Psychiatric patients from ethnic minorities display worsened mental health outcomes during the COVID-19 pandemic. In the United Kingdom, people of color (Bangladeshi, Indian, and Pakistani men) show a more significant increase in mental health distress than White British men<sup>[28]</sup>. In the United States, ethnic minority respondents who reported prior treatment for depression, anxiety, and PTSD presented with higher prevalence of these symptoms and subsequent adverse mental health outcomes than those who did not receive treatment<sup>[29]</sup>.

It is speculated that Blacks may have fewer physiological and psychiatric complications from COVID-19 based on a reduced molecular expression of angiotensin-converting enzyme-2, the binding site for SARS-CoV-2 present in the lung, kidneys, and brain<sup>[30]</sup>. However, there is a notable difference in COVID-19 outcomes since studies have shown more complications to the viral illness, including higher psychological distress and increased mortality in Blacks compared to Whites<sup>[31,32]</sup>. In the United States, a third of hospitalized COVID-19 patients are Black, although they make up only 13% of the total population<sup>[33]</sup>. In the United Kingdom, Blacks were found to have a four-fold increased risk for COVID-19 infection<sup>[31]</sup>. Black individuals diagnosed with COVID-19 (34.6%) showed psychological distress, but only a minimal (8.6%) sought out psychiatric care<sup>[31]</sup>. Poor access to services, stigma, cultural insensitivity and lack of awareness of their symptoms might prevent Blacks from obtaining mental health care during traumatic events<sup>[34]</sup>.

Structural racism or the “ways in which societies foster discrimination through mutually reinforcing inequitable systems<sup>[35]</sup>” can complicate mental health disparities. A general mistrust of health systems is based on the historical mistreatment of Blacks in psychiatric care<sup>[36]</sup>. To this extent, the American Psychiatric Association issued a public apology about their role in Blacks’ historical injustices acknowledging their

Table 1 Review of primary literature on coronavirus disease 2019 global health disparities

Ref.	Vulnerable population	Type of study	Country or region	Key mental health findings
El Hayek <i>et al</i> <sup>[5]</sup> , 2020	Mature adults	Thirteen country case studies by thirteen early career psychiatrists	Arab Countries in the Middle East North Africa Region	General lack of mental health services for geriatric population during the COVID-19 pandemic
Proto and Quintana-Domeque <sup>[28]</sup> , 2021	Ethnic minorities	Longitudinal survey	United Kingdom	Bangladeshi, Pakistani, and Indian individuals experienced significant increase in mental health distress than general population
Czeisler <i>et al</i> <sup>[29]</sup> , 2020	Ethnic minorities	Cross sectional survey	United States	Significant higher suicide rates in ethnic minorities having considered suicide in the past 30 d before completing survey during COVID-19 pandemic
Lassale <i>et al</i> <sup>[31]</sup> , 2020	Ethnic minorities	Cohort study	United Kingdom	Greater psychological distress experienced by Asians after hospitalization for COVID-19 than general population
Newby <i>et al</i> <sup>[39]</sup> , 2020	Ethnic minorities	Longitudinal survey	Australia	Significant higher anxiety and distress in individuals with self-reported history of mental health diagnosis than those without a mental health diagnosis
Lee and Waters <sup>[45]</sup> , 2020	Ethnic minorities	Longitudinal survey	United States	Over 40% of Asian Americans reported increase in anxiety, depressive symptoms and sleep difficulties during the COVID-19 pandemic
Gómez-Ramiro <i>et al</i> <sup>[54]</sup> , 2020	Children with autism and developmental disorders	Retrospective study	Spain	Significant increase in acute psychiatric hospitalizations during COVID-19 lockdown
Nadler <i>et al</i> <sup>[65]</sup> , 2021	Children with autism and developmental disorders	Case study	United States	Case study of child with autism and behavioral health concerns examines limited psychosocial support and availability during the COVID-19 pandemic
Bishop <sup>[69]</sup> , 2020	Sexual gender minorities	Qualitative study	Global	Interviews with 59 SGM from 38 countries; majority showed increased isolation and anxiety
Suen <i>et al</i> <sup>[73]</sup> , 2020	Sexual gender minorities	Community based survey	Hong Kong (China)	SGM are particularly vulnerable to poor mental health outcomes during the COVID-19 pandemic
Peterson <i>et al</i> <sup>[74]</sup> , 2020	Sexual gender minorities	Cross sectional, convenience sample survey	United States	Greater psychological distress in SGM. A large number of bisexual individuals in the sample may have magnified the differences between SGM and sexual-majority groups
Durankuş and Aksu <sup>[77]</sup> , 2020	Pregnant women	Cross sectional survey	Turkey	Higher depression scores on Edinburgh Postpartum Depression Scale in pregnant women than control group during COVID-19 pandemic
Liu <i>et al</i> <sup>[80]</sup> , 2021	Pregnant women	Cross sectional survey	United States	Study on pregnant women and women who recently gave birth. Women with self-reported psychiatric diagnoses were 1.6-to-3.7 more likely to score at clinically significant levels of depression, generalized anxiety, and PTSD
Corbett <i>et al</i> <sup>[81]</sup> , 2020	Pregnant women	Preliminary cross-sectional survey	Ireland	Pregnant women surveyed described heightened anxiety over COVID-19 affecting older adults, their children and their unborn baby
Saccone <i>et al</i> <sup>[82]</sup> , 2020	Pregnant women	Cross sectional survey	Italy	More than half of pregnant respondents rated psychological impact of COVID-19 as severe
Wang <i>et al</i> <sup>[83]</sup> , 2020	Female gender	Cross sectional survey	China	Increased psychological impact on female gender and having a poor self-rated health status
Liu <i>et al</i> <sup>[85]</sup> , 2020	Female gender	Cross sectional survey	China	Female respondents had higher negative cognitions on posttraumatic stress symptoms than males
Berthelot <i>et al</i> <sup>[87]</sup> , 2020	Pregnant women	Longitudinal cohort survey	Canada	Pregnant women assessed during the COVID-19 pandemic reported more prenatal stress and psychiatric symptoms than pre-pandemic cohort
Lebel <i>et al</i> <sup>[88]</sup> , 2020	Pregnant women	Cross sectional survey	Canada	Higher symptoms of depression and anxiety in pregnant women were associated with greater concern about COVID-19 threatening the life of the mother and baby
Taquet <i>et al</i> <sup>[113]</sup> , 2021	Psychiatric vs non psychiatric population	Retrospective medical record network study	United States	Psychiatric diagnosis might be considered an independent risk factor for COVID-19 illness.
Logue <i>et al</i> <sup>[114]</sup> , 2021	Psychiatric vs non psychiatric population	Longitudinal prospective cohort survey	United States	2.3% of respondents reported “brain fog” at 6 mo post COVID-19 infection

COVID-19: Coronavirus disease 2019; PTSD: Posttraumatic stress disorder; SGM: Sexual and gender minorities.

influence in inequitable practices, including the misdiagnosis of schizophrenia in this population<sup>[37]</sup>.

Indigenous people also face similar mental health disparities. There are presently 45 million indigenous people living in Latin America, 5.2 million in the United States, 2 million in Canada, and 798363 Aboriginal or Torres Strait Islander living in Australia<sup>[38]</sup>. In a controlled variable study, being Aboriginal or Torres Strait Islander was a strong predictor for higher anxiety, suggesting that indigenous people in Australia might be more vulnerable to poorer mental health outcomes<sup>[39]</sup>. During the COVID-19 pandemic, many indigenous people tend to handle stress independently of others by relying on spirituality to guide them, leading to a decline in seeking mental health care services<sup>[40]</sup>.

Limited access to indigenous villages due to isolation in remote geographical areas can prevent obtaining mental health care for indigenous people. In Brazil, many indigenous people cannot access health services due to geographical distance and unavailability of care<sup>[41]</sup>. Restrictive bans placed by governments to prevent the pandemic's spread can further complicate travel by health care workers to these remote places<sup>[38]</sup>. In specific indigenous communities such as the First Nations, Inuit, and Métis in Canada, there have been lower rates of COVID-19 compared to non-indigenous people due to protective measures taken by their leaders<sup>[42]</sup>. Despite lower infection and mortality in Canadian indigenous cultures, 38% of indigenous people reported fair to poor mental health on a governmental online survey during the pandemic compared to 16% in prior years<sup>[43]</sup>.

Public health messaging, which is essential during a pandemic, is hindered by poor access to broadband and internet service in indigenous villages. In Mexico, only 10% of indigenous villagers in Oaxaca have adequate internet service, mostly concentrated in city centers<sup>[44]</sup>. Limited access to internet service hampers the growth of telepsychiatry modalities in these communities, which could be beneficial for patient treatment.

Although the scientific literature focuses mainly on Blacks and their experience with discrimination during the COVID-19 pandemic, Asians have been significantly affected, displaying in some cases worsened mental health outcomes<sup>[45]</sup>. In the United Kingdom, 41.7% of hospitalized Asians with COVID-19 proved to have higher depression screening symptoms on Patient Health Questionnaire 4 than Blacks<sup>[31]</sup>. In the United States, many Asian Americans are targeted by their ethnicity in response to reports of the emerging virus<sup>[45]</sup>. Compared to pre-pandemic percentages, a United States cross-sectional study showed that 41% of Asians and Asian Americans reported an increase in anxiety and that 53% reported an increase in depressive symptoms<sup>[45]</sup>. A higher level of community support mitigates the impact of discrimination on depressive symptoms in Asians and Asian Americans<sup>[45]</sup>. Among other ethnic minority groups, Asians showed a lower incidence of suicide (6%) in the United States<sup>[29]</sup>.

During the start of the pandemic, Hispanics displayed a higher incidence of suicidal thoughts (18.6%), higher anxiety and depressive symptoms compared to other ethnic groups in the United States<sup>[29]</sup>. In general, Hispanics have lower utilization of mental health services with a strong Spanish language social preference and higher levels of ethnic identity, which are strong predictors for mood and anxiety disorders<sup>[46]</sup>. Hispanics also have the lowest health insurance coverage rate and twice the poverty level than Whites in the United States<sup>[47]</sup>. This ethnic group is overrepresented in critical essential workers, which, during the pandemic, mainly worked in the food industry, laboring in overcrowded meatpacking factories with poor ventilation, thus increasing exposure to COVID-19 illness<sup>[29,48]</sup>.

Among other ethnic minorities, cultural-religious minorities have shown worsened mental health outcomes during the COVID-19 pandemic. For instance, in India, an increased relapse of pre-existing psychiatric illness was observed during the quarantine period in Kashmir Muslims already affected by trauma and civil unrest in the area<sup>[49]</sup>. Moreover, members of the religious majority discriminated against the Muslim community in social media posts as being spreaders of viral illness<sup>[49]</sup>.

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## DISPARITIES IN CHILDREN WITH DEVELOPMENTAL DISABILITIES

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Children, adolescents, and adults with intellectual disability (ID) and neurodevelo-



mental disorders like autism spectrum disorder (ASD) are vulnerable to significant impacts by pandemic-related changes such as social distancing standards, stay-at-home orders, and closures of nonessential services. Furthermore, many individuals with ID and ASD experience significant communication challenges in processing information<sup>[50]</sup>, afflicting their ability to respond effectively and efficiently to social changes implemented secondary to the COVID-19 pandemic. Given expressive communication challenges, individuals with ID or ASD may have difficulty communicating emotional distress, pain, or illness symptoms<sup>[51]</sup>. As a result, many individuals with ID and ASD have to rely on their families or caregivers to communicate important information about the pandemic or observe for symptoms of a potential viral illness. Caregiver stress and depression increased during the COVID-19 pandemic compared to the pre-pandemic outbreak furthering the mental health disparity<sup>[52]</sup>. Furthermore, individuals with ID and neurodevelopmental disorders face various challenges secondary to the pandemic, including limited access to behavioral health services, changes in health services delivery, disruption of educational services, and vocational changes<sup>[53]</sup>. During the lockdown period in Spain, there were increased psychiatric emergency admissions in individuals with ASD, most likely due to an observed disruption of family daily routines<sup>[54]</sup>.

Individuals with ASD share a physiological and genetic vulnerability for COVID-19. There are documented increased levels of pro-inflammatory cytokines present in individuals with ASD<sup>[55]</sup>. The tendency towards a pro-inflammatory state among individuals with ASD may place them at higher risk for even more severe symptoms once this virus is contracted<sup>[56]</sup>, including a rare multisystemic inflammatory syndrome evident in children<sup>[57]</sup>. Focal brain inflammation in the amygdala with activation of mast cells may potentially result in a higher prevalence of ASD diagnoses due to COVID-19 infection<sup>[58]</sup>. Furthermore, individuals with ID and ASD have a greater risk for overall poor health compared to the general population<sup>[59]</sup>, type 2 diabetes<sup>[60]</sup>, along with sensory impairments and physical disabilities<sup>[61]</sup>; all of these have been documented as poor prognostic risk factors from COVID-19 infection<sup>[62]</sup>.

Many individuals with ID and ASD share documented health disparities both in the pre-pandemic and pandemic period. This health disparity might be due in part to the higher rates of ASD among transgender and gender-diverse individuals *vs* cis-gender individuals<sup>[63]</sup>. In the pre-pandemic period, transgender and gender-diverse groups with ASD experienced increasing rates of comorbid mental illness and higher rates of being refused health services<sup>[64]</sup>. In the United States, access to existing therapeutic services, including Applied Behavioral Analysis in rural regions, has been curtailed due to job shortages<sup>[65]</sup>. In addition to disparities in medical access and services contributing to this disproportion, there is evidence about potential genetic or biological susceptibilities among various ethnic groups<sup>[66]</sup>. It could be expected that individuals with ID and ASD within these groups carry even higher risk given the vulnerabilities outlined above.

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## SEXUAL AND GENDER DISPARITIES

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Sexual and gender minorities (SGM) include Lesbian, Gay, Bisexual, Transgender, Two-Spirit, Queer, Questioning, Intersex, and Asexual (LGBT2SQIA+) individuals<sup>[67]</sup>. SGM are a diverse group whose history of stigma, systemic discrimination, and structural violence leaves them particularly vulnerable to disproportionate impact by COVID-19 given inequitable conditions that have reduced their access to vital resources<sup>[67]</sup>. SGM share a heightened psychological vulnerability associated with minority stress, which increases their susceptibility to underlying health conditions<sup>[22,68]</sup>. Historically, SGM have been excluded from disaster research, thereby preventing identification of their unique mental health needs<sup>[69,70]</sup>. It is, therefore, no surprise that SGM experience health disparities, including higher rates of mental health diagnoses, substance use, and suicidality compared to their sexual-majority counterparts<sup>[71]</sup>.

Due to discrimination, SGM are overrepresented in essential services and sex work, experience higher poverty rates than the general population, and are less likely to have adequate healthcare and are more vulnerable to poor mental health outcomes<sup>[72,73]</sup>. When SGM intersect with oppressed intersections of identity, such as race, ethnicity, socioeconomic status, or chronic illness, the compounding nature of these vulnerabilities creates even wider health disparities for communities of SGM<sup>[68,70,72]</sup>. For instance, a Hong Kong community sample found stressors beyond those of the COVID-19 pandemic, including family conflict due to sexual orientation and

disconnection to the SGM community, likely leading to a combined effect on the one-week prevalence of clinical depression (31.5%) and generalized anxiety disorder (27.9%)<sup>[73]</sup>. Given the social disadvantages and mental and physical health disparities faced by SGM, it is likely that the pandemic trauma and social isolation measures to mitigate COVID-19 transmission are exacerbating these inequalities<sup>[68]</sup>.

Discrimination, oppression, and violence occur at the familial level, making isolation and quarantine dangerous for SGM who are forced to cohabit with unsupportive and abusive family members or partners<sup>[69]</sup>. Many SGM rely upon community supports for safety and acceptance, yet due to COVID-related restrictions, SGM have been unable to connect with their supportive community safe spaces<sup>[69]</sup>. SGM experience more anxiety, depression, and peritraumatic stress responses while doubling the odds of meeting future criteria for COVID-related PTSD when compared to sexual majorities<sup>[74]</sup>.

Furthermore, given the higher rates of human immunodeficiency virus (HIV), mental health diagnoses, substance use, and trauma among SGM, disruptions in mental healthcare access during COVID-19 have been particularly concerning<sup>[69,73,75]</sup>. SGM reported having difficulty obtaining HIV medications and mental health care in case studies in 59 countries<sup>[69]</sup>. Further validating this report, a convenience sample ( $n = 2732$ ) of cisgender gay men and other men who have sex with men across 103 countries displayed moderate to severe psychological distress with a prevalence of 31% in depression<sup>[75]</sup>. Globally, SGM have reported that they would delay or avoid seeking care for COVID-19 symptoms due to anticipated stigma and discrimination<sup>[69]</sup>.

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## DISPARITIES IN PREGNANT WOMEN

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Pregnant women are a vulnerable group for COVID-19 due to an increased risk of physical and mental health complications, such as depression and anxiety<sup>[76,77]</sup>. Homeschooling children and taking care of elderly family members in addition to working from home has been a challenge for most women, which generally increases caregiver stress<sup>[78]</sup>. COVID-19-related health anxiety experiences may also increase the likelihood of mental health symptoms among those pregnant women without a previous psychiatric diagnosis<sup>[79]</sup>. Pregnant women in Ireland reported excessive worries regarding older relatives and their unborn baby<sup>[80]</sup>, while Italian pregnant women reported high rates of anxiety regarding vertical transmission<sup>[81]</sup>. Studies from China, when COVID-19 emerged, have found that the female gender is significantly associated with higher self-reported anxiety, depression, and posttraumatic stress, causing a severe overall psychological impact<sup>[82-85]</sup>. Similarly, studies from Canada reported a higher rate of depressive and anxiety disorders, and substance use disorder<sup>[86,87]</sup>.

The outcomes of psychiatric complications during the COVID-19 pandemic are complex for pregnant women since mental health problems are associated with adverse outcomes, including suicidal ideations and an unstable mother-infant bond<sup>[88]</sup>. Perinatal depression is also related to fetal complications, including fetal growth restriction and increased odds of premature delivery<sup>[89]</sup>. Maternal complications of depression are also associated with preeclampsia and gestational diabetes<sup>[77]</sup>.

For many pregnant psychiatric patients, telehealth proves to be the most convenient way to obtain care. Due to governmental restrictions to halt the spread of COVID-19, many pregnant women cannot attend appointments in person. For socioeconomically disadvantaged women, telehealth can further the disparity of favoring those populations with resources to access technology *vs* those without, thus causing a gap in digital literacy<sup>[90]</sup>. This socioeconomic and educational disparity becomes apparent in developing countries where the prevalence of depression can reach around 15.6% during pregnancy and 19.8% after childbirth<sup>[91]</sup>. In Turkey, a recent online survey revealed that years of education and knowledge of COVID-19 protected against worsening of depression in pregnant women<sup>[77]</sup>.

Another challenge complicating the mental health of pregnant women is dealing with the surge of domestic violence. For some pregnant women, more time at home may mean more time spent with an abusive partner<sup>[6]</sup>. According to the United Nations, domestic violence rates against women are increasing worldwide during the pandemic<sup>[92]</sup>. This increased rate is indicated by the number of calls received by emergency support lines in China, Italy, France, Brazil, and Spain during their lockdowns<sup>[85]</sup>.

## DISPARITIES IN MATURE ADULTS

Psychiatric patients who are mature adults are particularly vulnerable to COVID-19 because of a susceptibility to disease precipitated by a normal age-related decline in the immune system and comorbid conditions<sup>[8,93]</sup>. Comorbid conditions such as associated polypharmacy, hypertension, diabetes mellitus, chronic renal failure, and chronic obstructive pulmonary disease can contribute to an increased vulnerability to illness with poor health outcomes in this population<sup>[8,93,94]</sup>. Early identification of COVID-19 is key to mitigating illness in mature adults but can be challenging due to physical health factors.

Unique challenges are encountered specifically in mature adults with major neurocognitive disorder due to an atypical presentation of symptoms, such as low fevers, increased confusion, increased agitation, and sudden mood changes<sup>[95]</sup>. Upon the onset of the COVID-19 outbreak in China, the first psychiatric patient identified with the viral illness was a man hospitalized with a major neurocognitive disorder who supposedly ate outside food brought by family members and unknowingly infected others<sup>[8]</sup>. Masking protocols and appropriate handwashing can prove challenging to implement in the cognitively impaired within hospitals and long-term care facilities<sup>[8,96]</sup>. Mature adults with severe neurocognitive deficits may wander off, causing problems in implementing social distancing<sup>[96]</sup>.

Another health inequity posited to affect mature adults more than other populations is self-isolation. Most of the daily social activities and contacts of many mature adults occur outside their homes<sup>[97]</sup>. In Canada, as the pandemic spread, leading to the cancellation of multiple community-based day programs for seniors<sup>[98]</sup>. During the early stages of the pandemic in China, self-isolation became a struggle, especially with mature adults without children or support, increasing the propensity to depressive symptoms<sup>[99]</sup>. Loneliness may also result from self-isolation. In Turkey, the pandemic has led to increased demand for home health aides to assist and accompany the elderly<sup>[94]</sup>. In the Caribbean, including Cuba, Puerto Rico, and the Dominican Republic, many mature adults with neurocognitive disorders live with extended family who can be of comfort and assistance<sup>[100]</sup>. Although social and physical distancing proves to be a difficult mitigating strategy, finding ways to connect and belong can help overcome the perceived loneliness of isolation.

Many mature patients also struggle with technology due to being unfamiliar with electronic devices, have difficulty navigating the internet or using platforms like those intended for telehealth appointments. There is a higher rate of illiteracy among the geriatric psychiatric population in the Middle East and North African countries<sup>[5]</sup>. Cognitive decline and lower education can add to the slow adaptation of technology and internet use in mature adults<sup>[94,101]</sup>. It is important to note that those mature adults who have higher education and seek social connectedness tend to adapt more rapidly to technology to overcome isolation<sup>[101]</sup>. For some mature adults who are marginalized, frequent phone calls and telephone calls from peer supports can help mitigate self-isolation<sup>[97]</sup>.

## DISPARITIES BETWEEN URBAN AND RURAL ENVIRONMENTS

Around 22% of Africa's population could become infected with COVID-19, a continent with a propensity to collective trauma due to the after-effects of the Ebola epidemic<sup>[101-103]</sup>. From 2014 to 2016, the Ebola virus outbreak caused psychosocial stressors such as discrimination, stigma, anxiety, and depression in Sub-Saharan communities<sup>[102]</sup>. In a cross-sectional study in Sierra Leone, knowing someone quarantined increased anxiety and depression, while PTSD was evident in 76% of Ebola virus survivors<sup>[104]</sup>. In many villages, healers and cultural treatment traditions were invalidated in preference for Westernized methods and treatment<sup>[105]</sup>. The government banned gatherings, and fear about the virus increased, causing heightened distress<sup>[105]</sup>. Due to overwhelming fears, many of the usual prevention methods of infectious spread were not practical during the Ebola epidemic<sup>[102,105]</sup>. Prevention methods to limit the spread of the Ebola virus were found to be poorly effective in those individuals with depression and trauma symptoms due to poor insight and impaired cognition<sup>[106]</sup>. Although it is unknown if the same prevention pattern with COVID-19 will result in individuals with depression, it is anticipated that such a similar pattern could occur since it has already been observed with other infectious diseases such as in the spread of HIV<sup>[106]</sup>.

The inequity between urban and rural environments in mental health care becomes



evident in the villages' communal life in Africa. In these communities, there is a reliance on family members to provide for each other economically and to provide support to relatives with psychiatric symptoms<sup>[102]</sup>. The pandemic has led to income losses as many villagers can no longer sell farming goods or artisan items in urban centers<sup>[107]</sup>. Food security is an issue for many Africans during the pandemic due to economic availability<sup>[107]</sup>. Due to the governmental lockdown restrictions, the rural villagers can be further stressed, potentially increasing depression and anxiety<sup>[102]</sup>. When Africans display psychiatric symptoms, communal methods are usually exhausted first before sharing their symptoms directly to health care providers<sup>[102,105]</sup>. Plans to provide trauma-informed care by community health workers are primordial for the survivors of COVID-19 to prevent further re-traumatization due to discrimination, which was an issue with the Ebola virus<sup>[103]</sup>. Also, the ease of telehealth services is generally limited in rural environments compared to urban centers due to the availability of internet and poor signal reception<sup>[102]</sup>.

The urban environment mental health disparity, which becomes apparent in densely populated cities, might be related to mitochondrial stress. Toxic metal pollutants in high dense areas can cause mitochondrial stress, increasing the vulnerability in psychiatric patients who already have mitochondrial dysfunction due to psychiatric illness, namely schizophrenia, bipolar disorder, and major depressive disorder, and who become infected and develop COVID-19 illness<sup>[17,108]</sup>. In Kuwait, a multi-ethnic country, South East Asians mostly live in highly populated dense areas where overcrowding and pollutants lead to higher exposure to COVID-19 illness<sup>[2]</sup>. This higher exposure can increase transmission of COVID-19, possibly leading to worsened mental health outcomes due to the potentiating effects of mitochondrial stress. A similar pattern occurs in Israel in which the Orthodox Jewish community populated in high dense cities contributes to an increased rate of transmission through religious rituals and gatherings<sup>[109]</sup>.

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## LIMITATIONS

The minireview is limited mainly to observational studies due to the emergency state of the COVID-19 pandemic (Table 1). Articles in English and articles translated in English were reviewed, restricting the scope of the search. A lack of substantiated research in global health disparities, especially in ethnic minority groups, was appreciated in countries like Japan and South Korea. Although significant, other disparities involving prisoners, homeless persons, and persons with low educational attainment with psychiatric diagnoses during the COVID-19 pandemic were not addressed due to the narrow body of research.

It is essential to consider the short span since the pandemic's outbreak since the sequelae of COVID-19 are currently being studied in psychiatric and non-psychiatric patients<sup>[110,111]</sup>. The sequelae of COVID-19 may affect individuals with and without a history of psychiatric illness: A recent retrospective study showed that COVID-19 is associated with a higher incidence of a first psychiatric diagnosis following 14 to 90 days from exposure in non-psychiatric patients<sup>[110]</sup>. It is imperative to examine the impact of the COVID-19 pandemic on vulnerable populations without psychiatric illness. There is also a need to evaluate the impact on health care workers who face daily traumatic psychological stressors due to their job occupation and high exposure. Health care workers are confronted by an increased rate of mortality and increased health care demands<sup>[112]</sup>.

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## CONCLUSION

The narrative minireview yielded evidence for worsened global mental health outcomes among vulnerable psychiatric patients during the COVID-19 pandemic. Psychiatric patients among vulnerable populations appear to be at higher risk for depression, anxiety, and posttraumatic stress symptoms. Among these vulnerable groups, collective trauma impacts marginalized individuals and communities. Expanding access to internet services and technical assistance in underserved areas can provide more effective delivery of psychiatric services through telehealth to vulnerable populations. Peer community supports for psychiatric patients can reduce social isolation. Programs promoting internet literacy for mature adults can support connectedness with family and relatives during prolonged periods of isolation. Providing programs that include psychiatric services with prenatal care can

potentially improve mental health outcomes in pregnant women. These findings suggest a need for greater implementation of programs that enhance communal resilience, decrease discrimination, and help overcome systemic barriers of care.

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