

Effects of COVID-19 on Anxiety, Depression and Other Mental Health Issues: A worldwide scope review.

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Abstract

BACKGROUND: The COVID-19 pandemic has spread across the world and, along with it, a considerable degree of fear and uncertainties that impact on various aspects of societal life, including on people's Mental Health (MH). Understanding how the COVID-19 pandemic affects MH can help to implement interventions and adequate public policies, providing more effective responses to mitigate its effects.

OBJECTIVES: To summarize the scientific evidence on the possible influence of the Covid-19 pandemic on MH, critically evaluating the methods and scientific validity of the studies found, in addition to summarizing the recommendations on strategic measures to reduce the impact of COVID-19 on MH.

METHODOLOGY: The current scoping review was conducted from a screening of 465 articles on COVID-19 and MH outcomes, based on the main database of scientific references on health, assessed throughout PubMed.

RESULT: Of the 43 papers selected for summary and critical analysis 77% (n=33) indicated a relationship between the COVID-19 pandemic and anxiety symptoms, 56% (n=26) with depression or depressive symptoms, seven with changes in sleep pattern and seven with obsessive behaviours or Obsessive Compulsive Disorder. In addition to studies that showed an influence of the COVID-19 pandemic on trauma or post-traumatic stress disorder (PTSD), psychological distress, stress and fear. Most of the studies were carried out in China, and primarily evaluated the presence of anxiety and depression, through scales and questionnaires. Health professionals and the elderly were cited among the most affected population groups.

CONCLUSIONS: Most studies presented significant methodological limits. Investments in new research, with controlled studies, including representative and randomized samples, and longitudinal follow-up, are necessary, to further explore the relationships between the COVID-19 pandemic and people's MH and long-term effects. Pending such studies, given the effects (during and after) of previous epidemics on MH, government measures need to be implemented to reduce the potential catastrophic effects of the COVID-19 pandemic on MH, and the burden that will remain after the pandemic. The timely identification of psychological distress and the identification of MH needs among populations, facilitate the development of targeted psychological interventions, in addition to the organization of health services and systems, during the pandemic.

Background

The COVID-19 pandemic has spread across the world and, along with it, a considerable degree of fear, concerns and uncertainties.¹ The massive number of cases and deaths, the diffusion of dubious information regarding different aspects of the pandemic and insufficiency in knowledge regarding control

and adequate treatment measures, arguably worsens uncertainty.¹ These uncertainties have consequences on various aspects of societal life, affecting people's daily lives and mental health (MH).²

In times of a pandemic, the main focus of health care is physical health and the control of virus transmission and, therefore, attention to MH may be compromised.^{3,4} Nonetheless, measures for the prevention and treatment of mental health problems need to be addressed during the pandemic, since the psychological implications can be immediate but also long-lasting, with enduring effects on individuals, families and communities.

The MH effects of Covid-19 have not yet been sufficiently studied. Still, there is already an increasing number of articles being published that evaluate people's MH, in the context of the pandemic. Symptoms of depression, anxiety and stress have been reported, especially in the groups most affected by COVID-19 or in more vulnerable sectors of the population, such as health professionals and the elderly.^{5–7}

Understanding how the COVID-19 pandemic affects MH helps to implement interventions and adequate public policies, providing more effective responses and mitigating its effects on people's MH. Thus, the objective of this study was to summarize the scientific evidence on the possible influence of the Covid-19 pandemic on individuals' MH worldwide, critically evaluating the methods and scientific validity of the studies found, as well as summarizing the recommendations on strategic measures to reduce the impact of COVID-19 on subjects' MH.

Methods

The present scoping review was conducted from a screening of 465 articles on COVID-19 and MH outcomes published until April 30, 2020, based on the main database of scientific references on health, assessed throughout PubMed.

Eligibility criteria

Original studies that assessed the effect of COVID-19 on individuals' MH, including outcomes such as depression, anxiety, psychological suffering, fear, panic, alcohol consumption and drug abuse.

The following search key was used for the research: ("COVID-19"[All Fields] OR "COVID19"[All Fields] OR (2019[All Fields] AND n-CoV[All Fields]) OR "Coronavirus"[All Fields] OR "Sars-Cov-2"[All Fields]) AND ("psychiatri*" [All Fields] OR "psycholo*" [All Fields] OR "mental health"[All Fields] OR "depression"[All Fields] OR "anxiety"[All Fields] OR "panic"[All Fields] OR (consumption[All Fields] AND ("drug effects"[Subheading] OR ("drug"[All Fields] AND "effects"[All Fields]) OR "drug effects"[All Fields] OR "of"[All Fields]) AND alcohol[All Fields]) OR (abuse[All Fields] AND ("drug effects"[Subheading] OR ("drug"[All Fields] AND "effects"[All Fields]) OR "drug effects"[All Fields] OR "of" [All Fields]) AND alcohol[All Fields]) OR "drug use" [All Fields] OR "drug abuse"[All Fields] OR "psychiatr*" [All Fields] OR "psycholo*" [All Fields] OR "mental health"[All Fields] OR "depression"[All Fields] OR "anxiety"[All Fields] OR "fear"[All Fields] OR "panic"[All

Fields] OR "alcohol consumption"[All Fields] OR "alcohol abuse"[All Fields] OR" drugs consumption "[All Fields] OR" drug abuse"[All Fields]).

Our protocol was drafted using the Preferred Reporting Items for Systematic Reviews and Meta-analysis Protocols (PRISMAP), which was revised by the research team and members of Rede CoVida, and was disseminated by email to solicit additional feedback. Also, due to urgency of publication we could not wait for the protocol registration process, however, it is made fully available upon email request.

Exclusion criteria

Scientific articles in English or Portuguese were included in this review, other languages, such as Chinese and German, not available on publication sites, and that did not meet one of the other inclusion criteria were excluded: they were not original articles, only addressed epidemics prior to COVID-19, or did not investigate MH outcomes.

A data-charting form was jointly developed by four reviewers to determine which variables to extract. We extracted data regarding the population of the studies, methodological aspects, evaluating the robustness of the studies, the mental health related findings and recommendations, including measures and strategies listed in the papers selected. The four reviewers independently charted the data, discussed the results and continuously updated the data-charting form in an iterative process.

The literature review was prepared for the purpose of identifying the effects of the pandemic on MH, including strategies for control measures (isolation, quarantine and social distancing). It is important to note that this literature review has been carried out based on studies published up to the present time and that a large number of new studies continue to be published every day. Accordingly, the recommendations presented are subject to change, as further information is published.

Results

Using the previously mentioned search key, we identified four hundred and sixty-five (465) original articles on the PubMed platform until April 30, 2020. Of these, nine articles were excluded because they were in other languages: eight in Chinese and one in German. Two articles^{8,9} were not available on publication sites, and the 411 others did not meet the previously-defined inclusion criteria (they were not original articles, only dealt with other epidemics, or did not deal with MH outcomes). Forty-three articles remained and were included in this summary and critical analysis.

Countries

The 43 selected papers, reported results of studies conducted in 11 different countries. Thirty-one were carried out in China, two in each of the following countries: the United Kingdom, Iran and Italy, and one in each of the following countries: the United States, Vietnam, Spain, Israel, India and, lastly, one reported a bi-national study from India and Singapore (Table 1).

Methodological aspects

Among the selected articles, the choice of a cross-sectional design was predominant. Sample sizes ranged from 20 participants to large surveys with 10,754, 10,178, 65,111 and 52,730,112 individuals. Most articles used online questionnaires for data collection, combining demographic and socioeconomic variables, with scales for assessing Mental Health (MH). On these scales, MH was assessed through the presence of psychiatric symptoms or mental disorders, such as the Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI), the Hamilton Depression Rating Scale, the Kessler Psychological Distress Scale, the Hospital Depression and Anxiety Scale, the Self-Rating Depression Scale (SDS) and Self-Rating Anxiety Scale (SAS), among others. In addition, questionnaires and scales were used to assess other MH issues, such as quality of life, satisfaction with life, and self-reported happiness. Other studies used alternative instruments for data collection such as online consultations, carried out by certified doctors,¹³ open interviews, carried out in person or by telephone,¹⁴ and the Chinese social network WEIBO, in which the frequencies of words that indicated negative and positive emotions emitted by users in the face of COVID-19 were calculated through machine learning¹¹ (Table 1).

Mental Health (MH) outcomes studied

MH outcomes most addressed by the 43 selected articles were: anxiety (n=33),^{10,11,14–44} depression or depressive symptoms (n=26),^{11,15,18–20,22,23,25–30,32,33,36,37,39–41,43,45–48} changes in sleep (n=7),^{22,29,31,32,36,49,50} obsessive behaviors (n= 4)^{13,15,31,44} and Obsessive Compulsive Disorder (OCD) (n = 3).^{28,32,49} Others evaluated trauma or post-traumatic stress disorder (PTSD),^{32,51} psychological distress,^{28,37} stress^{36,42} and fear²³. In addition, Ahorsu et al. (2020)³⁴ developed a scale to measure fear during the COVID-19 pandemic, Zhang et al. (2020)⁵² used Short Form-12 to assess MH and fitness, and Kang et al. (2020)³³ evaluated perceptions of psychological care among medical and nursing staff (Table 2).

Some of the selected studies addressed specific population groups. Two studies specifically^{44,53} focused on the elderly, six among children, schoolchildren or young people, and seven on women^{10,12,18,20,33,38,49} (Tables 1 and 2). Further results details will be presented and discussed in the next section.

Discussion

Forty-three articles for summary and critical analysis were included in this study. The majority of them described the presence of symptoms or mental disorders during the COVID-19 pandemic, especially in the most vulnerable population groups. These findings suggest that the advance of the pandemic may increase the likelihood of illness and psychiatric morbidities in different population groups, such as among the elderly and health professionals, and that it may be related to various aspects of the pandemic, such as social distancing measures, negative news and the growing number of confirmed and suspected cases.⁵⁴

There is a growing number of scientific publications showing the possible relationship between the COVID-19 pandemic, and the presence or worsening of mental disorders, or symptoms of anxiety and depression. However, no controlled or longitudinal studies were found that could more robustly explore the relationships between the COVID-19 pandemic and mental health outcomes (MH). Despite the noted effort to describe the problem (the effect of COVID19 on MH) while it is still occurring, there are problems in generalizing these findings, since most studies are cross-sectional, with no previous measurement of the outcomes studied for comparison. Also, some studies used samples based on voluntary selections, using online questionnaires. Therefore, selection bias is likely, due to samples concentrated in specific populations, often included according to availability criteria, in addition to many possible participants not being included because they do not have access to online tools, or have greater difficulty of using them.

Another limitation present in the studies was the collection of information in a single period and during different periods of the pandemic. While some studies measured outcomes at the beginning of the pandemic, others evaluated them at more advanced stages, therefore hindering comparisons.² Long-term exposure was also not measured, which would be important since an increase in mortality and confinement time can influence the way people evaluate their own MH.³

Mental disorders and symptoms associated with COVID-19

Anxiety

Of the 43 articles selected, 77% (n = 33)^{10,11,14–44} indicated a relationship between anxiety symptoms and the COVID-19 pandemic. High anxiety scores were found associated with the diagnosis of coronavirus, coping with alcohol/drugs, extreme hopelessness and suicidal ideation.³⁵ A study found high levels of anxiety among the population studied, 80% of which reported being concerned with COVID-19.³¹ Issues associated with the risk of anxiety and depression were related to the fear of the COVID-19 pandemic, and the fragility related to patients' clinical issues, the fear of being infected and becoming ill,⁴⁰ and that family members would contract COVID-19 (75.2%).³⁸ Anxiety generated by the fear of running out of medication was also one of the issues cited as sources of concern.⁴⁰ Negative emotions (anxiety, depression and indignation) increased, while positive emotions (measured by the Oxford happiness scores) and satisfaction with life decreased with the pandemic.¹¹

A study carried out with 7,236 Chinese individuals showed a general prevalence of symptoms of anxiety, depressive symptoms and poor sleep quality in 35.1%, 20.1% and 18.2% of those investigated, respectively.²⁹ The prevalence of symptoms of anxiety and depressive symptoms was significantly higher in younger participants (<35 years) (p<0.001).²⁹ Another study conducted in China on 5,851 individuals found a prevalence of depression, anxiety and a combination of depression and anxiety during the Covid-19 period among 48, 3% (95% CI 46.9% -49.7%), 22.6%

(95% CI 21.4%-23.8%) and 19.4% (95% CI 18.3%-20.6%) of participants, respectively.⁴⁸ Lei et al. (2020)²⁷ found the prevalence of anxiety and depression to be approximately 8.3% among the 1,593 survey participants. Moghanibashi- Mansourieh (2020),¹⁰ in applying an online questionnaire to 10,754

participants, found that the level of severe anxiety was serious for 9.3% of the participants and very serious for 9.8%. Chew et al. (2020),²⁸ conducting research among health professionals (n = 906), found that 8.7% (n = 79) of participants suffered from moderate to extremely severe anxiety, while Ahmed et al. (2020)³⁰ found a higher anxiety rate (29%), dangerous, harmful alcohol consumption or alcohol dependence (30%), and lower than usual mental well-being (32.1%) among the 1,074 individuals in the Chinese province of Hubei who answered the online questionnaire.

In another study, where 124 questionnaires were distributed, with a response rate of 84.7% (105/124),²⁶ it was found that the prevalence of total, mild, moderate and severe anxiety were 18.1%, 10.5%, 5, 7% and 1.9%, respectively. Respondents who had experience of exposure to COVID-19 reported higher rates of anxiety, accompanied by depression, than those who had no experience of exposure (incidence rates of 31.6% and 12.6%, respectively).²⁶

In addition to these studies, Lei et al. (2020),²⁷ in a study conducted on 1,593 participants in southeastern China, found a prevalence of 8.3% of anxiety, and 14.6% of depression. The prevalence in the affected group (12.9%, 22.4%) was significantly higher than in the unaffected group (6.7%, 11.9%). Subjects were considered affected if they or their families/colleagues/classmates/neighbours had been quarantined. Lower average family income, lower education levels, greater concern about being infected by COVID-19, not having psychological support, higher economic losses and poorer self-reported health conditions were statistically significant, associated with higher scores on the self-rating anxiety scale (SAS) and self-rating depression scale (SDS).²⁷

Depression

Of the selected articles, 56% (n = 26)^{11,15,18–20,22,23,25–30,32,33,36,37,39–41,43,45–48} investigated the relationship between COVID-19 and depression or depressive symptoms. Among these, a study with 1,593 participants in China found a prevalence of depression of approximately 15%.²⁷ Another study carried out in the most affected areas of China found that 634 [50.4%] of participants reported symptoms of depression.³⁸ Multivariate Logistic Regression analysis showed that participants from outside Hubei province were less likely to experience symptoms of distress, compared to those in Wuhan (OR: 0.62; 95% CI: 0.43-0.88).³⁸

A study found a prevalence of depression, and a combination of depression and anxiety, during the Covid-19 period of 48.3% (95% CI 46.9% -49.7%) and 19.4% (95% CI 18.3% - 20.6%), respectively.⁴⁸ Furthermore, a study in Vietnam found an increased prevalence of depression (29.2%) in patients who had COVID-19 infection (p 0.016).⁴⁶ There was an increase in the prevalence of comorbid depression with anxiety (p 0.086), both in patients with COVID- 19 infection (21.1%) and in the general public (22.4%). Patients who had COVID-19 infection (19.3%) and the general public (14.3%) also had a higher proportion of severe depressive symptoms (p 0.002). In addition, patients who experienced COVID-19 infection, and the general public, were more likely to display a depressed mood (p 0.038) and somatic symptoms (all p <0.01), compared to quarantined individuals. Survey participants (3,947 people recruited from the outpatient departments of nine hospitals and health centres in Vietnam) who were diagnosed

with COVID-19 had a higher probability of depression (OR 2.88; $p < 0.001$), and a lower score on the scale that measures health-related quality of life (HRQoL) (B -7.92; $p < 0.001$). Health literacy was a protective factor for depression and HRQoL during the COVID-19 epidemic, especially among people not diagnosed with the disease.⁴⁶

In a study of 500 individuals, 62% reported no likelihood of psychological distress, while 19.4% and 18.6% had a mild and moderate to severe likelihood.⁴⁵ Cyclothymic (OR 1.24; $p < 0.001$), depressive (OR 1.52; $p < 0.001$) and anxious temperaments (OR 1.58; $p = 0.002$) and the ASQ "Need for approval" (OR 1.08; $p = 0.01$) were risk factors for moderate- to-severe psychological distress, compared to no distress. On the other hand, the ASQ "Confidence" (OR 0.89; $p = 0.002$) and "Discomfort with closeness" were protective (OR 0.92; $p = 0.001$). The cyclothymic (OR 1.17; $p = 0.008$) and depressive (OR 1.32; $p = 0.003$) temperaments resulted in being risk factors in individuals with moderate to severe psychological distress, compared to mild distress, while the ASQ "Confidence" (OR 0.92; $p = 0.039$) and "Discomfort with closeness" (OR 0.94; $p = 0.023$) were protective.⁴⁵

In another study in which 124 questionnaires were distributed with a response rate of 84.7% (105/124), the results showed mild (SAS score 53 to 62), moderate (SAS score 63 to 72) and severe depression (SAS score ≥ 73) in 22, 5 and 4 cases, respectively.²⁶ The incidences of cases of total, mild, moderate and severe depression were 29.5%, 21.0%, 4.8% and 3.8 %, respectively. Respondents who had the experience of exposure reported higher rates of anxiety, accompanied by depression, than those who had no experience of exposure (incidence rates of 31.6% and 12.6%, respectively).²⁶

Analyzing the overall prevalence of generalized anxiety disorder (GAD), the public's depressive symptoms and sleep quality were 35.1%, 20.1% and 18.2%, respectively.²⁹ Young people, however, reported a significantly higher prevalence of GAD and depressive symptoms than the elderly. Compared to another occupational group, health workers were more likely to have poor sleep quality. Age (< 35 years) (OR 1.77; 95% CI 1.38-1.95) and time spent focusing on COVID-19 (≥ 3 hours per day) (OR 1.91; 95% CI 1, 77-2.15) were associated with GAD. Young age was also associated with depressive symptoms (OR 1.80; 95% CI 1.35-2.01), and health professionals were at high risk of having poor sleep quality (OR 1.48; 95% CI 1.15-1.95).²⁹

Changes in sleep pattern

Another symptom frequently reported in the articles was changes in sleep pattern.^{22,29,31,32,36,49,50} Huang & Zhao (2020)²⁹ found a general prevalence of anxiety symptoms, depressive symptoms and poor sleep quality of 35.1 %, 20.1% and 18.2%, respectively. The prevalence of symptoms of anxiety, depressive symptoms and poor sleep quality was significantly higher in health professionals who spent a great amount of time (≥ 3 hours / day) dealing with COVID-19 patients, as compared to those investing less time (< 1 hour / day and 1-2 hours / day).²⁹

Roy et al. (2020)³¹ reported negative sleep changes in 12.5% of the survey participants, Huang & Zhao (2020)²⁹ in 18.2 of the 7,236 participants, and Liu et al. (2020)⁴⁹ demonstrated that participants with

better sleep quality or lower frequency of nighttime waking reported lower PTSD. While anxiety was associated with greater stress and reduced sleep quality, higher levels of social capital were positively associated with increased sleep quality.⁵⁰ Compared to another occupational group, health professionals were more likely to have poor sleep quality (OR 1.48; 95% CI 1.15- 1.95).²⁹

Another study carried out in China, including a total of 1,563 participants, showed that 36.1% of participants (n = 564) had symptoms of insomnia, according to the Insomnia Severity Index (ISI) (total score ≥ 8).²² Insomnia symptoms were associated with education levels (high school or lower) (OR 2.69; p 0.042; 95% CI 1.0–7.0), type of team (physician) (OR 0.44; p 0.007 ; 95% CI 0.2–0.8), current work department (isolation unit) (OR 1.71; p 0.038; 95% CI 1.0–2.8), concern about being infected (OR 2.30 ; p <0.001; 95% CI 1.6–3.4), perceived lack of utility of news or social media in relation to COVID-19, in terms of psychological support (OR 2.10; p 0.001; 95% CI 1,3–3,3) and strong uncertainty regarding effective disease control (OR 3.30; p 0.013; 95% CI 1.3–8.5).²²

Obsessive behaviors

Four of the studies included in the current review addressed factors related to obsessive behaviours.^{13,15,31,44} Among these, a study carried out in China, including 1,060 respondents who accessed the online platform Wenjuanxing, showed a 70% prevalence of symptoms of moderate and higher psychological changes, with specifically high scores for obsessive-compulsive disorder, interpersonal sensitivity, phobic anxiety and psychoticism.⁴⁴ People aged over 50, who were better educated, divorced or widowed, and who performed agricultural work, had a higher number of symptoms. People who were younger, and those on a medical team, were in the highest risk group, in terms of the severity of psychological symptoms.⁴⁴ Another study also conducted in China found that living in rural areas, being a woman, and being at risk of contact with patients diagnosed with COVID-19, were the most common risk factors for being obsessive-compulsive.¹⁵

Comparing doctors to other health professionals, the study found that doctors had a higher prevalence of obsessive- compulsive symptoms (5.3 vs. 2.2%; p <0.01).²² They also had higher total scores for obsessive-compulsive symptoms in the Generalized Anxiety Disorder 2-item (GAD-2) psychological test and Revised Symptom Checklist- 90- (SCL-90-R)(p ≤ 0.01).¹⁵ Research on 3,947 participants in Vietnam showed that the COVID-19 epidemic led to panic and hypochondria, resulting in the unnecessary seeking-out of health care, and increased demand for health care services among people consulted online in the general population.¹³

Among the concerns that could increase obsessive symptoms, 72% (n = 662) of participants in a survey conducted in India cited excessive concern about the use of gloves and disinfectants.³¹ Participants reported symptoms such as negative sleep changes (12, 5%), paranoia about the use of social media related to COVID-19 infection (37.8%), and anguish (36.4%).

Post-Traumatic Stress Disorder (PTSD)

In addition to symptoms of anxiety, depression and sleep disorders, Post-Traumatic Stress Disorder (PTSD) has been linked to COVID-19. Liu et al. (2020)⁴⁹ found a 7% prevalence of PTSD symptoms in the areas most affected by the COVID-19 outbreak in China. Hierarchical regression analysis, and a nonparametric test, suggested that women had higher PTSD, with negative changes in cognition, mood or hyperexcitation. Participants with better sleep quality, or less frequency of nighttime waking, reported lower PTSD.⁴⁹

Tan et al. (2020),³² found that a prevalence of 10.8% of the 673 respondents to the questionnaire fit the diagnosis of PTSD after returning to work, and Chew et al. (2020)²⁸ found a high risk of PTSD (OR 2.20; 95% CI 1.12–4.35, p 0.023) associated with the presence of physical symptoms experienced in the previous month among 906 health professionals who participated in the research. The most common reported symptom was headaches (32.3%), with a large number of participants (33.4%) reporting more than four symptoms.²⁸

Specific populations

In addition to specific symptoms and disorders, the crisis caused by COVID-19 seems to be characterized by having a distinct influence on specific population groups. Two of the selected studies^{44,53} investigated the influence of the COVID-19 pandemic on the elderly, and five others^{17,22,25,29,39} its influence on children, schoolchildren or young people. In addition, seven studies addressed the relationship between COVID-19 and MH among women.^{10,12,18,20,33,38,49}

The elderly

Elderly subjects are more susceptible to depressive symptoms, due to losses they experience during their lives and cerebral vascular changes.⁵⁵ Depression and anxiety in the elderly appear among the most frequent reasons for requesting a psychiatric consultation.⁵⁶ The elderly population are among the most affected by the COVID-19 pandemic, both in terms of severity and mortality, and are also more likely to suffer psychological impacts during this period.^{4,57}

Tian et al. (2020),⁴⁴ observed a 70% prevalence of symptoms of moderate and greater psychological changes, with specifically high scores for obsessive-compulsive disorder, interpersonal sensitivity, phobic anxiety, and psychoticism. People aged over 50, who were better educated, divorced or widowed, and who performed agricultural work, had more symptoms. However, younger people and those in a medical team, were in the highest risk group, in terms of the severity of psychological symptoms.⁴⁴ Another study indicated that individuals over the age of 60 had higher anxiety scores than the general population.¹² Losada-Baltar et al. (2020),⁵³ however, suggested that it is not chronological age itself, but the negative self-perception of ageing that is related to loneliness and psychological suffering in people during a forced stay at home during the COVID-19 crisis. Elderly people with a positive self-perception of ageing seem to be more resistant to loneliness and distress during the COVID-19 outbreak.

Bacon & Corr (2020),²¹ found that interviewees who were more concerned were older, had negative attitudes towards illness, and scored higher in reactivity of the reward (RR), indicating motivation to adopt a positive attitude, despite prevailing concern/anxiety. Concerns about personal safety were greater in those with negative attitudes towards illness, and with higher scores in the fight-flight-freeze system (FFFS, reflecting fear/prevention). The results suggest that people are experiencing psychological conflicts between the desire to remain safe (related to FFFS), and the desire to maintain a normal and pleasant life (related to RR). Ways to reduce the conflict may include maladaptive behaviours (panic buying) reflecting reward-related displacement activity. Self-isolation is intended to be related to FFFS, but is also related to low scores in the behavioural inhibition system (related to anxiety). The elderly reported being less likely to isolate themselves.²¹

Children, schoolchildren and parents

The COVID-19 pandemic can also affect children's thoughts, behaviours and emotional responses, the most affected being those who are separated from their caregivers during this process.⁵⁸ Yuan et al. (2020),³⁹ found that the anxiety scores of parents of children undergoing epidemic hospitalization can also be altered, and were significantly higher (EH) (7.02 ± 3.01) when compared to the anxiety score of parents undergoing non-epidemic hospitalization (NEH) (3.62 ± 2.10) ($p < 0.001$). Likewise, the depression score of parents of children with EH (7.72 ± 2.81) was higher than the depression score of parents of children with NEH (4.54 ± 2.56) ($p < 0.001$). There was a positive correlation between the anxiety, depression and drowsiness scores among parents of children with EH. Parents of children hospitalized during the COVID-19 epidemic face enormous pressure and anxiety. Post-traumatic stress disorder and MH problems can occur in parents, which can affect the child's recovery.³⁹

Zhang & Ma (2020),²² demonstrated that the average behaviour of children with ADHD (M 2.25; SD 0.54) worsened significantly, compared to their normal state (95% CI 2.18-2.32); 53.94% of parents reported that their children's ability to stay focused worsened, 67.22% that the frequency of anger increased, and 56.02% that the daily routine worsened. More than half the parents reported that their children's behaviour in other domains had improved, or stayed at the same level. Children's ADHD behaviors were positively linked to acute stress in response to the COVID-19 outbreak ($r 0.21$; $p 0.001$), parental attention to the media coverage of COVID-19 news ($r 0.13$; $p 0.048$), general mood (negative) of children and parents ($r 0.48$; $p < 0.001$) and ($r 0.41$; $p < 0.001$) respectively) and negatively correlated with the children's study time ($r -0.19$; $p 0.004$) and children's interaction with parents' time ($r -0.17$; $p 0.008$). In the regression analysis, children's general mood ($\beta 0.17$; 95% CI 0.11-0.23; $p < 0.001$), parents'

general mood ($\beta 0.13$; 95% CI 0.06 -0.20; $p < 0.001$) and children's study time ($\beta -0.09$; 95% CI -0.15, -0.02; $p 0.010$) significantly predicted children's ADHD behaviors.²²

Young people can also be impacted by COVID-19 contingency measures, especially the most vulnerable population groups, such as informal and unemployed workers, in the face of scenarios in which the possibilities of work become scarcer. Research conducted in China, based on interviews with 7,143 university students, showed that 25% of participants suffered from anxiety. Of these, 0.9% experienced

severe anxiety, and 21.3% experienced mild anxiety.¹⁷ Protective factors against anxiety were seen to be: living in urban areas, having family income stability, and living with parents.¹⁷ On the other hand, having relatives or acquaintances infected with COVID-19 was a risk factor for anxiety among these university students.¹⁷ The results reinforce the importance of implementing social protection measures during social distancing, in order to mitigate possible MH impacts on the most vulnerable people in the population.

Research carried out with schoolchildren in home confinement in Wuhan & Huangshi, a province in Hubei, China, showed that of the 1,784 survey participants, 22.6% reported depressive symptoms, and 18.9% anxiety symptoms.²⁵ Wuhan students had significantly higher CDI-S scores than those from Huangshi (β 0.092; 95% CI, 0.014-0.170), with a higher risk of depressive symptoms (OR 1.426; 95% CI 1.138-1.786). Students who were not concerned about being affected by COVID-19, or only slightly, had significantly lower CDI-S scores than those who were very concerned (β -0.184; 95% CI -0.273 to -0.095), with a reduced risk of depressive symptoms (OR 0.521; 95% CI 0.400-0.679). Those who were not optimistic about the epidemic, compared to those who were quite optimistic, had significantly higher scores on the Children's Depression Inventory–ShortForm (CDI-S) (β 0.367; 95% CI 0.250-0.485), with an increased risk of depressive symptoms (OR 2.262; 95% CI 1.642-3.117). There was no significant association between demographic characteristics and symptoms of anxiety.²⁵

Huang & Zhao (2020),²⁹ on the other hand, found a general prevalence of generalized anxiety disorder (GAD), depressive symptoms and sleep quality disturbances in the public in 35.1%, 20.1% and 18.2% of young people, respectively. Young people reported a significantly higher prevalence of GAD, and depressive symptoms than the elderly. Age (<35 years) (OR 1.77; 95% CI 1.38-1.95) and the time spent focusing on COVID-19 (≥ 3 hours per day) (OR 1.91; 95% CI 1.77-2.15) were associated with TAG. A young age was also associated with depressive symptoms (OR 1.80; 95% CI 1.35-2.01), and health professionals were at high risk of having poor sleep quality (OR 1.48; 95% CI 1.15-1.95). Young people who spent more than 3 hours a day thinking about the outbreak had a significantly higher prevalence of symptoms of anxiety ($p < 0.001$).²⁹ A previous study found that isolated or quarantined children during epidemics, or in disaster situations were more likely to develop acute stress and adjustment disorders, and suffering.⁵⁹

Women

A study using hierarchical regression analysis and a nonparametric test, in research conducted in the areas most affected by the COVID-19 outbreak in China, suggested that women had higher levels of PTSD.⁴⁹ Another study in China, carried out among health professionals, found that young women were the most affected psychologically.³³ The chance of experiencing anxiety during the pandemic period seems to be greater among women (OR 3.01; 95% CI 1.39-6.52) and among people aged over 40 (OR 0.40; 95% CI 0.16-0.99).¹⁸ Almost 35% of respondents experienced psychological distress.¹² Multinomial logistic regression analyses showed that women showed significantly higher psychological levels of distress than men.¹² Female nurses, women, first-line health professionals, and those working in Wuhan,

China reported more severe degrees of all MH measurements than other health professionals.²⁰ Female gender, the presence of Covid-19 symptoms, and poor self-rated health status were significantly associated with a greater psychological impact of the outbreak and higher levels of stress, anxiety and depression ($p < 0.05$).³⁸

Another study, of more than 12,000 people, of which approximately 90% (10,754) completed the questionnaire, showed that the total anxiety level was 8.61 ± 6.95 , and the severity of anxiety symptoms in 49.1% of the cases was normal, in 9.3% it was severe, and in 9.8% it was very severe, with the highest level of anxiety being among women ($p < 0.001$).¹⁰

Health professionals

Doctors, nurses, and other healthcare professionals may experience trauma while treating patients, especially when they are dealing with a new disease that they are unsure how to treat effectively. According to Bao et al. (2020),⁶⁰ the stress they experience can trigger common mental disorders, including post-traumatic stress disorder, anxiety and depressive disorders which, in turn, can result in threats exceeding the consequences of the COVID-19 epidemic itself.

A study conducted in China showed that of the 994 medical and nursing staff surveyed in Wuhan, 36.9% had MH disorders below the threshold (PHQ-9: 2.4 average), 34.4% had mild (PHQ-9: 5.4), 22.4% had moderate (PHQ-9: 9.0) and 6.2% had severe disorders (mean PHQ-9: 15.1), shortly after the COVID-19 epidemic.³³ With regards to these professionals' Mental Health in this period, 36.3% reported having accessed psychoeducational materials (such as books on MH), and 50.4% psychological resources available in the media (such as online messages about MH self-help methods). Meanwhile, 17.5% of professionals participated in counselling or psychotherapy.³³ A similar result was also found by Zhang Y. and Ma Z.F. (2020),²² in China, with the prevalence of depressive, anxiety and stress-related symptoms being 50.7% (PHQ-9 ≥ 5), 44.7% (GAD-7 ≥ 5) and 73.4% (HEI-R ≥ 9), respectively, among the medical team. Xu et al. (2020)⁴¹ compared MH measurements during and prior to the outbreak among the medical team, and found that the surgical team's anxiety, depression, dream anxiety, and SF-36 scores during the outbreak period were significantly higher than in the non-outbreak period ($p < 0.001$).

In India and Singapore, a study showed that of the 906 health professionals who participated in the survey, 5.3% ($n = 48$) had positive results for moderate to very severe depression, 8.7% ($n = 79$) for moderate to extremely severe depression, 2.2% ($n = 20$) for moderate to extremely severe stress and 3.8% ($n = 34$) for moderate to severe levels of psychological distress.²⁸ Depression (OR 2.79; 95% CI 1.54-5.07; $p < 0.001$), anxiety (OR 2.18; 95% CI 1.36-3.48; $p < 0.001$), stress (OR 3.06; 95% CI 1.27-7.41; $p < 0.001$), and post-traumatic stress disorder (PTSD) (OR 2.20; 95% CI 1.12-4.35; $p < 0.023$) were significantly associated with the presence of physical symptoms experienced in the previous month.²⁸

Studies have also shown that professionals who are on the front line for the treatment of Covid-19 may be more impacted by the consequences of the pandemic.^{14,20,29,41,51} For example, a study conducted in China showed that health professionals involved in the diagnosis, treatment and care of patients with

COVID-19 were more likely to have symptoms of depression (OR 1.52; 95% CI 1.11-2.09), anxiety (OR 1.57; 95% CI 1.22-2.02), insomnia (OR 2.97; 95% CI 1.92-4.60) and anguish (OR 1.60; 95% CI 1.25-2.04) than those working in other areas.²⁰ Also in China, trauma scores of frontline nurses, including those for psychological and physiological clinical responses, were significantly higher than staff who were not on the front line ($p < 0.001$).⁵¹

Huang & Zhao (2020),²⁹ also found a higher prevalence of symptoms of anxiety, depressive symptoms and poor sleep quality in health professionals who spent more time caring for COVID-19 patients.²⁹ Sun et al. (2020),¹⁴ explained that nurses who care for patients with COVID-19 may have negative emotions, such as fatigue, discomfort and helplessness, caused by high-intensity work, fear, anxiety, and concern for patients and family members. A study carried out in China compared fear, anxiety and depression between two groups of hospital employees,⁴³ with the medical team showing greater symptoms of fear, anxiety and depression than the administrative team. In addition, the analysis also showed that medical staff working in departments that maintain direct contact with patients with pneumonia resulting from coronavirus infection had more psychological disorders and almost twice the risk of experiencing anxiety and depression.⁴³

Other factors can also influence the mental health of health professionals, such as living in rural areas, being a woman, and being at risk of contact with patients diagnosed with COVID-19.¹⁵ Mo Y. et al. (2020),¹⁶ investigated work-related stress among female nurses who supported the fight against the COVID-19 infection in Wuhan, and found that being an only child, having a greater weekly workload, and anxiety, were the main factors that affected the nurses' stress levels.

Summary of recommendations and strategies listed by the studies

Although controlled or longitudinal studies related to MH at the time of COVID-19 were not found in this review, research indicates that there may be expected MH consequences for populations. The studies published so far point to the need of emphasising on MH care while the pandemic is still ongoing, in order to avoid extensive future problems, and possibly reduce the duration and cost of treating subsequent psychological effects. Psychotherapy and counselling are fundamental to this aim. They also listed specific measures for the most vulnerable population groups or those that may be most affected by COVID-19, such as the elderly and health professionals. Cognitive Insomnia Behavior Therapy (CIBT) is a promising intervention for acute sleep pattern alterations, it also can improve patients' self-efficacy and confidence in controlling their sleep problems.²²

Mental Health (MH) Professionals

It is recommended that mental health professionals be attentive to individuals' emotional responses during the current pandemic, as well as to pre-existing risk factors, and people with a history of mental illness presenting pathological levels of negative emotions and related behaviours.²³ They should suggest limiting the time for taking in information related to COVID-19 to a maximum of two hours a day; maintaining a normal work rhythm, and resting as much as possible; exercising regularly in order to

promote sleep quality; and not accessing information about outbreaks before bed.²⁹ They should educate the public about common adverse psychological consequences and promote healthy behaviour, for example using alternative forms of communication, such as virtual networks.¹⁰

MH professionals currently have an important role to play in supporting the public's well-being. Continuous surveillance and monitoring of the psychological consequences of outbreaks of potentially epidemic and life-threatening diseases, and establishing early mental health interventions should become routine, as part of efforts to prepare for outbreaks worldwide.²⁹

Health professionals on the front line

The study results pointed to the importance of being prepared to support frontline workers fighting the pandemic through mental health interventions in times of crisis,³³ especially those allocated to the respiratory, emergency, ICU, and infectious disease departments.^{43,51} The main measures cited by the articles were: to increase the availability of specialized treatment with psychologists and psychiatrists;^{33,44} to enable multidisciplinary interventions, addressing both psychological manifestations and physical symptoms; to provide counselling dedicated to relieving the fear of transmitting the infection to family members, and increase confidence and self-esteem;²⁸ and to develop the strengthening of support from colleagues in the workplace, online forums for teams or advice hotlines, and early identification of risk factors by employers,³² through stress management and professional health services in psychological consultancy, and early intervention.^{32,61}

Health professionals also require adequate working conditions, with the provision of sufficient protective medical equipment, and adequate rest time, as well as access to programs designed to increase the capacity for resilience and psychological well-being.¹⁵ They must be mobilized so that they actively seek out their social support systems. Leisure activities and training on how to relax should be organized, to help staff reduce stress.¹⁶

The post-pandemic period is also a concern, it will also involve MH impacts seen during the pandemic. It is highly recommended that health professionals include the promotion of mental health as part of their follow-up after the pandemic, and that they observe symptoms of traumatic stress, which can lead to the development of avoidance behaviours, or passive lifestyles after the pandemic.²² Finally, in order to better prepare for future outbreaks of infectious diseases, greater investment in MH tools is needed, in order to assist and protect the medical and nursing teams working on the front line.³³

Meanwhile, as far as patients are concerned, the importance of performing a periodic assessment of patients' health-related quality of life under clinical-home care should be emphasized. At-risk patients require adequate care, planning individualized medical and psychological support throughout life, especially in exceptional cases, as in the COVID-19 pandemic.⁴⁰

Children and young individuals

For children and parents, early detection of parental MH problems, and the timely provision of certain psychological interventions will help parents to take better care of their children in hospital, and help children to recover and be discharged as quickly as possible.³⁹ Attention is also needed to identify an appropriate approach for children with Attention Deficit Hyperactivity Disorder (ADHD), in terms of disaster risk reduction activities.²²

Special attention must also be paid to the psychological health of individuals under the age of 18, and from middle age to the elderly (aged over 50), providing psychological interventions through television, internet and the telephone. For young people, guidance should be given, in order to understand the epidemic, and to alleviate panic and fear.⁴

Public policies

Governments must first recognize COVID-19 as an emergency public health concern, in order to improve health literacy and control the disease and its consequences during the outbreak.⁴⁶ It is necessary to provide the public with transparent, up-to-date, accurate, brief and simple information, and knowledge about the epidemic, pathogenicity and transmissibility, in order to better control the disease.^{29,46} It could also establish an official, integrated and uniform platform for MH counselling, to provide psychological counselling to people in need.²⁹

Identifying those who may be most affected by COVID-19, not exclusively epidemiologically, but also through working and living in the most affected regions, has important implications. This identification helps direct resources to those who need most.⁵² The timely identification of psychological distress, and accurate classification of MH needs among populations, will facilitate the development of targeted psychological interventions.⁴⁷ Similarly, it is necessary to adopt preventive measures for PTSD, and other mental problems.⁴⁹ Professional psychological assistance and counselling should focus on the psychological health of vulnerable populations, those with lower levels of education, women and susceptible groups, such as the divorced or widowed,⁴⁴ suspected and diagnosed patients, young people and health professionals, especially doctors and nurses who work directly with patients or quarantined people.²⁹

In summary, it is necessary to formulate psychological interventions to improve MH and psychological resilience during the COVID-19 epidemic.³⁸ The government should aim to adopt appropriate subsidy policies to alleviate the economic pressure on the general population caused by the epidemic,⁴⁴ and increase medical support,²⁷ in addition to implementing public policies that stimulate social capital during isolation.⁵⁰ Social support not only reduces psychological pressure during epidemics, but also changes attitudes towards methods for seeking help.¹⁷

The Media

The use of social media data can provide a timely understanding of the impact of public health emergencies on the public's MH during the epidemic period.¹¹ However, the media can also have

negative consequences on people's MH. Research has found that more than 80% (95% CI 80.9%-83.1%) of participants reported being frequently exposed to social media,⁴⁸ and high chances of anxiety (OR 1.72; 95% CI 1.31-2.26) and a combination of depression and anxiety (CDA) (OR 1.91; 95% CI 1.52-2.41) were observed among users who were frequently exposed.⁴⁸ A study conducted in Iran also showed a higher level of anxiety among the people who followed coronavirus-related news the most ($p < 0.001$).¹⁰ Therefore, the feeling of distress and panic that takes hold of the population due to the amount of information in the media, or "infodemia", is also of concern. Monitor, filter out false information and promote accurate information by means of collaboration between professionals from distinct backgrounds could reduce the impact of this type of distress.⁴⁸ It is also recommended that MH services be disseminated through various channels, including hotlines, online consultations, online courses and outpatient consultations, with special attention to signs of depression and anxiety.⁴⁸ The media should aim at reporting the progress of the epidemic and increase publicity for psychological counseling.⁴⁴

Conclusion

Most of the reviewed studies indicated that the Covid-19 pandemic could impact people's Mental Health (MH), especially among the most vulnerable population groups, with the development and maintenance of MH actions being important, in conjunction with activities to control Covid-19. The most addressed MH outcomes were anxiety, depression or depressive symptoms, obsessive behaviours, obsessive-compulsive disorder, trauma or post-traumatic stress disorder (PTSD), psychological distress, stress and fear.

However, most studies presented significant methodological limits. Investigations showing greater methodological robustness, including representative and randomized samples, and with longitudinal designs, would be necessary in order to assess the long-term impact of COVID-19 on MH. Pending such studies, given the effects (during and after) of previous epidemics on MH, government measures need to be implemented to reduce the potential catastrophic effects of the current COVID-19 pandemic on MH, and the burden that will remain after the pandemic.

In terms of policies, the population's access to medical resources and public health system services must be strengthened and improved, especially after review of the initial COVID-19 pandemic response and management process, including MH support. To this end, (A) national strategic planning and coordination of psychological first aid should be established, and potentially carried out via telemedicine; and (B) comprehensive care must be established, with a prevention and intervention system, including epidemiological monitoring, screening, referral and targeted intervention, in order to reduce psychological distress and prevent new MH problems.

In terms of research, investments in new research, with controlled studies, or longitudinal follow-up, are necessary, in order to further explore the relationships between the COVID-19 pandemic and people's MH. The timely identification of psychological distress and the identification of MH needs among populations, facilitate the development of targeted psychological interventions, in addition to the organization of health services and systems, during the pandemic.

Abbreviations

Mental Health (MH)

Trauma or Post-traumatic Stress Disorder (PTSD) Insomnia Severity Index (ISI)

Attention Deficit Hyperactivity Disorder (ADHD) Cognitive Insomnia Behavior Therapy (CIBT)

Fight-Flight-Freeze System (FFFS, reflecting fear/prevention)

Declarations

- Ethics approval and consent to participate

Not applicable

- Consent for publication

Not applicable

- **Availability of data and materials**

Not applicable

- **Competing interests**

The authors declare that they have no competing interests

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DBM and FJOA wrote the first draft. DBM, FJOA, CSST and ASR extrated the data for the tables. All the authors contributed with interpretation of the finds and critical revision of the manuscript.

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Tables

Table 1 Summary of the 43 selected studies' scope, methodological aspects and analyses of scientific robustness of the studies.

Table 2 Summary of the selected studies' principal mental health findings and recommendations.

Author(s)	Country	Study scope (study population) 1. National level 2. State/Provincial 3. Municipal 4. Inter-country 5. Other (describe)	Methodological aspects	How scientifically robust is the study?
Losada-Baltar, A. ⁽¹⁾	Spain	5 (participation was requested on social media and all the available options)	<p>This is a cross-sectional study involving 1,310 people over the age of 18, who lived in Spain and experienced the necessary (mandatory) situation of isolating at home, following the government's decision. Participation in this study was requested through social media. Information was collected about age, sex, marital status and self-perception about aging. A 5-item scale was used (for example, "Things get worse as we get older"), with higher scores indicating more negative self-perceptions about aging. Sources of stress related to COVID-19 were considered: conditions such as the physical health risks for doctors, fears for their own health and the huge amount of information about the pandemic. Family resources were measured through questions about their satisfaction with support and their type of feeling regarding family ties, with answers ranging from "almost never" to 2 "always". Ad hoc questions were included to measure various personal resources related to regulating emotions, behavioral, cognitive and social strategies chosen from the many and diverse potential variables of resources analyzed in the literature on stress and coping. Perceived loneliness was measured using the item "How lonely do you feel?", With answers ranging from 0 "I don't feel lonely" to 10 "I feel completely lonely". Psychological stress was estimated considering a wide range of psychological responses to COVID-19, including anxiety and depression, anger or fear. An ad-hoc scale of 5 items was used, which measured anxiety, anger, sadness, fear and hope, respectively. Responses ranged from 0 "I don't feel (...)" to 10 "I feel totally (...)". In addition to descriptive and correlational analyses, two hierarchical regression analyses</p>	<p>The external validity may be low because the sample obtained may not be representative of Spain's general population. In general, the internal validity of the self-perception scale used for aging is low. In addition, the cross-sectional nature of the data does not allow clear identification of the associated factors' effects. Although the proportion of loneliness and psychological distress is high, other variables that can also contribute to distress in this situation were not measured (perceived susceptibility and confusion about whether information is reliable, knowledge, attitudes and practices in relation to COVID-19, or uncertainty about the future).</p>

			were carried out to examine the association between the variables evaluated and loneliness and psychological distress.	
Lee, S.A. ⁽²⁾	United States	5 (775 adults who answered an online questionnaire and were paid for this)	This was an online cross-sectional survey, with data obtained through Amazon MTurk, in exchange for payment (US \$ 0.50). The people recruited gave consent, full details and followed the instructions for item validity. Information gathered included age, sex, ethnicity, education, current residence, coronavirus diagnosis and history of anxiety. A five-item scale (Coronavirus Anxiety Scale - CAS) was used for validation, each representing the symptoms of physiological arousal associated with clinically elevated fear and anxiety: Dizziness, which is an important symptom of panic attacks, and a characteristic associated with generalized anxiety disorder; Sleep disturbance, which is a common symptom of generalized anxiety disorder and post-traumatic stress disorder; Tonic immobility, which is not an important symptom of any psychiatric condition, but motor inhibition is an involuntary response to extreme fear and the perception of inevitability and is typically experienced by victims of highly traumatic situations, such as sexual assault; Loss of appetite, which is a common symptom of major depressive disorder, a condition that often occurs together with panic disorder; nausea or abdominal distress, which reflect digestive changes associated with a response to fear. The criteria for determining the five symptoms on the scale were based on the properties of a psychometrically correct item. Participants answered questions ranging from 0 (not at all) to 4 (almost every day in the past 2 weeks). Factor analysis was applied to anxiety symptoms, in order to identify a small and reliable subset of symptoms that best represents the latent construct of coronavirus anxiety.	The internal validity may be compromised because the study used a single item scale, which could have reduced the complexity and validity of the psychological, attitudinal and coping constructs that were measured. Secondly, the results of this study may underestimate the psychological impact of the COVID-19 pandemic, because the data was collected in the USA during the initial stages of the crisis, before Americans experienced large-scale shutdowns of schools and workplaces. Thus, the results cannot be generalized, compromising their external validity.
Pulvirenti, F. et al. ⁽³⁾	Italy	5 (158 patients from a hospital's Immunology and Hematology Clinical Unit)	A cross-sectional study conducted with patients with Primary Antibody Deficiency (PAD) to assess quality of life. Quality of life was estimated by the Common Variable Immune Deficiency Quality of Life (CVID_QoL), a self-administered questionnaire	The internal validity of the results can be considered to be good because the authors compare the study's results

			<p>developed and validated in Italy in 2016. CVID_QoL includes 32 items in the Likert or forced choice format, and measures health in three dimensions with several items: emotional functioning, relational functioning and gastrointestinal and skin symptoms. The General Health Questionnaire-12 (GHQ-12) was also used, a 12-item self-administered questionnaire designed to measure psychological distress and detect current non-psychotic psychiatric disorders, such as depression and anxiety. Since the beginning of the COVID-19 epidemic, all patients with PAD have been transferred to home therapy and have initiated remote visits. The questionnaires were sent by email four weeks after the transfer. The CVID_QoL and GHQ-12 data scores were compared with the same data set from a survey carried out in 2017.</p>	<p>to an initial measure of the patients' anxiety/depression status taken from a 2017 study. However, the results cannot be generalized, since they are findings for patients receiving treatment in the region's established health system.</p>
Huang, Y. & Zhao, N. ⁽⁴⁾	China	5 (7,236 respondents who used Chinese social media, such as WeChat, Weibo, or other tools.)	<p>The study was based on a cross-sectional online survey, Internet Survey on Emotional and Mental Health (ISEMH), which assesses the Chinese public's psychological behavior. The entire Chinese population which uses WeChat, Weibo, or other social tools, was able to participate in the survey and answer the questionnaire, either by scanning the QR code of the questionnaire's address or by clicking on the relevant link. The questionnaire was completely voluntary and not commercial. All individuals provided demographic data, information related to COVID-19 and three standardized questionnaires, which assessed their symptoms of anxiety, depression, and quality of sleep. Demographic variables included sex, age and individual occupations. The Chinese version of the Generalized Anxiety Disorder-7 (GAD-7) scale was used to assess the subject's anxiety symptoms. The Chinese version of the Center for Epidemiology Scale for Depression (CES-D) was used to identify the presence of depressive symptoms. And the Chinese version of the Pittsburgh Sleep Quality Index (PSQI) scale was used to assess the subjects' quality of sleep in the past two weeks. Knowledge of the COVID-19 outbreak was assessed by two general items: time spent thinking about the COVID-19 outbreak; and</p>	<p>The cross-sectional design makes it difficult to make causal inferences. Secondly, the study was limited to the COVID-19 outbreak, leading to voluntary sampling and conducted online. Therefore, the possibility of selection bias should be considered. Thirdly, due to the study's design on the web, the sample cannot be guaranteed to be representative, which may affect the external validity of the research results.</p>

			<p>knowledge of the COVID-19 outbreak. Descriptive analyses were carried out and the prevalence of mental health burden was stratified by sex, age, occupations and by groups considered to be at high risk (such as health workers and younger people). The proportions were compared using the Chi-square test.</p>	
Gao, J. et al. (5)	China	5 (5,851 respondents used the online platform Wenjuanxing)	<p>A cross-sectional study was carried out among Chinese citizens over the age of 18, between January 31 and February 2, 2020. An online survey was used for a quick evaluation. A total of 4,872 participants from 31 provinces and autonomous regions were involved in this study. In addition to demographics and social media exposure, depression was assessed using the Chinese version of the WHO-Five Well-Index Index (WHO-5), and anxiety was assessed using the Chinese version of the generalized anxiety disorder scale (GAD-7). Multivariate logistic regression was used to identify associations between social media exposure and mental health problems, after controlling for covariates.</p>	<p>The cross-sectional design of the study prevents causal relationships being established between exposure to social media and mental health. Although it is a large sample, the survey was conducted online, which is suitable for a quick evaluation; therefore, some respondent biases, such as few elderly people participating, may have affected the results. Finally, although many covariates have been controlled, we cannot exclude the possibility of residual confusion, caused by unmeasured factors.</p>
Yuan, R. et al. (6)	China	5 (100 parents of child patients in a hospital)	<p>This is a cross-sectional study, using the Hospital Anxiety and Depression Scale (HADS), Van Dream Anxiety Scale (VDAS) and Short Form (SF) -36. The interviewed parents were divided into two groups: children in “non-epidemic hospitalization” (NEH) and “epidemic hospitalization” (EH). The scores for anxiety, depression and dream anxiety of the two groups of parents were compared to verify their mental health. Basic information (age, gender of parents and children) was collected, as well as scores for anxiety, depression, dream anxiety and SF-36. Data was obtained from 100 parents of hospitalized children: 50 parents of children hospitalized during the</p>	<p>The cross-sectional design of the study and absence of previous measures of the parents' mental health status, prevent a discussion of some inferences found, which compromises the study's internal validity. As this is a study carried out in a hospital, the results may also have been skewed,</p>

			COVID-19 epidemic (EH), and 50 parents of children hospitalized in the non-epidemic period (NEH).	since it is an inherently hostile environment. The sample is not representative for the results to be generalized.
Xu, J. et al. ⁽⁷⁾	China	5 (120 members of a hospital's medical staff)	This is a cross-sectional study, in which 120 individuals were interviewed from the surgical medical team at Shanghai Shuguang Hospital's Baoshan Branch. The professionals were divided into two groups (60 in each group) in two periods (outbreak: 28 January 2020 to 29 February 2020; non-epidemic outbreak) period: 2 to 21 March 2020) to complete four scales (Anxiety scale, Depression score, Dream anxiety score and SF-36).	The study was able to compare the data assessed during the pandemic period with previous measures in non-pandemic periods, which increases the consistency of the results. However, some important variables were not considered, to determine the correlations found.
Tian, F. et al. (8)	China	5 (1,060 respondents using the online platform Wenjuanxing)	The study was cross-sectional, using data from January 31 and February 2, 2020, obtained from questionnaires from an online research platform. All subjects participated voluntarily and signed the informed consent form in this study and were identified through snowball sampling by region, age, sex, level of education, marital status and occupation. Psychological symptoms were assessed using the Symptom Checklist - 90 (SCL-90) questionnaire in Chinese. The SCL-90 evaluates self-reported symptoms of 90 items, which include psychological distress and symptoms of psychopathology. This scale produces nine main dimensions of symptoms and three global indices. The nine dimensions of symptoms are Somatization, Obsessive-Compulsive Disorder, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. In addition, seven additional items assess disturbances in appetite and sleep. The three global indices measure overall psychological distress, including the Global Severity Index (GSI), the Positive Symptom Distress Index (PSDI). (PSDI) and the Positive Symptom Total (PST). Descriptive statistics, one-sample t test and one-way analysis of variance (ANOVA) were performed to compare data between groups.	The study population was based on voluntary selection and there was an over-sampling of a specific network, such as highly educated people, which may introduce a selection bias. Thus, the results cannot be generalized. Secondly, the measurements were taken only at a single moment, which may not reflect long-term exposure for the dimensions related to the psychological health of the Chinese, in the face of the COVID-19 epidemic. In addition, people's psychological state may be different as the epidemic develops, which compromises the

				internal validity of the study.
Roy, D. et al. (9)	India	5 (662 respondents recruited via social media)	This was a cross-sectional observational study conducted in India. A snowball sampling technique was used. A semi-structured online questionnaire was developed using Google forms, with a consent form attached. The questionnaire link was sent by email, WhatsApp and other social media to the investigators' contacts. Sociodemographic variables included age, sex, occupation, education, household, area of residence and religion. The online self-report questionnaire developed by the researchers contained the following six sections related to awareness (knowledge), attitude, anxiety and mental health care needs perceived during the new coronavirus pandemic. There were 6 multiple choice questions in the awareness section. The attitude section contained 7 items to be classified in the format of the 5-point Likert scale. Anxiety related to the new coronavirus infection had 18 items to be classified on a 5-point Likert scale, ranging from never, occasionally, sometimes, often and always. The perceived need for mental health care was assessed by 4 items on a 3-point Likert scale. Descriptive statistics were used in the study to analyze the findings. Mean and standard deviation and proportions were used to estimate the results of the study.	The study is limited to people who had smartphones, email addresses and the ability to deal with the English language, which leads to a selection bias. Thus the studied population represents the group of people with a higher level of education and, therefore, it should not be generalized for the entire population. In addition, there was no data on the participants' profile before the pandemic, and the responses stated in the survey, regarding previous behaviors, may have been influenced by the current situation.
Zhang, J. et al. (10)	China	5 (205 respondents used an anonymous questionnaire via an online application)	This is a pilot, cross-sectional study to identify the characteristics of psychological distress among populations affected by the COVID-19 pandemic. The anonymous app-based questionnaire was developed to assess the level of psychological distress and the study was conducted in Zhongshan, one of the cities in Guangdong province, China, from February 15 to 29, 2020. The Chinese 9-item scale of the General Health Questionnaire (GHQ-9) and the 7-item version of the Generalized Anxiety Disorder (GAD-7) scale were used to assess the prevalence and severity of psychological distress in newly recovered COVID-19 patients, individuals under quarantine and the general public. A total score ≥ 10 for the Patient Health Questionnaire-9 (PHQ-9) and GAD-7 was defined as	The cross-sectional design of the study and the absence of previous measures of the individuals' mental health status prevent a discussion of some inferences found, which compromises the study's internal validity. Since it is an online survey, there may have been bias in the selection of participants, and the sample may not be representative for

			depression and anxiety, respectively. The severity of psychological distress was classified with the standard thresholds: Minimal or none (0-4), Mild (5-9), Moderate (10-14), Severe (> 15) for PHQ-9 and GAD-7.	the results to be generalized.
Zhang, S. et al. (11)	China	2 (529 adults from 64 cities in the worst affected regions)	<p>A cross-sectional study was carried out during the COVID-19 outbreak, from 20 to 21 February 2020, in 64 cities in China. All the participants were adults who were not epidemiologically affected by the virus, but who lived in places affected by COVID-19 to varying degrees. Individual health was assessed using the Short Form-12 (SF12), a standard scale for mental and physical health function. SF12 contains 12 items and 8 dimensions: physical functioning (2 items), role-physical (2 items), bodily pain (1 item), general health (1 item), vitality (1 item), social functioning (1 item), role-emotional (2 items) and mental health (2 items). The eight dimensions give two scores composed of the composite physical and mental scale (PCS-12: physical component summary; MCS-12: mental component summary), with a possible score ranging from 0 to 100. As a formative score, a higher SF12 score indicates better health conditions. Anguish was measured by Kessler's six psychological questions scale (K6) with a Cronbach's alpha of 0.79. Adults also provided their sociodemographic characteristics, such as sex, age, education and location (city). Descriptive analysis was carried out of the study variables and regression models, to examine the relationships.</p>	The research was observational and the dependent variables, distress and life satisfaction, were measured by predictors, which compromises the study's internal validity. Also, even if there was data from before the start of the outbreak for some individuals assessed, the sample size was small and the sample was not representative at the national level.
Lu, W. et al. (12)	China	5 (A hospital)	This is a cross-sectional study conducted through questionnaires and psychological tests in a hospital. The occurrence of fear, anxiety and depression were measured on the numerical rating scale (NRS), the Hamilton Anxiety Scale (HAMA) and the Hamilton Depression Scale (HAMD), respectively. A total of 2,299 eligible participants were registered, including 2,042 medical staff and 257 administrative staff.	It demonstrated good internal validity, applying internationally validated psychological questionnaires. However, since it is a hospital convenience sample, there are limits to its external validity, and for the extrapolation of results.
Zhang, W. et	China	5 (2,182)	This was an online survey, evaluating	The criteria for

al. (13)		participants who replied to the whole questionnaire online)	aspects of mental health using the Insomnia Severity Index (ISI), the Symptom Check List-Revised (SCL-90-R) and the Patient Health Questionnaire-4 (PHQ-4), which included the 2-item anxiety scale and the 2-item depression scale (PHQ-2).	participation in the study are not clear, or how the participants were selected/ attracted to answer the online questionnaire. Those who did not answer the questionnaire in full were discarded. It was not possible to assess whether this procedure introduced a bias into the study.
Mo, Y. et al. (14)	China	5 (180 female nurses combatting the epidemic in Guangxi)	This is a cross-sectional study, using an online questionnaire. Data collection tools included the Chinese version of the Stress Overload Scale (SOS), and the Self-Rating Anxiety Scale (SAS). Single factor, correlation and multiple regression analyses were used to analyze associations.	The study sample was limited to female nurses from Guangxi who are supporting the fight against COVID-19 in Wuhan, China, so they did not collect additional data from female nurses from other provinces, which limits the power to generalize the results. The study design was cross-sectional and limited to assessing the importance of stress at work, at one given moment, without longitudinal observation of the subjects. Future research could expand the region, and increase the sample size.
Gong, K. et al. (15)	China	5 (8,913 online consultations from 30 public hospitals in 11 Chinese provinces outside the Hubei area).	Online consultations conducted by certified doctors at public hospitals were analyzed. They investigated suspected hypochondria, social panic resulting from the epidemic, and the motivation for seeking medical consultation. The relationship between suspected hypochondria, and motivation for the consultation, was	The patients' characteristics were collected according to the consultation, since standardized questionnaires were not used and, therefore, important

			explored using logistic regression models.	symptoms may have been neglected or underestimated. The survey included online consultation services from public hospitals and, thus, cannot be generalized, having low external validity. Follow-up consultations were not included and relevant information may have been lost.
Zhang, Y. & Ma, Z.F. ⁽¹⁶⁾	China	5 (263 participants aged 18 or over, resident in Liaoning, who completed an online survey distributed via a social media platform).	An online survey was distributed via a social media platform. The participants completed a modified and validated questionnaire which evaluated the Impact of Event Scale (IES), indicators of negative impacts on mental health and on social and family support, and lifestyle changes related to mental health.	The results found may have suffered a recall bias. Some relevant information was not collected, including income and possible infection or symptoms among relatives and friends.
Nguyen, H.C. et al. ⁽¹⁷⁾	Vietnam	5 (3,947 participants recruited in outpatient clinics in 9 hospitals and health centers in Vietnam)	This is a cross-sectional study, conducted through interviews using printed questionnaires, including the participants' characteristics, clinical parameters, health-related behaviors, depression, health knowledge and quality of life, assessed through the Health-related quality of life (HRQoL).	A convenience sample was used; thus, it does not have good external validity. It only represents patients who came to the hospital under study, and agreed to participate in the research. It is not possible to assess the self-selection bias for participation in the study; people who spontaneously volunteer to participate in a study may have characteristics that are different from others.
Liu, N. et al. ⁽¹⁸⁾	China	5 (285 residents of Wuhan and neighboring cities)	Post-traumatic stress disorder (PTSD) and sleep quality using the PTSD Checklist for DSM-5 (PCL-5) and 4 items from the Pittsburgh Sleep Quality Index (PSQI) were	The selection criteria for participants leaves room for bias, since random

			investigated. Hierarchical regression analysis and a nonparametric test were used to analyze the data.	selection was not used and may have been influenced by online self-selection for participation.
Kang, L. et al. (19)	China	5 (994 doctors or nurses who work in Wuhan)	Four scales were used to assess the mental health state of doctors and nursing staff. The item questionnaire, the 9-item Patient Health Questionnaire (PHQ-9), the 7-item Generalized Anxiety Disorder (GAD-7), the 7-item Insomnia Severity Index (ISI) and the 22-item Impact of Event Scale-Revised (IESR) were used to assess depression, anxiety, insomnia and distress, respectively.	The applied questionnaires were distributed online, without any randomization, and only those that were answered in full were analyzed. The selection criteria for participants leaves room for bias, since random selection was not carried out, and may have been influenced by self-selection for participation.
Cao, W. et al. (20)	China	5 (A sample of 7,143 university students from Changzhi faculty of medicine)	The clustering method was used to select the sample of students from Changzhi Faculty of Medicine, and structured questionnaires were applied to assess the mental health of these students during the COVID-19 outbreak. Univariate analysis (nonparametric test) was used to explore the significant associations between sample characteristics and the level of anxiety during the COVID-19 epidemic. Statistically significant variables were tracked and included in the multivariate logistic regressions and Spearman's correlation coefficient was used to assess the association between stressors related to COVID-19, including economic factors, and day-to-day related stressors, as well as those related to delays in academic activities and levels of anxiety.	Appropriate sample selection techniques were used, demonstrating robust internal validity; however, since only one educational institution was used, it would not be possible to extrapolate the results to students in general.
Wang, Y. et al. (21)	China	1 National (Some regions of China)	A total of 605 questionnaires on psychological status were distributed to the general population through online questionnaires from 6 to 9 February 2020. 600 valid questionnaires were returned. The scales used to assess mental health were: The Self-Rating Anxiety Scale (SAS) and The Self-Rating Depression Scale (SDS).	The investigation of mental health aspects was evaluated while the outbreak was taking place. Sampling selection techniques were not used. The survey was conducted online, which limits the participation of people with less

				access to technology and the internet.
Qiu, J. et al. (22)	China	5 (52,730 participants from 36 autonomous provinces, regions and cities, such as Hong Kong, Macau and Taiwan)	A self-report questionnaire was designed to investigate psychological distress during an epidemic. Data collection started on January 31, 2020. Demographic data was collected - sex, age, education and occupation, in addition to information collected on Mental Health through the COVID-19 Peritraumatic Distress Index (CPDI) - with information on the frequency of anxiety, depression, specific phobias, cognitive impairment, avoidance, compulsive behavior, physical symptoms and loss of social functioning in the previous week, ranging from 0 to 100. A score of between 28 and 51 indicates that distress is moderate. A score ≥ 52 indicates severe distress. Psychiatrists at the Shanghai Mental Health Center confirmed the validity of the CPDI content. Cronbach's alpha for CPDI is 0.95 ($p < 0.001$).	The investigation of aspects of mental health was evaluated while the outbreak was taking place. Sampling selection techniques were not used. The survey was conducted online, which limits the participation of people with less access to technology.
Li, S. et al. (23)	China	1 (Sina Weibo users)	A sample of posts from 17,865 active users of the Sina Weibo Social Network was studied, using the Online Ecologic Recognition (OER) approach, based on various machine learning predictive models. Frequency of words, emotional indicator scores (for example, anxiety, depression, indignation and Oxford happiness) and cognitive indicators (judgment of social risk and life satisfaction) were calculated from the data. Sentiment analysis and the paired sample t-test were performed to examine differences in the same group before and after the COVID-19 declaration on January 20, 2020.	There is a limitation in generalizing the study, since Weibo users are mainly young. Analysis based on the impressions at weekly periods presents relatively high granularity, which may not reflect the tendency to change social mentality in a timely manner. Finer granularity is needed.
Lai, J. et al. (24)	China	1 (National)	A cross-sectional study, with demographic data collection and measures of mental health for 1,257 health professionals, in 34 hospitals in China, from January 29, 2020 to February 3, 2020. All health workers in hospitals, clinics or wards for COVID-19 patients were eligible. The degree of symptoms of depression, anxiety, insomnia and distress was assessed using the Chinese versions of the 9-item Patient Health Questionnaire, the Generalized Anxiety Disorder Scale, the 7-item Insomnia Severity Index and	It has limitations in external generalization, due to the greater participation of provincial residents. In addition, information was collected only 6 days after the epidemic was declared, not reflecting the

			the 22 item Event Scale - Revised, respectively. Multivariate logistic regression analysis was performed to identify factors associated with mental health outcomes.	entire period. It does not measure prior mental health.
Xiao, H. et al. (25)	China	1 National, but concentrated in central China	Individuals (n = 170) who self-isolated at home for 14 days in central China completed self-report questionnaires on the third day of isolation. Individual social capital was assessed using the Personal Social Capital Scale 16 (PSCI-16). Anxiety was assessed using the Self-Rating Anxiety Scale (SAS) questionnaire, stress was assessed using the Stanford Acute Stress Reaction (SASR) questionnaire and sleep was assessed using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. Path analysis was performed to assess the relationships between a dependent variable (social capital) and two or more independent variables, using Pearson's correlation analysis and structural equation modeling (SEM).	The study sample size was small and a cross-sectional study design was used, which may have prevented the identification of other associations between social capital and sleep. In addition, social capital was measured using a self-report questionnaire and the data relied on the individual's ability to interpret the questions and provide accurate answers, but these responses were not verified objectively. Therefore, some causal relationships may have been lost.
Li, Z. et al. (26)	China	1 National	214 people from the general public and 526 nurses (234 frontline nurses and 292 non-frontline nurses) were interviewed to assess the indirect trauma scores using a mobile application questionnaire. Frontline nurses are involved in the process of providing care to COVID-19 patients.	There was a larger number of medical staff for comparison (70% of the sample). It does not measure prior mental health.
Wang, C. et al. (27)	China	1 National (1,210 participants)	The aim of this study was to research the general public in China to understand the levels of psychological impact, anxiety, depression and stress during the early stage of the COVID-19 outbreak. An online survey was carried out, with 1,210 participants, from January 31 to February 2, 2020, using snowball sampling. Information was collected on demographic data, physical symptoms from the previous 14 days, history of contacts with COVID-19, knowledge and concerns about COVID-19, precautionary measures against COVID-19 and additional information needed in relation to COVID-19. The psychological impact was assessed by	Random sampling was not performed (snowball sampling), so it may not reflect the population. It is a cross-sectional study, and does not have data on participants before the study (a previous measurement of participants' mental health is unknown). There is over-sampling of some regions and

			the Impact of Event Scale-Revised (IES-R) and mental health status was assessed by the Depression, Anxiety and Stress Scale (DASS-21).	specific groups (selection bias).
Bacon, A.M. & Corr, P.J. (28)	United Kingdom	5 (202 interviewees recruited via Prolific)	A cross-sectional study, in which UK respondents (No. 202) were recruited via Prolific - a platform for online research participants. Participants accessed the study through a web link and answered a questionnaire about personality (RST - PQ), measures of disease attitudes, concerns about the impact of coronavirus on health services and on socioeconomic infrastructures, personal safety and probability of voluntary self-isolation. Questionnaires used: The Beck Depression Inventory II (BDI-II), Generalized Anxiety Disorder-7 (GAD-7), Illness Attitudes Scale (IAS) and Reinforcement Sensitivity Theory of Personality Questionnaire (RST-PQ).	The sample is relatively small, in addition to the need for a basic level of health knowledge, related to the coronavirus's behavior, which may have influenced the responses. Also no differentiation was made between individuals who were isolated and those who intended to do so, which can influence the results, since behavioral health intentions do not always result in behavior. In addition, the study is cross-sectional and, although personality traits are considered reasonably stable, it is possible that concerns and responses to the virus may change over time as the situation evolves, for example, there was no mandatory 'lockdown', when the data was collected.
Zhang, C. et al (29)	China	5 (medical staff members in China)	This is a cross-sectional study conducted with recruited medical staff members in China, including frontline medical workers. The questionnaire was forwarded to different medical staff groups on WeChat to recruit participants and the people who responded to the questionnaire were also encouraged to forward the questionnaire to other people. The questionnaire, administered through the WeChat program, obtained demographic data and asked self-	Subject to recall bias, in addition to measuring mental health at just one moment in time. The situation prior to the outbreak is not known for better assessment of whether Covid-19 impacts mental health.

			<p>design questions related to the COVID-19 outbreak, insomnia/depressive/anxiety symptoms and stress-related symptoms. Questionnaires used were: the Insomnia Severity Index (ISI); the Patient Health Questionnaire 9-item depression module (PHQ-9); Generalized Anxiety Disorder (GAD) scale and Impact of Event Scale-Revised (IES-R). Logistic regression analysis was used to examine the associations between sociodemographic factors and insomnia symptoms.</p>	
Harper, C.A. et al ⁽³⁰⁾	United Kingdom	4 Inter-country (members of the international community recruited via Prolific)	<p>It used a sample from the international community (N = 324) recruited via Prolific. Participants reported measures of self-perceived risk of contracting COVID-19, fear of the virus, moral foundations, political orientation and behavior change in response to the pandemic. Questionnaires used were: Fear of Coronavirus-19 Scale (FCV-19S); YouGov Behaviour Change (YGBC); PROMIS Emotional Distress Short Forms (PROMIS-SFs); Moral Foundations Questionnaire (MFQ-20); World Health Organization: Quality of Life-BREF (WHOQOL-BREF). Linear regression was performed to explore the extent to which the FCV-19S scores predicted involvement with the behavior change scores (YGBC). This base model was then compared with a second model, including the results from PROMIS-SF and WHOQOL-BREF. Then, a third analysis was carried out, including in the model the effect of MFQ and political orientation, to answer whether political orientation has a greater effect on behavior change than anxiety or fear on the behavior change scores.</p>	<p>The data presented is self-reported and, therefore, may be subject to recall bias. In addition, although regression models can inform how behavioral compliance in public health can be predicted from a perspective of individual differences, there is a lack of identification and understanding of any potential barriers to making this change. In addition to this, mental health was measured at just one point in time.</p>
Lei, L. et al. (31)	China	2 State/Provincial (1,593 adults aged 18 or over)	<p>This is a cross-sectional study conducted from February 4 to 10, 2020. The study was conducted in southeast China, including Sichuan Province, Chongqing City, Guizhou Province and Yunnan Province. A convenience sample was used to select participants using an online questionnaire. The link was sent to local chat groups involving several people through WeChat. The sample included only adults aged 18 or over. Respondents were grouped as an 'affected group' and an 'unaffected</p>	<p>As a cross-sectional design, it does not give mental health measures prior to the outbreak. Use of self-report data is subject to recall bias. Sample composed of volunteers, with no random selection, which</p>

			group', based on whether they or their families / colleagues / classmates / neighbors were quarantined. Evaluation was made of sociodemographic conditions, anxiety, depression, self-reported health status, concern about being infected; economic losses caused by COVID-19 and social support from government agencies. Scales used were: Self-rating anxiety scale (SAS) and Self-rating depression scale (SDS). Multiple linear regression analysis was used to assess the effects of each variable on the sum of the SAS and SDS scores.	compromises the generalization of results.
Moghadasi, A. N. (32)	Iran	5 (33 patients with multiple sclerosis)	A cross-sectional study, in which the anxiety level of patients with multiple sclerosis was measured using the Beck Anxiety Inventory on February 25, 2020. The questionnaire divides the level of anxiety into four levels: none, low, moderate and severe. 33 patients completed the questionnaire.	The number of individuals is small, as well as measuring mental health at only one point in time.
Tan, W. et al. (33)	China	5 (1,323 members of the workforce who returned to work after lockdown and quarantine)	A cross-sectional study conducted with 1,323 members of the workforce who returned to work after the lockdown and quarantine in Chongqing, China. Workers were asked to complete an online questionnaire about their attitude towards the COVID-19 epidemic and the return to work, along with psychological parameters. The structured questionnaire consisted of questions that covered several areas: (1) demographic and occupational data; (2) physical symptoms and self-assessment of their state of physical health in the last 14 days; (3) Impact of Event Scale-Revised (IES-R), (4) Depression, Anxiety and Stress Scale (DASS-21), (5) Insomnia Severity Index (ISI), (6) other psychiatric symptoms and (7) psychoneuroimmunity prevention measures at personal and organizational levels. Multiple linear regression with backward elimination method was used to examine the association between outcome variables (average IES-R, DASS-21 and ISI scores) and demographic variables and psychoneuroimmunity prevention measures.	The use of a self-report questionnaire is subject to recall bias about the interviewees' mental state. Random sampling was not used, which compromises a generalization of the results.
Sun, N. et al. (34)	China	5 (20 State/Provincial nurses who cared for Covid-19 patients in <i>First</i>	Colaizzi's method is used as a phenomenological approach to qualitatively analyze the psychological experience of nurses who care for COVID-19 patients. Using an intentional sampling method, 20 nurses	This is a small number of individuals because it is a qualitative study. Research was only

		<i>Affiliated Hospital of Henan University of Science and Technology)</i>	who care for COVID-19 patients were selected at the First Affiliated Hospital of Henan University of Science and Technology, from January 20 to February 10, 2020. The interviews were conducted in person or by telephone and analyzed by the Colaizzi 7-step method. The main interview questions put to the participants were: (1) What are the main psychological feelings of professionals nursing COVID-19 patients? (2) What are your coping strategies? and (3) what are your ideas in the face of the epidemic? Sub-questions: (1) How did it feel to accept the task of fighting the epidemic? (2) How do you feel when working with COVID-19 patients? (3) What has changed in your life? (4) How do you deal with changes in your work and life? (5) What are your thoughts and feelings about this task fighting the epidemic?	carried out with nurses, with the experiences of other health professionals and administrators not being explored. The research was not conducted in focus groups and was short-term.
Moghanibashi-Mansourieh, A. (35)	Iran	State/Provincial (10,754 individuals from the general population of 31 Iranian provinces)	A cross-sectional online survey conducted with 10,754 individuals from the general population of 31 provinces in Iran. Social networks such as Telegram and Instagram were the main distribution platforms for the questionnaire from March 1 to 9, 2020; An anonymous online questionnaire with 15 questions was applied to collect the data, including three general sections on the demographic characteristics of the interviewees, questions related to the coronavirus, and 7 questions from the anxiety sub scale that assessed autonomic arousal, skeletal muscle effects, situational anxiety and subjective experience of anxious impact. The data was analyzed using descriptive statistics (frequency distribution, mean and standard deviation) and inferential statistics (chi-square tests, independent t-Test and variance analysis).	The use of a self-reporting questionnaire is subject to recall bias. Mental health was measured at just one moment in time. There was no comparison group.
Shacham, M. et al. (36)	Israel	5 (338 Israeli dentists and dental hygienists)	A cross-sectional survey was carried out among 338 Israeli dentists and dental hygienists. Participants were approached using social media, dedicated mailing lists and forums, during the period from March 30 to April 10, 2020. In addition to demographic data, questions about factors related to COVID-19 were answered; subjective overload, self-efficacy and psychological distress scales were also evaluated. The data	Mental health was measured at just one moment in time. The selection criteria for participants leaves room for bias, since a random selection was not carried out, and may have been influenced by online self-

			was analyzed using multivariate logistic regression.	selection for participation.
Chew, N.W.S. et al. ⁽³⁷⁾	Singapore and India	4 Inter-country (906 health professionals from 5 large hospitals in Singapore and India)	A cross-sectional study carried out with 906 health professionals from 5 large hospitals, involved in caring for COVID-19 patients in Singapore and India, who were invited to participate in a study, using a self-administered questionnaire from February 19 to 17 April 2020. The health professionals included doctors, nurses, allied health workers, administrators, administrative staff and maintenance workers. The questionnaire collected information on demographic data, medical history, symptom prevalence in the past month, Depression Anxiety Stress Scales (DASS-21) and the Impact of Events Scale-Revised (IES-R). Evaluation was made of the prevalence of physical symptoms presented by health professionals and the associations between physical symptoms and the psychological results of depression, anxiety, stress and post-traumatic stress disorder (PTSD). Linear regression was used to assess associations between baseline characteristics, risk status, physical symptoms and the average scores of the components DASS-21 and IES-R.	The cross-sectional nature of the study means that mental health is measured at just one point in time. The use of a self-administered questionnaire is subject to recall bias, in addition to important variables not being recorded, such as socioeconomic status and education levels.
Xie, X. et al. ⁽³⁸⁾	China	2 State/Provincial (2,330 students from 2 primary schools in Hubei province)	A cohort study was carried out with 2,330 students from the 2nd to 6th grades in two primary schools in Hubei province, of which 845 were from Wuhan and 1,485 were from Huangshi. The students were asked to complete a survey between February 28 and March 5, 2020, and completed the investigation through an online crowdsourcing platform, the link to the survey and the declaration of consent were sent to their guardian's cell phone. The information included sex, school grade, optimism about the epidemic, whether they were concerned about COVID-19 infection, and symptoms of depression and anxiety as measured by the children's Depression Inventory - Short Form (CDI-S) and Screen for Child Anxiety Related Emotional Disorders. Generalized linear regressions were applied for continuous variables and logistic regressions for binary variables.	The study sampling was voluntary and conducted online, with the psychological conditions of individuals before the outbreak not being assessed.
Huang, Y. & Zhao, N. ⁽⁴⁾	China	5 (7,236 self-selected)	This is a cross-sectional study, based on the National Internet Survey on	This is a cross-sectional web-

		volunteers via the internet)	Emotional and Mental Health (NISEMH). This COVID-19 web-based survey was posted on the internet through the public platform WeChat, and mainstream media. The participants answered the questionnaires anonymously on the internet, reported their demographic data, information related to COVID-19 and filled out three standardized questionnaires: the Chinese version of the GAD-7 Scale (Generalized Anxiety Disorder-7) that evaluated generalized anxiety disorder (GAD); the Chinese version of the Center for Epidemiology Scale for Depression (CES-D) that evaluated depressive symptoms; and the Chinese version of the PSQI (Pittsburgh Sleep Quality Index) that evaluated sleep quality. Univariate and multivariate logistic regression models were performed to explore potential influencing factors for GAD, depressive symptoms and sleep quality during the COVID-19 outbreak.	based research design, with voluntary sampling conducted online, not evaluating the individuals' psychological conditions before the outbreak.
Moccia, L. et al. (39)	Italy	1 National (online survey conducted with the general population, using snowball sampling)	This is a cross-sectional study carried out through an online survey between April 10 and 13, 2020. The snowball sampling method was used to recruit participants, initially selecting five subjects from a wide range of age, sex, occupation, education and geographical area. Each participant was asked to choose five people they considered suitable for the research, and to send them the questionnaire. Additional participants were contacted in the same way until data saturation occurred, being recruited from all Italian regions. Sociodemographic and lockdown-related information was collected and distress, temperament and attachment were assessed using the Kessler 10 Psychological Distress Scale (K10), the Memphis, Pisa, Paris and San Diego Temperament Assessment short version (TEMPS-A) and the validated Italian version of the Attachment Style Questionnaire (ASQ). The factors significantly associated with mild or moderate to severe psychological distress in the bivariate analyses were subjected to multivariate multiple logistic regression.	The research design involved an online invitation, thus leaving the population that does not use internet devices unexplored, and it is not possible to assess the participation rate, since it is not clear how many subjects received the study. In addition, the reliability of self-administered questionnaires may be partially biased.
Zhang, J. et al. (10)	China	3 Municipal (241 parents of school age children)	A cross-sectional study, in which 241 parents of school-age children diagnosed with attention deficit hyperactivity disorder (ADHD) were	Data was reported by parents and the relationship between

		diagnosed with ADHD)	invited to participate in this research. The study obtained ethical approval from Shanghai's Xinhua Hospital. Information was collected on (1) ADHD behavioral symptoms, as measured by the Swanson, Nolan, and Pelham scales (SNAP-IV) - parent form; (2) the children's acute responses in the 2019-nCoV outbreak event, measured using the Child Stress Disorders Checklist (CSDC) (3) allocation of time to children's activities, measured as the approximate time allocation for the activities; (4) the children's and parents' mood, assessed on a scale of 1 to 4, with a higher score indicating a worse mood. (5) Attention to media coverage of the 2019-nCoV outbreak. How much attention children and parents paid to media coverage of the 2019-nCoV outbreak, rated on a scale of 1 to 4.	aggravated behaviors among children with ADHD and medication status was not tested directly. Subject to recall bias, in addition to the severity of the disorder being measured at just one point in the outbreak.
Ahmed, Z. et al. (40)	China	2 State/ Provincial (1,074 people from the Chinese province of Hubei)	A cross-sectional online survey conducted via Tencent. The Tencent link was shared through WeChat. 1,074 people participated in the study. Participants completed an online questionnaire that included the Beck Anxiety Inventory (BAI), the Beck Depression Inventory - II (BDI-II), Alcohol Use Disorder Identification Test (AUDIT), Warwick Edinburgh Mental Wellbeing Scale (WEMWBS) and a section for personal details. The chi-square test was used to assess the interaction between sociodemographic factors and mental health state and drinking behavior (anxiety, depression, alcohol consumption, mental well-being).	Self-assessment scales were used to assess anxiety, depression, alcohol abuse and mental well-being, being subject to recall bias. More than 50% of the participants were from Wuhan province, the epicenter of COVID-19, so the data cannot be generalized to the entire population.
Chen, Y. et al. (41)	China	3 Municipal (124 pediatric medical staff in Guiyang)	A cross-sectional study, in which data was collected through an anonymous and self-assessed questionnaire. The questionnaire consisted of three parts: basic demographic data, the Self-Rating Depression Scale (SDS) and the Self-Rating Anxiety Scale (SAS). Individuals who had worked in high-risk settings, such as COVID-19 wards, fever clinics, infectious disease departments, emergency rooms, pulmonary medicine departments, or X-ray labs, were classified as having exposure to high-risk work..	Self-assessment scales were used, being subject to recall bias. There is no information about the mental health of individuals before the outbreak.

Author(s)	Principal mental health findings	Article recommendations (measures and strategies)
Losada-Baltar, A. (1)	The data in this study suggests that it is not chronological age itself, but a negative self-perception of aging that is related to loneliness and psychological suffering in people during lockdown at home during the COVID-19 crisis. Elderly people with a positive self-perception of aging seem to be more resistant to loneliness and distress during the outbreak of COVID-19.	The study does not make any recommendations, nor mention strategies to mitigate the effects of loneliness and psychological distress.
Lee, S.A. (2)	High anxiety scores were associated with a coronavirus diagnosis, coping with alcohol/drugs, negative religious coping, extreme hopelessness and suicidal ideation. In addition, coronavirus-related anxiety also significantly influenced social attitudes, such as approval of President Trump's responses to the coronavirus outbreak. A positive correlation was found between coronavirus anxiety and avoidance of Chinese foods and products, which reflects xenophobic attitudes.	The study does not make any recommendations, nor mention strategies to mitigate the effects of coronavirus-related anxiety, since it involves validation of a scale. The recommendations are only restricted to the potential use of the measurement when assessing the affected people's mental health.
Pulvirenti, F. et al. (3)	The issues associated with the risk of anxiety/depression were related to the fear of the COVID-19 pandemic, and to fragility concerning the patients' clinical issues (being afraid of being infected and becoming ill). The anxiety of running out of medication was a major concern.	The importance of carrying out a periodic assessment of the health-related quality of life of patients under clinical-home care is highlighted. At-risk patients need to be cared for, planning personalized medical and psychological support throughout life, especially in exceptional cases, such as in the COVID-19 pandemic.
Huang, Y. & Zhao, N. (4)	The general prevalence of anxiety symptoms, depressive symptoms, and poor sleep quality was 35.1%, 20.1% and 18.2%, respectively. The prevalence of anxiety symptoms and depressive symptoms was significantly higher in younger participants (<35 years old) ($p < 0.001$). The prevalence of anxiety symptoms, depressive symptoms and poor sleep quality was significantly higher in health professionals who spent a large amount of time (≥ 3 hours/day) caring for COVID-19 patients compared to those spending less time (<1 hour/day and 1-2 hours/day). Young people who spent more than 3 hours a day thinking about the outbreak had a significantly higher prevalence of anxiety symptoms ($p < 0.001$).	Governmental organizations, and various communication vehicles, must further disseminate the right information, to ease the mental health burden among people. The national public health organization should establish an official, integrated and uniform mental health counseling platform, to provide psychological counseling to people in need. Vulnerable populations, such as suspected and diagnosed patients, younger people and health professionals, especially doctors and nurses who work directly with patients, or people in quarantine, deserve special attention for follow-up. People should try to balance their free time with other activities (for example, exercising at home) and the amount of time they spend accessing outbreak information (<2 hours/day). In addition, people should try to carry on working and resting normally as much as possible, exercise regularly to promote quality sleep, and not pay too much attention to epidemic information before bedtime.
Gao, J. et al. (5)	The prevalence of depression was 48.3% (95% CI 46.9%-49.7%). For anxiety it was 22.6% (95% CI 21.4%-23.8%) and the combination of depression/anxiety (CDA) was 19.4% (95% CI 18.3%-20.6%) during the Covid-19 period. More than 80% (95% CI	Mental health services are recommended through different channels, including a direct line, online consultation, online courses and outpatient consultation, with special attention given to signs of depression and anxiety. It is also necessary to combat the

	80.9%-83.1%) of the research participants reported being frequently exposed to social media. A high risk of anxiety (OR 1.72, 95% CI 1.31-2.26) and CDA (OR 1.91, 95% CI 1.52-2.41) was observed among users frequently exposed to social media.	“infodemic” (feelings of distress and panic that are established in the population due to the amount of information in the media), monitoring and filtering false information, and promoting accurate information through cross-sectional collaborations.
Yuan, R. et al. (6) _y	The anxiety score of parents with hospitalized children in the epidemic (EH) (7.02 ± 3.01) was significantly higher, compared to the anxiety score of parents of non-epidemic hospitalized children (NEH) ($3.62 \pm 2, 10$) ($p < 0.001$). Likewise, the depression score of parents of EH children (7.72 ± 2.81) was higher than the depression score of parents of NEH children (4.54 ± 2.56) ($p < 0.001$). There was a positive correlation between anxiety, depression and sleep scores among parents of EH children. Therefore, parents of children hospitalized during the COVID-19 epidemic face enormous pressure and anxiety. Post-traumatic stress disorder and mental health problems can occur in the parents, which can affect the child's recovery.	Early detection of these parents' mental health, and the timely provision of certain psychological interventions, will help parents to take better care of their children in hospital, and help children to recover and be discharged as quickly as possible.
Xu, J. et al. (7)	The anxiety score of the surgical team during the outbreak period (7.817 ± 2.550) was significantly higher than in the non-outbreak period (5.283 ± 1.738) ($p < 0.001$). The depression score of professionals in the surgical team was also higher during the outbreak period (7.333 ± 2.550), compared to the non-outbreak period (4.933 ± 2.154) ($p < 0.001$). Also, the dream anxiety score and the SF-36 of the surgical team during the outbreak were significantly higher than in the non-outbreak period ($p < 0.001$). All of these indicators (anxiety, depression and dream anxiety scores) measured in the surgical team during the outbreak period were positively correlated.	To protect the mental health of the medical-surgical team, adequate rest time and psychological intervention measures need to be guaranteed, and must be carried out early when necessary.
Tian, F. et al. (8)	A 70% prevalence of symptoms for moderate to severe psychological disturbance was observed, with scores specifically high for obsessive compulsive disorder, interpersonal sensitivity, phobic anxiety and psychoticism. Those who were aged over 50, well educated, divorced or widowed, and who worked in agriculture had more symptoms. The youngest participants and medical staff were in the highest risk group, in terms of the severity of psychological symptoms.	Special attention needs to be paid to the psychological health of individuals under the age of 18, and middle-aged to elderly people (aged over 50), providing psychological interventions through television channels, the internet and telephone. For young people, guidelines should be given to understand the epidemic and to alleviate panic and fear. A professional organization for psychological care should be established to guarantee the health and safety of frontline medical staff, regularly checking their psychological status, and providing psychological intervention services, both for the medical staff and their families. For groups such as other company employees and agricultural workers, the government must adopt appropriate policies for subsidies to ease economic pressure on the general population caused by the epidemic. The media must objectively report

		on the epidemic's progress and increase publicity for psychological counseling. Actions should focus on the psychological health of people with lower levels of education. Also, special attention should be paid to the psychological health of women and sensitive groups, such as divorced or widowed people, with professional psychological help and counseling.
Roy, D. et al. (9)	High levels of anxiety were observed; 80% of the research participants were worried, having thoughts about COVID-19, and 72% reported a lot of worry about the use of gloves and disinfectants. Symptoms such as negative changes in sleep (12.5%), paranoia about the use of social media related to COVID-19 infection (37.8%) and distress (36.4%) were reported. The perceived need for mental health care was observed in more than 80% of the participants.	The possibility of mental health consultations online or on the doorstep need to be considered as forms of intervention.
Zhang, J. et al. (10)	An increased prevalence of depression (29.2%) was observed in patients infected with COVID-19 (p 0.016). There was an increase in the prevalence of comorbid depression with anxiety (p 0.086) both in patients infected with COVID-19 (21.1%), and in the general public (22.4%). Patients infected with COVID-19 (19.3%) and the general public (14.3%) also had a higher proportion of severe depressive symptoms (p 0.002). In addition, infected patients and the general public were more likely to have a depressed mood (p 0.038) and somatic symptoms (p <0.01), compared to quarantined individuals. Anxious behavior, including becoming easily irritated or irritable, was manifested mainly in the general public and in patients infected with COVID-19 (p <0.01).	The timely identification of psychological distress, and the precise classification of mental health needs among populations will facilitate the development of psychological interventions focused on individuals in emerging infectious disease epidemics.
Zhang, S. et al. (11)	People who continued to work in the workplace had better mental health ($\beta=3.46$, $p=0.01$, 95% CI 0.79-6.14) and physical health ($\beta=2.19$, $p=0.01$, 95% CI 0.20-4.18), compared to those who stopped working during the outbreak. People who worked from home also had better mental health than those who stopped working ($\beta=2.60$, $p=0.03$, 95% CI 0.45-5.16).	Identifying who may be most affected by COVID-19 can help prioritize those who need the most help. Psychologists, mental health professionals and social workers can provide services to address mental health problems, even during the lockdown.
Lu, W. et al. (12)	The study compared fear, anxiety and depression between two groups of hospital staff. The medical staff showed greater fear, anxiety and depression than the administrative staff. The extra analysis showed that medical staff working in departments that maintain direct contact with patients with pneumonia resulting from coronavirus infection had more psychological disorders and had almost twice the risk of experiencing anxiety and depression.	Effective strategies to improve mental health must be provided for frontline medical staff combating COVID-19, in ICUs, emergency rooms, and respiratory and infectious disease departments.
Zhang, W. et	The study found that doctors had a higher	Health professionals need protection and

al. (13)	prevalence of insomnia (38.4 vs. 30.5%, $p < 0.01$), anxiety (13.0 vs. 8.5%, $p < 0.01$), depression (12.2 vs. 9.5%; $p < 0.04$), somatization (1.6 vs. 0.4%; $p < 0.01$) and obsessive-compulsive symptoms (5.3 vs. 2.2%; $p < 0.01$), compared to other health professionals. They also had higher total scores for the Insomnia Severity Index (ISI), obsessive-compulsive symptoms for GAD-2, PHQ-2 and SCL-90-R ($p \leq 0.01$). Among health professionals, having an organic disease was an independent factor for insomnia, anxiety, depression, somatization and obsessive-compulsive symptoms ($p < 0.05$ or 0.01). Residents of rural areas, women and those at risk of contact with patients diagnosed with COVID-19 had the highest risk factors for insomnia, anxiety, obsessive-compulsive symptoms and depression ($p < 0.01$ or 0.05). Among non-medical health professionals, having an organic disease was a risk factor for insomnia, depression and obsession.	adequate working conditions, for example, the provision of sufficient personal protective equipment, adequate rest time, as well as access to programs designed to increase resilience and psychological well-being.
Mo, Y. et al. (14)	Work stress was investigated among female nurses supporting the fight against COVID-19 infection in Wuhan. The results showed widespread pressure on nurses in Hubei who helped fight COVID-19. Being an only child, having a greater weekly workload and anxiety were the main factors that affected the nurses' stress levels.	Nursing sector managers should guide nurses on how to care for their psychological health and mobilize them to actively seek out their social support systems. Leisure activities and training on how to relax should be organized to help staff reduce stress.
Gong, K. et al. (15)	The results showed that the COVID-19 epidemic caused panic and hypochondria, leading to unnecessary behavior in seeking healthcare, and increased demand for healthcare services among patients.	Hospitals providing online care (Internet hospitals) can carry out targeted and personalized medical interventions for various types of patient, helping to prevent and control the COVID-19 epidemic in China. Based on its own results, the study also indicated that remote medical services are very necessary when the public is panicking.
Zhang, Y. & Ma, Z.F. (16)	After the start of the pandemic, more than half (69.2%) of the study's participants reported not having increased stress at work, 76.8% did not experience increased financial stress due to the pandemic and 74.5% did not experience increased stress at home. On the other hand, 52.1% of the participants reported feeling horrified and apprehensive due to the COVID-19 pandemic, and 46% felt powerless due to the pandemic.	It is highly recommended that health professionals include mental health promotion as part of their follow-ups after the pandemic and that they observe traumatic stress symptoms, which can lead to the development of avoidance behaviors or passive lifestyles after the pandemic.
Nguyen, H.C. et al. (17)	Research participants who were diagnosed with COVID-19 had a higher probability of depression (OR, 2.88; $p < 0.001$) and a lower score on the scale measuring health and quality of life (HRQoL) (B, -7.92; $p < 0.001$). Health literacy was a protective factor for depression and HRQoL during the COVID-19 epidemic, especially among people not diagnosed with the disease.	Governments must first recognize COVID-19 as a public health emergency, in order to improve health literacy and disease control, and its consequences during the outbreak. It is also necessary to seek a balance between public health, civil liberties and being culturally sensitive. The government needs to provide the public with transparent, up-to-date, accurate, brief and simple information and knowledge about the epidemic, its

		pathogenicity and transmissibility, in order to better control the disease.
Liu, N. et al. (18)	The prevalence of Post-traumatic Stress Disorder (PTSD) symptoms in the areas most affected by the COVID-19 outbreak in China was 7%. Hierarchical regression analysis and non-parametric testing suggested that women had higher PTSD, with negative changes in cognition, mood or hyperexcitation. Participants with better sleep quality, or who woke up at night less frequently, reported lower PTSD.	Public attention should be given to the high prevalence of PTSD, adopting measures to prevent PTSD and other mental problems, especially among women.
Kang, L. et al. (19)	Among the 994 medical and nursing staff surveyed in Wuhan, 36.9% had mental health disorders below the threshold (PHQ-9: 2.4 average), 34.4% had mild disorders (PHQ-9: 5.4), 22.4% had moderate disorders (PHQ-9: 9.0) and 6.2% had severe disorders (average PHQ-9: 15.1), shortly after the COVID-19 epidemic. Young women were the most affected. Of the total participants, 36.3% had access to psychoeducational materials (such as books on mental health), 50.4% accessed psychological resources available in the media (such as online messages on methods of self-help coping for mental health) and 17.5 % participated in counseling or psychotherapy. Although the team had limited access to mental healthcare services, they considered these services to be important resources for alleviating acute mental health disorders among health professionals.	The results indicate the importance of being prepared to support frontline workers through mental health interventions in times of crisis. Increasing the availability of specialized treatment from psychologists and psychiatrists could benefit them. Finally, in order to better prepare for future outbreaks of infectious diseases, greater investment in mental health tools is needed to assist and protect medical and nursing staff working on the front line.
Cao, W. et al. (20)	Approximately 25% of university students experienced anxiety due to the COVID-19 outbreak. Living in urban areas, living with parents, and having a stable family income were protective factors for university students against anxiety experienced during the COVID-19 outbreak. However, having a relative or acquaintance infected with COVID-19 was an independent risk factor for anxiety. The stressors related to COVID-19 included economic factors, effects on daily life and academic delays that were associated with higher levels of anxiety symptoms among Chinese university students during the epidemic, while social support correlated with less anxiety.	Social support not only reduces psychological pressure during epidemics, but also changes attitudes towards methods of seeking help. The results found suggest that robust social support is necessary during public health emergencies.
Wang, Y. et al. (21)	The likelihood of experiencing anxiety during the pandemic period was higher among women (OR: 3.01; 95% CI 1.39-6.52) and among people aged over 40 (OR: 0.40; 95% CI 0, 16-0.99). Compared to people with a Master's degree, or higher qualification, those in the undergraduate group had a 0.39 times lower risk of depression (95% CI 0.17-0.87).	The public should pay attention to the information presented by the media and advertising, and avoid absorbing misleading information that can lead to panic and depression. Anxiety and depression are common psychological phenomena in disasters and can be a barrier to rational medical and mental health interventions. Adequate support for mental health should be provided through effective public policies.
Qiu, J. et al.	Almost 35% of respondents experienced psychological distress. Multinomial logistic	Greater attention for the most vulnerable groups of the population is needed. The

(22)	<p>regression analyses showed that women had significantly higher psychological levels of distress than men. Individuals aged over 60 had higher scores than the general population, and migrant workers had the highest level of distress, among all occupations</p>	<p>population's accessibility to medical resources and the public health service system must be reinforced and improved, mainly following a review of the initial process of coping and managing the COVID epidemic. National strategic planning and coordination of psychological first aid during major disasters, potentially carried out remotely, must be established. Comprehensive care should be constructed, with a prevention and intervention system, including epidemiological monitoring, screening, referral and targeted intervention, to reduce psychological distress and prevent new mental health problems.</p>
Li, S. et al. (23)	<p>The results showed that negative emotions (anxiety, depression and indignation) increased while positive emotions (measured by Oxford happiness scores) and life satisfaction decreased with the pandemic. Regarding concerns during the outbreak, people were more concerned about their health and family, and less about leisure and friends.</p>	<p>The use of social media data can provide a timely understanding of the impact of public health emergencies on public mental health during the epidemic period. It is also important to prepare clinicians to provide the corresponding therapeutic support for risk groups and affected people.</p>
Lai, J. et al. (24)	<p>1,257 of the 1,830 individuals contacted completed the survey, with a 68.7% participation rate. A considerable proportion of the participants reported symptoms of depression (634 [50.4%]), anxiety (560 [44.6%]), insomnia (427 [34.0%]) and distress (899 [71.5%]). Female nurses, women, and frontline health workers who were working in Wuhan, China, reported more severe degrees in all the mental health measures, compared to other health professionals. Multivariable Logistic Regression analysis showed that participants from outside Hubei province were less likely to experience symptoms of distress, compared to those in Wuhan (OR: 0.62; 95% CI: 0.43-0.88). Frontline health professionals involved in the diagnosis, treatment and care of COVID-19 patients were more likely to experience symptoms of depression (OR: 1.52; 95% CI: 1.11-2.09), anxiety (OR : 1.57; 95% CI: 1.22-2.02), insomnia (OR: 2.97; 95% CI: 1.92-4.60) and distress (OR: 1.60; 95% CI, 1.25-2.04).</p>	<p>The protection of health professionals is an important component of public health measures to combat the COVID-19 epidemic, requiring interventions to promote the mental well-being of health professionals exposed to COVID-19.</p>
Xiao, H. et al. (25)	<p>Low levels of social capital have been associated with increased levels of anxiety and stress and increased levels of social capital have been positively associated with increased quality of sleep. Anxiety was associated with increased stress and reduced quality of sleep.</p>	<p>The study warned of the need for public policies that stimulate social capital during the necessary isolation period.</p>
Li, Z. et al. (26)	<p>Traumatization scores, including scores for psychological and physiological clinical responses, were significantly lower for nurses who were not on the frontline than for</p>	<p>There is a need to pay greater attention to the psychological problems of medical staff, especially female nurses who are on the frontline, and the general public in the</p>

	nurses who were on the frontline of Covid-19 care (p <0.001).	situation where COVID-19 is being disseminated and controlled.
Wang, C. et al. (27)	The results showed that 53.8% of the interviewees classified the psychological impact of the outbreak as moderate or severe; 16.5% reported moderate to severe depressive symptoms; 28.8% reported moderate to severe anxiety symptoms; and 8.1% reported moderate to severe stress levels. Most respondents spent 20 to 24 hours a day at home (84.7%); were concerned about family members contracting COVID-19 (75.2%); and were satisfied with the amount of health information available (75.1%). Being a woman, having Covid-19 symptoms, and self-reporting health as poor, were significantly associated with a greater psychological impact of the outbreak and with higher levels of stress, anxiety and depression (p <0.05).	Formulate psychological interventions to improve mental health and psychological resilience during the COVID-19 epidemic.
Bacon, A.M. & Corr, P.J. (28)	The study suggested that the participants were experiencing psychological conflict: between the urge to stay safe (FFFF-related) and the desire to maintain a normal, pleasurable (RR-related) life. Forms of ameliorating conflict can sometimes include maladaptive behaviors (panic buying), reflecting reward-related displacement activity.	The study did not make any recommendations
Zhang, C. et al (29)	1,563 people participated in the study, of which 564 (36.1%) had symptoms of insomnia, according to the Insomnia Severity Index (ISI) (total score ≥ 8). Among medical staff, the prevalence of symptoms of depression was 50.7% (PHQ-9 ≥ 5), anxiety 44.7% (GAD-7 ≥ 5) and symptoms related to stress 73.4% (IES-R ≥ 9). Insomnia symptoms were more likely to occur among people with secondary education or lower (OR 2.69; p 0.042; 95% CI 1.0-7.0), professionals who worked in the isolation unit (OR 1.71; p 0.038; 95% CI 1.0-2.8), people who were concerned about being infected (OR 2.30; p <0.001; 95% CI 1.6-3.4) and those with very strong uncertainty regarding disease control being effective (OR 3.30; p 0.013; 95% CI 1.3-8.5). When comparing the presence of insomnia between the categories of health professionals, doctors were less likely to have symptoms (OR 0.44; p 0.007; 95% CI 0.2-0.8).	The study points out the need to think of and adopt strategies for the prevention and treatment of insomnia among health professionals. Cognitive insomnia behavior therapy (CBTI) can effectively treat acute insomnia, improve patients' self-efficacy and confidence in controlling their sleep problems, and is recommended as a first-line treatment for acute insomnia in adults.
Harper, C.A. et al (30)	The authors found a small-to-moderate positive relationship between PROMIS Anxiety and self-reported risk of COVID-19, meaning that those who showed more anxiety symptoms and believed themselves to be at risk of contracting the virus changed their behavior more than those who did not. They also found, moderate-to-strong correlations	For mental health professionals, it is recommended that these professionals are attentive to the emotional responses of individuals during the current pandemic, along with pre-existing risk factors, and people with a history of mental illness, presenting pathological levels of negative emotions and related behaviors.

	between the FCV-19S scale and PROMIS Anxiety and Depression, suggesting that this new measure of fear was highly related to anxiety symptomatology. Increased FCV-19S scores were also moderately correlated with an increased self-reported risk of getting infected by COVID-19.	
Lei, L. et al. (31)	A prevalence was found of 8.3% of anxiety and 14.6% of depression. The prevalence in the affected group (12.9%, 22.4%) was significantly higher than in the unaffected group (6.7%, 11.9%), whether they or their families/colleagues/classmates/neighbors had been quarantined. A lower average family income, lower level of education, greater concern about being infected by COVID-19, not having psychological support, greater economic losses and lower self-reported health conditions were statistically significant, associated with higher scores on the self-rating anxiety scale (SAS) and self-rating depression scale (SDS).	Governments should focus on providing economic and medical support, in order to improve the general population's mental state.
Moghadasi, A. N. (32)	The average level of anxiety in terms of the Beck Anxiety Inventory was 25.72 ± 6.53 in patients with multiple sclerosis who were in the moderate to severe range. The level of anxiety was severe in 15 patients, and moderate and low in 18. There was no statistically significant correlation between the level of anxiety and the patients' disease-modifying medications.	The study did not make any recommendations.
Tan, W. et al. (33)	The authors aimed to quantify the immediate psychological effects and psychoneuroimmunity prevention measures of a workforce returning to work during the COVID-19 epidemic. They found that 10.8% of the 673 respondents met the diagnosis of post-traumatic stress disorder (PTSD) after returning to work, and a low prevalence of anxiety (3.8%), depression (3.7%), stress (1.5%) and insomnia (2.3%). They also found no significant differences in the severity of psychiatric symptoms between workers/technicians and executives/managers. Being single/divorced/widowed, the presence of physical symptoms, poor physical health and viewing return to work as a health hazard ($p < 0.05$) were associated with the severity of psychiatric symptoms. While personal psychoneuroimmunity prevention measures, including hand hygiene and wearing face masks, as well as organizational measures, including significant improvement of workplace hygiene and concerns from the company were associated with less severe psychiatric symptoms ($p < 0.05$).	Employees can benefit from strengthening peer support in the workplace; online staff forums or direct lines of advice and early identification of risk factors by employers, stress management and professional psychological consultancy services, and early intervention.
Sun, N. et al. (34)	The authors found that the negative emotions present in the initial stage, such as fatigue, discomfort and helplessness, were caused by	Self-coping strategies and psychological growth are important for nurses to maintain

	high-intensity work, in addition to fear, anxiety and concern for patients and family members. Among the self-coping strategies adopted by female nurses, they included altruistic acts, team support, rational cognition, greater affection and gratitude, the development of professional responsibility and self-reflection. Lastly, it was shown that positive emotions occurred simultaneously with negative emotions during the fight against the pandemic.	their mental health while providing care for patients infected by COVID-19.
Moghanibashi-Mansourieh, A. (35)	More than 12,000 people answered the questionnaire and about 90% (10,754) of them completed the questionnaire. The results showed that the total level of anxiety was 8.61 ± 6.95 and the degree of anxiety symptoms in 49.1% of cases was normal, in 9.3% it was serious and in 9.8% it was very serious. The level of anxiety was higher among women ($p < 0.001$), people who followed the news related to coronavirus the most ($p < 0.001$), those aged 21 to 40 ($p < 0.001$) and among people who had at least one family member, relative or friend who contracted COVID-19 (95% CI [1.2, 35.03], $p < 0.001$).	Mental health professionals should educate the public about common adverse psychological consequences, promote healthy behavior, advise people to decrease their exposure to negative news, prevent social isolation, and use alternative forms of communication, such as virtual networks. Responsible organizations should design and implement a gender-sensitive psychosocial protocol to reduce anxiety. Use NGO services, since they are more efficient and effective in the service delivery process, due to their closer relationship with people, and less bureaucratic operations.
Shacham, M. et al. (36)	The results revealed an elevated risk of psychological distress of 11.5% among the research participants. High psychological stress was found among those with an underlying illness (OR = 3.023; 95% CI: 1.186-7.705), fear of contracting COVID-19 from a patient (OR = 2.110 95% CI: 1.236-3.603) and a greater subjective burden (OR = 1.073; 95% CI: 1.010-1.141). Less psychological distress was associated with being in a committed relationship (OR = 3.023; 95% CI: 1.186-7.705) and having greater self-efficacy (OR = 0.889; 95% CI: 0.833-0.968).	It is recommended that methods be introduced to improve the dental team's self-efficacy, in addition to providing a broader understanding of mental health
Chew, N.W.S. et al. (37)	After adjusting for age, gender and comorbidities, the authors found that depression (OR 2.79, 95% CI 1.54-5.07, $p=0.001$), anxiety (OR 2.18, 95% CI 1.36-3.48, $p=0.001$), stress (OR 3.06, 95% CI 1.27-7.41, $p=0.13$), and PTSD (OR 2.20, 95% CI 1.12-4.35, $p=0.023$) remained significantly associated with the presence of physical symptoms experienced in the preceding month. Running static analysis using linear regression, they also found that the presence of physical symptoms was associated with higher mean scores in the IES-R, DASS Anxiety, Stress and Depression subscales.	The authors mention that multidisciplinary interventions are needed to support health professionals, addressing both psychological manifestations and physical symptoms, in addition to offering psychological support and interventions after the exclusion of acute infection. Counseling can be offered to alleviate the fear of transmitting the infection to family members, and increasing the confidence and self-esteem of health professionals.
Xie, X. et al. (38)	Among the 1,784 (76.6%) who completed the survey, 22.6% reported depressive symptoms and 18.9% symptoms of anxiety. Wuhan students had significantly higher CDI-S scores than those from Huangshi (β 0.092;	The study did not make any recommendations.

	<p>95% CI, 0.014-0.170), with a higher risk of depressive symptoms (OR 1.426; 95% CI, 1.118-1.786). Students who were slightly, or not worried about being affected by COVID-19, had significantly lower CDI-S scores than those who were very concerned (β -0.184; 95% CI, -0.273 to -0.095), presenting a reduced risk of depressive symptoms (OR 0.521; CI 95% 0.400-0.679). Those who were not optimistic about the epidemic, compared to those who were quite optimistic, had significantly higher CDI-S scores (β 0.367; 95% CI, 0.250-0.485), with an increased risk of depressive symptoms (OR 2,262; 95% CI 1,642-3,117). There was no significant association between demographic characteristics and symptoms of anxiety.</p>	
Huang, Y. & Zhao, N. (4)	<p>The overall prevalence of generalized anxiety disorder-GAD, depressive symptoms and sleep quality in the population were 35.1%, 20.1% and 18.2%, respectively. Young people reported a significantly higher prevalence of GAD and depressive symptoms than the elderly. Compared to another occupational group, health workers were more likely to have poor sleep quality. Age (<35 years) (OR = 1.77, 95% CI 1.38-1.95) and time spent focusing on COVID-19 (\geq 3 hours per day) (OR = 1.91, CI 95% 1.77-2.15) were associated with GAD. Young age was also associated with depressive symptoms (OR = 1.80, 95% CI 1.35-2.01) and health professionals were more likely to have poor sleep quality (OR = 1.48, 95 CI % 1.15-1.95).</p>	<p>Psychological interventions should target vulnerable populations, such as controlling and limiting time spent receiving information related to COVID-19 to less than two hours a day, maintaining a normal work pattern and resting as much as possible, exercising regularly to promote quality of sleep and not paying too much attention to information about outbreaks before bedtime. The ongoing surveillance and monitoring of the psychological consequences of outbreaks of potentially epidemic and life-threatening diseases, establishing early mental health interventions, should become routine as part of preparedness efforts worldwide.</p>
Moccia, L. et al. (39)	<p>500 individuals participated in the study, of which 62% did not report any probability of psychological distress, while 19.4% and 18.6% had mild and moderate to severe probability. Cyclothymic (OR: 1.24; $p < 0.001$), depressive (OR: 1.52; $p < 0.001$), anxious temperaments (OR: 1.58; $p = 0.002$) and ASQ "Need for approval" (OR: 1.08; $p = 0.01$) were risk factors for moderate to severe psychological distress, compared to no distress, while ASQ "Confidence" (OR: 0.89; $p = 0.002$) and "Discomfort with closeness" were protective (OR: 0.92; $p = 0.001$). The cyclothymic (OR: 1.17; $p = 0.008$) and depressive (OR: 1.32; $p = 0.003$) temperaments resulted in risk factors in individuals with moderate to severe psychological distress, compared to mild distress, while ASQ "Confidence" (OR: 0.92; $p = 0.039$) and "Discomfort with closeness" (OR: 0.94; $p = 0.023$) were protective.</p>	<p>The study did not make any recommendations.</p>
Zhang, J. et al. (10)	<p>The average behavior of children with ADHD (M = 2.25, SD = 0.54) worsened significantly compared to those children who did not present any behavioral disturbances (95% CI = 2.18-2.32). 53.94% of parents reported that</p>	<p>Attention is needed to identify an appropriate approach for children with ADHD, in terms of disaster risk reduction activities.</p>

	<p>their children's ability to stay focused worsened, 67.22% described an increase in the frequency of anger, and 56.02% became worse in their daily routine. More than half the parents reported that their children's behavior in other domains had improved or maintained the same level. Children's ADHD behaviors were positively linked to acute stress in response to the COVID-19 outbreak ($r = 0.21, p = 0.001$), parental attention to media coverage of COVID-19 news ($r = 0.13, p = 0.048$), general (negative) mood of children and parents ($r = 0.48, p < 0.001$ and $r = 0.41, p < 0.001$, respectively), and negatively correlated with the children's study time ($r = -0.19, p = -0.004$) and children's time interacting with parents ($r = -0.17, p = 0.008$). In regression analysis, the children's general mood ($\beta 0.17, 95\% \text{ CI } 0.11-0.23, p < 0.001$), the parents' general mood, $\beta = 0.13, 95\% \text{ CI } 0.06 -0.20, p < 0.001$) and the children's study time ($\beta -0.09, 95\% \text{ CI } -0.15, -0.02, 0.010$) significantly predicted the children's ADHD behaviors.</p>	
<p>Ahmed, Z. et al. (40)</p>	<p>The results showed that 29% of those surveyed suffered from anxiety (mild 10.1%, moderate 6.0% and severe 12.9%), while 37.1% suffered from different levels of depression (mild 10.2%, moderate 17.8%, and severe 9.1%). There was also a 29% increase in hazardous alcohol consumption, harmful drinking increased to 9.5%, and alcohol dependency reached 1.6%. Approximately one-third of people (32.1%) had lower mental well-being.</p>	<p>It is very important to quickly implement a multifaceted approach at personal, social and international levels. Therefore, the following is recommended: restriction of media exposure, a treatment and training plan, use of an online counseling platform, specific care for vulnerable people, and a rehabilitation program.</p>
<p>Chen, Y. et al. (41)</p>	<p>124 questionnaires were distributed with a response rate of 84.7% (105/124). The average SAS and SDS scores were significantly higher than the SAS norms in the Chinese population in general (40.3 ± 11.5 vs. 29.8 ± 10.1 in SAS, 47.1 ± 10.5 vs. 41.9 ± 10.6 in SDS, $P_s < 0.001$). The results showed mild (SAS scores from 50 to 59), moderate (SAS scores from 60 to 69) and severe anxiety (SAS scores ≥ 70) in 11, 6 and 2 cases, respectively. The incidences of total, mild, moderate and severe anxiety were 18.1%, 10.5%, 5.7% and 1.9%, respectively. In addition, the results showed mild (SAS score of 53 to 62), moderate (SAS score of 63 to 72) and severe depression (SAS score ≥ 73) in 22, 5 and 4 cases, respectively. The incidences of cases of total, mild, moderate and severe depression were 29.5%, 21.0%, 4.8% and 3.8%, respectively. Respondents who had experienced exposure reported higher rates of anxiety accompanied by depression than those who had not (incidence rates of 31.6% and 12.6%, respectively).</p>	<p>Mental health services for frontline pediatricians should receive more attention and are urgently needed during this epidemic outbreak of COVID-19.</p>