Psychological sequelae within different populations during the COVID-19 pandemic: a rapid review of extant evidence

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ABSTRACT The rapid spread of COVID-19 has a potentially significant impact on not only physical health but also psychological well-being. To the best of our knowledge, no review thus far has consolidated the psychological impact of COVID-19 across different subpopulations. A systematic search of the literature until 15 June 2020 found 150 empirical papers pertinent to the mental health consequences of the pandemic. The majority (87.3%) were from China (45.3%), the rest of Asia (22.0%) and Europe (20.0%), and mostly examined the general population (37.3%), healthcare workers (31.3%) and those with pre-existing mental and physical illnesses (14.7%). The most common psychological responses across these subpopulations were anxiety (overall range 24.8%–49.5%), depression (overall range 18.6%–42.6%) and traumatic stress symptoms (overall range 12.7%–31.6%). Healthcare workers and those with pre-existing physical and mental illnesses were more severely affected. Future studies are needed on underexamined subgroups such as the elderly and patients who recovered from COVID-19.

Keywords: healthcare workers, infectious diseases, psychological responses, vulnerable populations

INTRODUCTION

The severity and rapid spread of COVID-19 has had a significant impact on not only the physical health of communities worldwide but also their psychological well-being. This issue is of particular concern as the battle against this pandemic becomes increasingly long-drawn and strict infection control measures have been implemented. These measures will be eased at different rates around the world but may be reinstated with new waves of infection. As of 15 June 2020, COVID-19 had infected more than eight million people across 213 countries and territories; more than 435,000 people had died from the disease and over 4.1 million had recovered.[1]

Previous studies on the psychological impact of infectious diseases have commonly reported responses in the general population such as anxiety/fear, depression, anger, guilt, grief and loss, post-traumatic stress and stigmatisation. However, there is also a greater sense of empowerment and compassion towards others.[2] Healthcare workers at the forefront of the fight against infectious diseases experience various stressors such as the fear of getting infected, losing control of the spread of the virus, and passing the virus on to their family and friends.[3] Based on these past experiences, the potential mental health repercussions of infectious disease outbreaks are increasingly being recognised and acknowledged during the current COVID-19 pandemic.

To date, although there have been various international studies on the psychosocial responses related to COVID-19, no review thus far has consolidated the extant psychological impact on the different subpopulations, such as the general population, healthcare workers and vulnerable populations, including patients with pre-existing physical or psychiatric illnesses. Hence, we aimed to examine and summarise existing studies to date regarding the psychological impact of COVID-19 on various populations through a rapid review. Understanding the psychological ramifications of this pandemic could inform healthcare systems to target policy decisions for specific populations, and to anticipate and prepare for a protracted battle against COVID-19, in the face of globally dyssynchronous and varied infection control measures.

METHODS

We performed a systematic search of the available literature using PubMed and MEDLINE (Ovid). The following search strategy was used ((('Betacoronavirus'[Mesh] OR 'Coronavirus Infections'[MH] OR 'Spike Glycoprotein, COVID-19 Virus'[NM] OR 'COVID-19'[NM] OR 'Coronavirus'[MH] OR 'Severe Acute Respiratory Syndrome Coronavirus 2'[NM] OR 2019nCoV[ALL] OR Betacoronavirus*[ALL] OR Corona Virus*[ALL] OR Coronavirus*[ALL] OR Coronovirus*[ALL] OR CoV[ALL] OR CoV2[ALL] OR COVID[ALL] OR COVID19[ALL] OR COVID-19[ALL] OR HCoV-19[ALL] OR nCoV[ALL] OR 'SARS CoV 2'[ALL] OR SARS2[ALL] OR SARSCoV[ALL] OR SARS-CoV[ALL] OR SARS-CoV-2[ALL] OR Severe Acute Respiratory Syndrome CoV*[ALL]) AND (mental health OR psychiatric OR psychological)) based on recommendations.[4] Papers that were published from database inception to 15 June 2020 were considered for inclusion. Only empirical studies in the English language and papers from peer-reviewed journals that reported the psychological impact of COVID-19 on one or more populations were included. Case studies, reviews, qualitative studies and dissertations were excluded. Studies that did not

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report the rates or prevalence of psychological responses were also excluded. A PRISMA flow diagram depicting how articles were selected is presented in Fig. 1.

RESULTS

The majority of the 150 included papers originated from Asia (67.3%, n = 101), Europe (20.0%, n = 30) and North America (9.3%, n = 14). Anxiety, depression and traumatic distress were the three commonest reported psychological responses across all papers, with prevalence rates ranging from 2.7%[5] to 72.8%,[6] 0.9%[7] to 83.6%[6] and 1.9%[8] to 96.2%,[9] respectively. Detailed prevalence rates are reported in the Appendix.[5-154] Out of the 150 studies, 56 (37.3%) explored psychological responses in the general population, while 47 (31.3%) reported them within healthcare workers. Only 22 (14.7%) studies examined psychological responses in patients with pre-existing mental and physical conditions. In the general population, the prevalence of anxiety ranged from 2.7%[5] to 62.5%,[10] while that of depression ranged from 0.9%[5] to 40.3%[11] and that of post-traumatic stress symptoms ranged from 1.9%[12] to 33.0%.[13] Among healthcare workers, the prevalence of anxiety ranged from 5.7%[14] to 61.0%,[15] that of depression ranged from 8.9%[16] to 64.7%,[17] and that of post-traumatic stress symptoms ranged from 3.8%[18] to 49.4%.[19] Among patients with pre-existing mental illnesses, the prevalence of anxiety was 23.6%[5] to 50.0%[20] and that of depression was 10.8%[8] to 64.3%,[20] while only one paper reported the prevalence of post-traumatic stress symptoms to be 31.6%.[5] Among patients with pre-existing physical conditions, the prevalence of anxiety ranged from 42.0%[21] to 72.8%,[6] while that of depression ranged from 9.7%[22] to 83.6%.[6] There were relatively fewer reports on younger persons (children and youths), quarantine subgroups and COVID-19 patients. Available data suggests that the younger subgroup reported substantial rates of anxiety ranging from 24.9%[23] to 45.5%,[24] depression ranging from 9%[25] to 48.1%[26] and traumatic stress ranging from 2.7%[25] to 31.8%.[27] Those who were quarantined reported anxiety ranging from 10.2%[28] to 50.3%,[29] depression ranging from 9.0%[25] to 22.4%[30] and traumatic stress ranging from 2.7%.[25] Patients suffering from COVID-19 infection reported anxiety ranging from 2.4%[31] to 55.3%,[12] depression ranging from 12.2%[31] to 60.2%[12] and traumatic stress ranging from 1%[12] to 96.2%.[9] Table I summaries the overall prevalence rates of COVID-19-related psychological responses among the different populations.

Measures proposed to address the mental health repercussions of the pandemic could be grouped into individual and collective measures. A total of 16 papers proposed measures that an individual could take, including ensuring adequate rest and exercise,[32-34] increasing one's self-awareness of emerging psychological stressors and mental health issues,[32,35] and boosting one's sense of control.[35] Collective measures proposed by 129 papers include regular crisis communications in order to ensure that accurate information is disseminated in a timely manner.[36-39] False information should also be filtered out and corrected as soon as possible.[39,40] There is a need to continually assess and
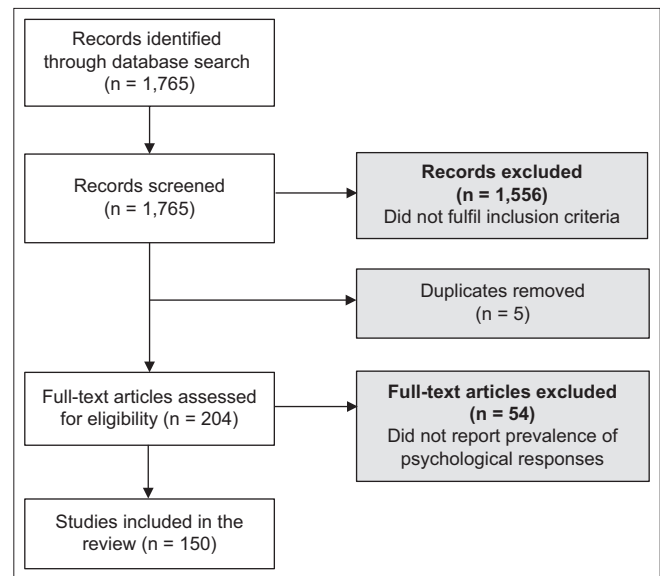

Fig. 1 PRISMA chart shows the article selection process.

monitor the psychological well-being of various populations (e.g. general population, healthcare workers and those with pre-existing physical or psychiatric conditions) in order to identify those at risk and offer early intervention.[15,41,42] It has been recommended that adequate resources be allocated to mental health interventions, which should be made available and acceptable to various subpopulations through channels, including digital means.[43] Disruption to essential medical services should be kept to a minimum such that those with pre-existing medical conditions can be supported throughout this pandemic.[44] In addition, financial and social support may be helpful for reducing the repercussions for mental health that can arise from job losses or prolonged quarantine.[30,45-48]

DISCUSSION

Our rapid review sought to capture an overview of psychological responses to date in various populations during the COVID-19 pandemic. We found that most studies focused on the general adult population, healthcare workers and the vulnerable (defined as those with pre-existing physical and psychiatric illnesses), and anxiety, depression and traumatic stress were the more commonly reported responses across studies.

By geographical region, the majority of the studies conducted were from Asia (101 papers, 67.3%), especially China (68 papers, 45.3%), followed by Europe (30 papers, 20.0%). This is likely because China was the first country to discover and experience the rapid spread of COVID-19, followed by countries in Europe. Other countries may learn from the experiences of Asia (such as China) and Europe to better plan to serve mental healthcare needs in response to changes in the respective epidemic curves over time.

In terms of prevalence rate, healthcare workers tended to report higher rates of anxiety (overall 33.0%, 4,866/14,728) but lower rates of traumatic stress (overall 14.6%, 3,256/22,320) compared with the general population (overall 24.8%, 16,825/67,773 for anxiety and 20.8%, 2,163/10,380 for traumatic stress). The higher anxiety in healthcare workers could be related

Table I. Overall prevalence rates of COVID-19-related psychological responses among different populations.

Population	Anxiety	Depression	Traumatic stress symptoms
General population	2.7%–62.5% Overall 24.8% (16,825/67,773)	0.9%–40.3% Overall 23.1% (13,412/58,114)	1.9%–33.0% Overall 20.8% (2,163/10,380)
Healthcare workers	5.7%–61% Overall 33.0% (4,866/14,728)	8.9%–64.7% Overall 25.7% (7,950/30,885)	3.8%–49.4% Overall 14.6% (3,256/22,320)
Patients with pre-existing mental conditions	23.6%–50.0% Overall 26.0% (583/2,242)	10.8%–64.3% Overall 18.6% (411/2,213)	31.6% Overall 31.6% (24/76)
Patients with pre-existing physical conditions	42%–72.8% Overall 49.5% (791/1,597)	9.7%–83.6% Overall 42.6% (609/1,428)	12.7% Overall broad criteria 12.7% (32/252)

to the high infectivity of COVID-19 with the resultant sharp rise in infected cases and mortality seen and managed by frontline healthcare workers, especially at the start of the pandemic when little was known about its natural history.[155] The relatively lower rate of traumatic stress in healthcare workers could be related to the better preparedness in terms of protective equipment and strict infection control measures within healthcare facilities in managing the outbreak.[49] Compared with past epidemics such as the severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) outbreaks, the rates of anxiety (up to 96% in MERS vs. overall 33% in COVID-19)[15,156] and traumatic stress (25.5% in SARS vs. overall 14.6% in COVID-19)[19,157] in healthcare workers were lower during the current pandemic. This likely reflects progressive improvements in infection control measures and infrastructure that have translated to better psychological well-being since earlier outbreaks such as SARS, especially in Asia, which bore the brunt of the infection and fatality.[158] Of note, there were relatively substantial psychological responses within subgroups, such as among those with pre-existing physical and psychiatric illnesses (overall anxiety 26%–49.5%, overall depression 18.6%–42.6% and overall traumatic stress symptoms of 12.7%–31.6%).[5,6,8,20,22,44,50-65] Although less studied, psychological sequelae were noted in younger individuals such as children and youths (overall anxiety 31.0%, overall depression 34.2% and traumatic stress symptoms 11%),[23-27,39,41,66-69] individuals who were quarantined (overall anxiety 28.2%, overall depression 14.7%, overall traumatic stress symptoms 2.7%)[24,25,28-30,67,70,71] and patients who were infected with COVID-19 (overall anxiety 32.2%, overall depression 39.9%, overall traumatic stress symptoms 80.7%).[9,12,28,31,72,73] This highlights the need for active monitoring, early detection and attention to these psychological issues within the different subpopulations.

Practical implications include individual and institutional measures to address and ameliorate the psychological impact. At the institutional and governance level, useful considerations are: commitment for the long haul; timely communication about the local epidemic curve; enabling access to timely, accurate COVID-19-related information and resources for psychological help among the population and subgroups; constant review of implemented measures; and early identification of those in need of psychological help.[2] At the individual level, an emphasis on self-care and a healthy balance between work and rest, nutrition, sleep, and social connectivity[2] are crucial.

Several limitations were observed in this study. First, timely publication of appropriate reports from other affected countries worldwide would provide a better representation of the nature and scale of the psychological impact. Second, examination of the psychological sequelae in specific subgroups such as the elderly, those who have recovered from COVID-19, and patients with multiple physical and psychiatric comorbidities is warranted. Third, some specific psychosocial responses are less examined but have been observed in past infectious disease outbreaks, including stigmatisation, grief and positive growth. Fourth, a better understanding of how digitalisation has helped or hindered psychological well-being would inform measures to enhance psychological support. Fifth, there is a need to consider longitudinal studies to ascertain the longer-term psychological sequelae within the different subgroups.

In conclusion, extant studies at this juncture suggest that there are substantial COVID-19 psychological sequelae among healthcare workers and the general population, including vulnerable subgroups. Further work is needed to better understand the psychological impact on under-examined subgroups, especially prospectively, in order to optimise psychological support for them globally.

SUPPLEMENTARY MATERIAL
The Appendix is available online at https://doi.org/10.11622/smedj.2020111.

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APPENDIX

Studies in 2020 reporting prevalence rates of psychological responses to COVID-19.

Author; country	Population	Scale	Main findings
Hao et al;[5] China	Psychiatric patients n = 76 Age 32.8 ± 11.8 yr 37.1% female Healthy controls n = 109 age 33.1 ± 11.2 yr 62.4% female	IES-R, DASS-21, ISI	Psychiatric patients vs. healthy controls: • 31.6% vs. 13.8% PTSD • 23.6% vs. 2.7% anxiety • 22.4% vs. 0.9% depression • 17.0% vs. 0.9% stress • 27.6% vs. 0.9% insomnia
Almandoz et al;[6] USA	Patients with obesity n = 123 Age 51.2 ± 13.0 yr 87.0% female	QIDS-SR – self-designed (lifestyle behaviours, COVID-19, employment)	• 72.8% anxiety • 83.6% depression • 61.2% stress eating
Cao et al;[7] China	Medical staff n = 37 Age 32.8 ± 9.6 yr 78.3% female 43.2% doctors; 51.3% nurses; 5.5% clinical technicians	PHQ-9, MBI	• Doctors: 6.3% depression • Nurses: 31.6% depression • Entire sample: 18.9% depression
Rohde et al;[8] Denmark	Case notes of patients under psychiatric services in Central Denmark Region n = 1,357 case notes from 918 patients Age (female) 36.3 ± 14.3 yr Age (male) 40.9 ± 13.8 yr 67.6% female	–	• 39.7% anxiety • 12.8% unspecific stress • 10.8% depression • 11.0% delusions • 0.019% PTSD symptoms • 0.063% obsessive-compulsive symptoms
Bo et al;[9] China	COVID-19 patients n = 714 Age 50.2 ± 12.9 yr 50.9% female	PCL-C	• 96.2% significant PTSS • 49.8% considered psycho-educational services helpful
Balkhi et al;[10] Pakistan	General population in Karachi, Pakistan n = 400 50.0% female	Self-designed (psychological impact of COVID-19)	62.5% anxious on a daily basis
Lee et al;[11] USA	Adults n = 1,237 45% female	CAS, GAD-7, PHQ, WSAS	• 25.4% coronavirus anxiety • 36.0% generalised anxiety • 40.3% depression • 35.0% functional impairment
Guo et al;[12] China	COVID-19 patients n = 103 Age 42.5 ± 12.5 yr 42.7% female Matched controls n = 103 Age 41.5 ± 13.1 yr 47.6% female	PHQ-9, GAD-7, PSS-10, PCL-5	Patients: • 60.2% depression (17.5% moderate to severe) • 55.3% anxiety (6.8% moderate to severe) • 1.0% PTSD
Fekih-Romdhane et al;[13] Tunisia	Tunisia general population n = 603 Age 29.2 ± 10.4 yr 74.0% female	IES-R, MSPSS, self-designed (COVID-19 knowledge and behaviour)	33.0% reported PTSD symptoms
Chew et al;[14] Singapore, India	Healthcare workers from major hospitals in Singapore and India n = 906 53.0% Singapore, 47.0% India 64.3% female 39.2% nurses; 29.6% physicians; 10.6% allied healthcare professionals	DASS-21, IES-R	5.7% anxiety, 10.6% depression, 5.2% stressed, 7.4% PTSD Most commonly reported physical symptoms: • 31.9% headache • 33.6% throat pain • 26.7% anxiety • 26.6% lethargy • 21.0% insomnia

Choudhury et al;[15] England	Staff at a tertiary cardiac centre in the northwest of England n = 106 67% female	Self-designed (COVID-19 knowledge and behaviour), PHQ-9, PSS-4, GAD-7	• 53.0% depression • 61.0% anxiety
Tan et al;[16] Singapore	Medical personnel n = 296 Non-medical personnel n = 174	DASS-21, IES-R	Medical personnel: • 10.8% anxiety • 8.1% depression • 6.4% stress • 5.7% PTSD Non-medical personnel: • 20.7% anxiety • 10.3% depression • 6.9% stress • 10.9% PTSD
Elbay et al;[17] Turkey	HCWs n = 442 Age 36.05 ± 8.69 yr 56.8% female	DASS-21	• 64.7% depression • 51.6% anxiety • 41.2% stress
Yin et al;[18] China	HCWs n = 371 Age 35.3 ± 9.5 yr 61.5% female	PCL-5, PSQI	3.8% PTSS
Rossi et al;[19] Italy	HCWs n = 1,379 Age 39.0 ± 16.0 yr 77.2% female	GPS, PHQ-9, GAD-7, ISI, PSS	• 49.38% reported PTSS • 24.73% reported symptoms of depression • 19.80% reported symptoms of anxiety • 8.27% reported insomnia • 21.90% reported high perceived stress
Forlenza & Stella;[20] Brazil	Outpatients attending a psychogeriatric clinic n = 72	HADS, NPI-Q	• 37.7% exacerbation of pre-existing symptoms • 20.8% report new mental health symptoms • 60.0% psychiatric or psychological distress • 57.0% sleep complaints • 64.3% depression/dysphoria • 50.0% anxiety • 65.7% apathy • 60.0% irritability • 67.1% nocturnal behaviours • 58.6% appetite/eating behaviours • 23.0% paranoid symptoms
Yuan et al;[21] China	Parents with children hospitalised during COVID-19 n = 50 Age 36.8 ± 5.2 yr 62% female Parents with children hospitalised during other periods n = 50 Age 37.2 ± 5.4 yr 52% female	HADS, VDAS, SF-36	During COVID-19 period: • 42.0% anxiety • 48.0% depression Non-COVID-19 periods: • 8.0% anxiety • 8.0% depression
Ng et al;[22] Hong Kong	Cancer survivors n = 72 Age 52.96 ± 8.34 yr Healthy controls n = 45 Age 57.78 ± 8.77 yr	HADS, Brief COPE, SHAI, PCS	Cancer survivors: • 8.3% borderline anxiety • 9.7% borderline depression • 4.2% clinical anxiety • 5.6% clinical depression Healthy controls: • 6.7% borderline anxiety • 4.4% borderline depression • 6.7% clinical anxiety • 6.7% clinical depression
Cao et al;[23] China	Undergraduates of Changzhi Medical College n = 7,143 67% female	Self-designed (COVID-19 knowledge and behaviour), GAD-7	24.9% anxiety

Zhang et al;[24] China	College students practising social distancing at home n = 66 Age 20.70 ± 2.11 yr 62% female	DASS-21, BPAQ, self-designed (COVID-19 knowledge and behaviour)	• 28.79% stress • 45.45% anxiety • 22.73% depression • 84.85% worried or very concerned about COVID-19
Tang et al;[25] China	Home quarantined university students n = 2,485 60.8% female	PCL-C, PHQ-9	• 2.7% probable PTSD • 9.0% depression
Odriozola-González et al;[26] Spain	Members of university n = 2,530 Age 27.9 ± 12.4 yr 66.1% female	DASS-21, IES	• 35.2% anxiety • 48.1% depression • 40.3% stress • 50.4% moderate to severe impact of outbreak
Liu et al;[27] USA	Young adults aged 18–30 yr n = 898 Age 24.5 yr 81.3% female	CD-RISC-10, Distress Tolerance Scale, MSPSS, Two-Way Social Support Scale, UCLA-3 Short Form, Self-designed (COVID-19 related worry), PHQ-8, GAD-7, PCL-C	• 61.5% high loneliness • 72.0% low resilience • 74.1% low distress tolerance • 43.3% high levels of depression • 45.4% high anxiety scores • 31.8% high PTSD symptoms
Zhang et al;[28] China	Patients with COVID-19 n = 57 Age 46.9 ± 15.4 yr 49.1% female Under quarantine n = 50 Age 36.2 ± 10.9 yr 46% female General public n = 98 Age 29.6 ± 12.7 yr 65.4% female	PHQ-9, GAD-7	Patients: • 29.2% depression • 20.8% anxiety Under quarantine: • 9.8% depression • 10.2% anxiety General public: • 34.7% depression • 19.6% anxiety
Madani et al;[29] Algeria	Internet users living through first confinement n = 678 40.3% female	Self-designed (COVID-19 impact)	• 50.3% reported feeling anxious • 48.2% reported feeling stress
Lei et al;[30] China	Chinese population n = 1,593 Age 32.3 ± 9.8 yr 61.3% female Affected by quarantine: n = 420 Unaffected by quarantine: n = 1,173	Self-designed (COVID-19 knowledge and behaviour), SAS, SDS	Entire sample: • 8.3% anxiety • 14.6% depression Under quarantine: • 12.9% anxiety • 22.4% depression Not under quarantine: • 6.7% anxiety • 11.9% depression
Qi et al;[31] China	COVID-19 patients n = 41 58.5% female	GHQ-12, PCL-C, SAS, SDS, FS-14, SSRS, SCSQ	• 43.9% general mental health problems • 12.2% PTSD symptoms • 12.2% both anxiety and depression • 12.2% only depression • 2.4% only anxiety • 53.6% chronic fatigue
Wu & Wei;[32] China	Frontline medical staff from a designated hospital for COVID-19 n = 60 Age 33.5 ± 12.4 yr 73.3% female Frontline medical staff from non-designated hospital n = 60	SCL-90, SDS, SAS, PSQI, PCL-C	Designated hospital staff: 26.7% severe insomnia (Total PSQI 17–21)

	Age 33.8 ± 11.9 yr 75.0% female		
Xu et al;[33] China	Surgical medical staff n = 120	Self-designed (anxiety, depression, dream anxiety) SF-36	• 46.7% anxiety • 40.0% depression
Zhang et al;[34] China	Persons in China n = 2,182 64.2% female 42.4% medical health workers	ISI, SCL-90-R, PHQ-4 (GAD-2 and PHQ-2)	Non-medical health workers vs. medical health workers: • 30.5% vs. 38.4% insomnia • 8.5% vs. 13.0% anxiety • 9.5% vs. 12.2% depression • 0.4% vs. 1.6% somatisation • 2.2% vs. 5.3% obsessive-compulsive symptoms
Yang & Ma;[35] China	General population in China Before outbreak (end-December 2019) n = 11,131 Average age 37.78 48% female During outbreak (mid-February 2020) n = 3,000 Average age 34.7 yr 50% female	Emotional Well-being Scale	74% decline in emotional well-being after the outbreak
Abdessater et al;[36] France	Members of the French Association of Urologists in Training n = 275 Age 29.5 ± 0.5 yr 30% female	Self-designed (COVID-19 knowledge and behaviour)	92.0% stressed
Lwin et al;[37] NA	> 20 million social media (Twitter) posts	–	Change in proportion of daily tweets from January to April: • Fear: > 50% to < 30% • Anger: ~10% to > 20% • Joy: ~10% to ~30% • Sadness: Maintained at < 10% but still doubled over the course of time
Teufel et al;[38] Germany	People in Germany n = 12,244	GAD-7, PHQ-2	• 11.9% depression • 10.0% generalised anxiety
Zhou et al;[39] China	Junior and senior high school students in China n = 8,079	Self-designed (COVID-19 knowledge and behaviour), PHQ-9, GAD-7	• 43.7% depression • 37.4% anxiety • 31.3% comorbid anxiety and depression
Gao et al;[40] China	Chinese citizens n = 4,872 Age 32.3 ± 10.0 yr 67.6% female	Self-designed (social media exposure), WHO-5, GAD-7	• 48.3% depression • 22.6% anxiety • 19.4% combined depression and anxiety
Li et al;[41] China	Health professional students n = 1,442	K6, IES-R	• 26.6% clinically significant psychological distress • 11.1% probable ASR • 9.1% both distress and ASR
Wang et al;[42] China	General Chinese population n = 1,210 67.3% female	Self-designed (COVID-19 knowledge and behaviour), IES-R, DASS-21	• 16.5% moderate to severe depressive symptoms • 28.8% moderate to severe anxiety symptoms • 8.1% moderate to severe stress
Meng et al;[43] China	Seniors in China n = 1,556 61.3% female	PHQ-9, GAD-7	37.1% depression and anxiety
Jiang et al;[44] China	Patients in Wuhan undergoing the methadone maintenance treatment programme n = 17	PHQ-9, GAD-7	Average number of visits decreased from 127 persons per day to 109 persons per day

Li et al;[45] China	General population of Chinese residents n = 5,033 66.7% female	GAD-7, PHQ-9	20.4% anxiety or depression or both
Mamun & Ullah;[46] Pakistan	Suicide data from press reports	–	16/29 suicide reports were related to COVID-19 issues: • About 9 were due to economic recession • 4 were due to fears of COVID-19 infection
Wang et al;[47] China	General Chinese population n = 1,738	Self-designed (COVID-19 knowledge and behaviour), IES-R, DASS-21	• 8.1% moderate to severe stress • 28.8% moderate to severe anxiety • 16.5% moderate to severe depression
Zhou et al;[48] China	Frontline healthcare workers n = 1,001 Age 33.8 ± 6.6 yr 88.9% female	SCL-90, PSQI, CPSS	
Cai et al;[49] China	Doctors, nurses, and other hospital staff throughout Hunan province n = 534 Age 36.4 ± 16.2 yr 68.7% female 46.4% nurses; 43.6% doctors; 9.0% medical technicians; 1.0% hospital staff	Self-designed (COVID-19 knowledge and behaviour)	40.6% moderately or very nervous or frightened in the ward Strict protective measures, knowledge of virus prevention and transmission, social isolation measures, and positive self-attitude were coping strategies used most frequently. Seeking help from family and friends was endorsed as a helpful strategy. Medical staff did not wish to reduce stress by consulting a psychologist.
Brown et al;[50] USA	Affected hip and knee arthroplasty patients n = 360 Age 65 yr 58% female	Self-designed (COVID-19 knowledge and behaviour)	• 60.0% moderately to severely anxious about not knowing when the procedure would be rescheduled • 79.4% isolated or lonely
Colizzi et al;[51] Italy	Parents and guardians of individuals with autism spectrum disorder n = 527 Age of children with autism 13.0 ± 8.1 yr	–	• 35.5% reported more intense behavioural problems during outbreak • 41.5% reported more frequent behavioural problems during outbreak
Colle et al;[52] France	Patients from the psychiatric department n = 376 Age 46.0 yr 57.1% female	–	• 63.1% exacerbation of anxiety • 20.8% exacerbation of depression • 15.1% exacerbation of substance abuse
Frank et al;[53] Germany	Patients with mental illnesses treated in Technische Universität München, München, Germany n = 196 Age 47 ± 15.8 yr 54% female Affective disorders (n = 121); schizophrenia and related disorders (n = 41); addictive disorders (n = 21); other conditions (n = 13)	CGI	• Patients from all groups: > 50% felt that they had to endure much more mental distress due to the pandemic • Patients with affective disorders: 1 in 4 reported increased difficulties sleeping • Patients with addiction: ≥ 50% complained that their daily routines were badly affected, they were afraid of the future, had financial worries, suffered from isolation and had increased irritability
Gupta;[54] Canada	Patients with primary PTSD diagnosis n = 20 85% female	–	• 55.0% recent onset of difficulty falling asleep • 70.0% fragmented sleep recently and waking up 2–3 times due to disturbing dreams
Hao et al;[55] China	Patients with epilepsy n = 252 Age 29.3 ± 11.3 yr 52.4% female Healthy controls n = 252	K6	Patients vs. healthy controls: 13.0% vs. 2.0% psychological distress

	Age 29.4 ± 11.5 yr 52.4% female		
Plunkett et al;[56] Ireland	Patients attending community mental health team for anxiety disorder n = 30 Age 38.8 ± 12.8 yr 60.0% female	BAI, HAMA, CGI-Severity, GAF, Y-BOCS, CGI-Improvement	• 50.0% reported deleterious effect of COVID-19 on mental health • 40.0% reported deleterious effect of COVID-19 on anxiety • 26.7% patients had disimprovement in symptoms, as reported by clinician • 46.7% patients had improvement in symptoms as reported by clinician
Prasad et al;[57] India	Patients with Parkinson's Disease n = 100 Age 58.06 ± 10.04 yr 30% female Caregivers n = 100 Age 44.14 ± 13.79 yr 49% female	Self-designed (COVID-19 knowledge and behaviour)	Patients: • 8.0% perceived a higher risk of contracting COVID-19 • 11.0% reported or perceived a worsening of or new symptoms following the onset of the COVID-19 pandemic Caregivers: • 4.0% perceived a higher risk of contracting COVID-19 • 10.0% reported or perceived a worsening of or new symptoms following the onset of the COVID-19 pandemic
Rivetti & Barruscotti;[58] Italy	Female patients with diagnosed telogen effluvium of at least 4–24 mth duration n = 25 Age 36.3 yr 100.0% female	–	• 8.0% required psychological counselling due to worry • 56.0% perceived a worsening of their medical condition
Shalash et al;[59] Egypt	Parkinson's Disease (PD) patients and controls PD patients n = 38 Age 55.6 ± 9.96 yr 23.7% females Controls n = 20 Age 55.6 ± 5.71 yr 30.0% female	DASS-21, International Physical Activity Questionnaire, PD Questionnaire	PD patients vs. healthy controls: • 60.5% vs. 30.0% depression • 60.5% vs. 25.0% anxiety • 52.6% vs. 25.0% stress
Siniscalchi et al;[60] Italy	Adults with celiac disease who had been on a gluten-free diet for at least 6 months n = 276 Age 39.0 ± 12.5 yr 75.7% female	CD-QOL	• 60.1% worried about pandemic • 39.4% disturbed/tense thinking about COVID-19
Sun et al;[61] China	People living with HIV in China n = 703	–	• 60.8% depression • 49.8% anxiety • 38.5% recent insomnia
Termorshuizen et al;[62] USA, Netherlands	People with eating disorders n = 511 (USA) Age 30.6 ± 9.4 yr 97.0% female n = 510 (Netherlands) 99.0% female	Self-designed (COVID-19 impact on eating disorders), GAD-7	Eating disorder behaviour in past 2 weeks USA sample: • 23.0% binge eating • 48.0% restriction • 35.0% compensatory behaviours • 57.0% anxiety about being unable to exercise Netherlands sample: • 14.0% binge eating • 39.0% restriction • 38.0% compensatory behaviours
Umucu & Lee;[63] USA	People with self-reported chronic conditions and disabilities n = 269 Age 39.37 ± 12.18 yr 43.9% female	PSQ-8, Brief COPE, PERMA-Profiler (Well-being), PHQ-4	Moderate level of stress, depression and anxiety based on mean scores reported. Acceptance and self-distraction were the most frequent coping strategies used. Denial was the least commonly used strategy, followed by substance use as the second least.

Zhao et al;[64] China	Post-transplant patients residing in Wuhan during the outbreak n = 492	–	• 69.7% fear • 11.0% depression
Zhou et al;[65] China	Psychiatric outpatients n = 2,065 71.5% patients with pre-existing psychiatric disorders; 28.5% new patients	GAD-7, PHQ-9, ISI	Entire sample: • 25.5% anxiety • 16.9% depression • 26.2% insomnia Patients with pre-existing psychiatric disorders: • 20.9% reported deterioration of their mental health condition related to the pandemic • 22.0% could not receive routine psychiatric care due to suspended hospital visits • 18.1% have self-reduced medication dosages • 17.2% have stopped taking their medication due to lack of access to prescriptions • 7.4% sought online help for medical care New patients • 24.5% could not receive timely diagnoses and treatment
Ma & Miller;[66] various	Chinese students studying abroad n = 182 Age 26.5 ± 4.9 yr 57.0% female	STAI, self-designed (discrimination, fear, living conditions), PSSS	• 31.3% perceived discrimination from the local community • 58.2% perceived discrimination from the media • 72.0% afraid of being infected • 73.1% afraid of family/friends being infected
Saurabh & Ranjan;[67] India	Quarantined children and adolescents n = 121 Age 15.4 yr 14.88% female	Self-designed (COVID-19 knowledge and behaviour)	• 68.59% worry • 66.11% helpless • 61.98% fear
Xie et al;[68] China	Primary school students in Hubei n = 1,784 43.3% female	CDI-S	• 22.6% depressive symptoms • 18.9% anxiety symptoms
Liang et al;[69] China	Chinese youths (aged 14–35 yr) n = 584 61.2% female	Self-designed (COVID-19 knowledge and behaviour), GHQ-12, PCL-C, SCSQ	• 40.4% prone to psychological problems • 14.4% PTSD symptoms
Xue et al;[70] China	General population in China who were medically isolated n = 707 Those in reported self-isolation n = 3,012 Those in non-reported isolation n = 10,786	–	• Medically isolated: 76.7% difficulty falling asleep at least once in past week • Under self-isolation: 51.0% difficulty falling asleep at least once in past week The prevalence of sleep problems was high during the first 2 weeks of medical isolation and decreased thereafter
Zhu et al;[71] China	Under quarantine n = 1,443, 59.5% female Not under quarantine n = 836, 60.0% female	SRQ-20, GAD-7, PHQ-9	Under quarantine • 15.0% general psychological symptoms • 22.2% anxiety • 22.1% depression Not under quarantine • 13.4% general psychological symptoms • 20.8% anxiety • 20.8% depression
Zarghami et al;[72] Iran	COVID-19 patients n = 82 (32 inpatients, 50 outpatients) Age of inpatients 40.3 ± 14.4 yr Age of outpatients 43.6 ± 15.8 yr 61.0% female	PHQ-9, GAD-7, PSS-14	• 15.9% adjustment disorder • 29.3% insomnia • 3.7% major depressive disorder • 6.1% generalised anxiety disorder • 15.9% had 2 psychiatric illnesses • 37.3% depression (PHQ-9) • 28.9% anxiety (GAD-7) • Those with hospital admission (n = 30): 60.0% incidence of mental illness

			• Those without hospital admission (n = 52): 28.8% incidence of mental illness
Zhou et al;[73] China	Suspected COVID-19 patients n = 63 Age: 33.9 yr 52.3% female	HADS	23.8% reported hospital anxiety and/or depression
Ahmad et al;[74] Iraq	Social media users in Iraq n = 516 43% female	Self-designed	38.6% psychologically affected
Ahmed et al;[75] 30 different countries	Dentists n = 650 75% female	Self-designed (COVID-19 knowledge and behaviour)	• 87.0% afraid of getting infected with COVID-19 from either a patient or co-worker • 90.0% anxious when treating a coughing patient or patient suspected to be infected with COVID-19 • 92.0% afraid of carrying the infection from dental practice to their families
Md Hazir et al;[76] China	Chinese people n = 1,074 Age 33.5 ± 11.1 yr 46.8% female	BAI, BDI, AUDIT, WEMWBS	• 29.0% anxiety (12.9% severe) • 37.1% depression • 32.2% hazardous drinking or worse
Amerio et al;[77] Italy	Italian general practitioners n = 131 Age 52.3 ± 12.2 yr 49.1% female	Self-designed (COVID-19 knowledge and behaviour), PHQ-9, GAD-7, ISI, SF-12	22.9% at least moderate depressive symptoms
Barbato & Thomas;[78] United Arab Emirates	Italian foreign workers in United Arab Emirates n = 148 Age 41.4 ± 7.7 yr 76% female	IES-R, PHQ-8, GAD-7	• 22.3% PTSD • 20% depressive symptoms • 23% anxiety
Barello et al;[79] Italy	HCWs assisting COVID-19 patients n = 376 Age 40 ± 11 yr	MBI	• 37.0% high emotional exhaustion • 24.7% high depersonalisation • 45% high frequency of physical symptoms
Büntzel et al;[80] Germany	Oncologists n = 47 Patients n = 146	Self-designed (COVID-19 knowledge and behaviour)	Physicians: • 52.0% anticipated negative impact of the crisis on their own mental and physical health • 21.0% feared the consequences of mental health specifically • 40.0% worried about getting infected by COVID-19 • 33.0% emotionally stressed or burned out Patients: • 43.0% expected long-term impact on physical health • 34.0% described medical staff as emotionally stressed or burned out
Buonsenso et al;[81] Sierra Leone	Householders n = 78 21.8% female	Self-designed (COVID-19 knowledge, impact and behaviour)	• 57.7% anxiety • 82% difficulty providing food for family
Cai et al;[82] China	HCWs treating COVID-19 n = 1,521 75.5% female	SCL-90, CD-RISC, SSRS	14.1% psychological abnormality
Chen et al;[83] China	Paediatric medical staff in Guiyang, China n = 105 Age 32.6 ± 6.5 yr 90.5% female	SAS, SDS	• 18.1% anxiety • 29.5% depression
Choi et al;[84] Hong Kong	Hong Kong general population n = 500 Age 47.26 ± 15.82 yr 54.80% female	PHQ-9, GAD-7, Global Rating of Change Scale	• 19.8% depression • 14.0% anxiety • 25.4% deterioration in mental health
Civantos et al;[85] USA	Otolaryngology physicians n = 349 39.3% female	Mini-Z Burnout Assessment, GAD-7, IES, PHQ-2	• 21.8% burnout • 47.9% anxiety • 60.2% distress • 10.6% depression

Consolo et al;[86] Italy	Dental practitioners n = 356 39.6% female	Self-designed (COVID-19 knowledge and behaviour), GAD-7	• 4.2% experienced fear intensely • 42.7% minimal anxiety; 33.3% mild anxiety; 15.2% moderate anxiety; 8.7% severe anxiety
Dixit et al;[87] Bangladesh, India, Indonesia, Nepal	General population in Bangladesh, India, Indonesia and Nepal n = 548 61.3% India; 22.3% Nepal; 10.2% Bangladesh; 6.2% Indonesia Age 32.6 ± 10.3 yr 60% male	Self-designed (binge watching)	73.7% had considerable increase in binge watching
Dong et al;[88] China	Hospital staff n = 4,618 86.7% female	Self-designed (COVID-19 knowledge, behaviour and impact), HEI	• 24.2% high levels of anxiety and/or depressive symptoms • 14.9% mild negative emotions • 5.5% moderate negative emotions • 3.8% severe negative emotions
Du et al;[89] China	Frontline HCWs from two Wuhan-based hospitals n = 60 Age 37.65 ± 9.72 yr 68.3% female HCWs in the outreach team n = 74 Age 34.66 ± 6.1 yr 54.1% female	Self-designed (sleep quality), PSS, BDI-II, BAI	• 12.7% mild depressive symptoms • 20.1% mild anxiety symptoms • 59.0% moderate to severe perceived stress • 61.7% poor sleep quality Fear of self and colleagues getting infected ranked as the top source of stress and anxiety
Durankuş & Aksu;[90] Turkey	Pregnant women n = 260 Age 29.6 ± 3.8 yr	EPDS, BDI, BAI	35.4% at risk of depression
El-Zoghby et al;[91] Egypt	Adult Egyptians n = 510 65.9% female	IES-R, self-designed (COVID-19 knowledge and behaviour)	• 41.4% severe impact • 34.1% stress from work • 55.7% financial stress • 62.7% stress from home • 53.9% horrified • 52.0% helpless • 66.3% apprehensive • 64.7% increased care for family members' feelings
Forte et al;[92] Italy	Italian general population n = 2,286 Age 29.6 ± 11.4 yr 74.0% female	Self-designed (COVID-19 PTSD), IES-R, SCL-90, PSQI, STAI-Y	29.0% PTSD
Forte et al;[93] Italy	Italian general population n = 2,291 Age 30.0 ± 11.5 yr 74.6% female	Self-designed (mood scales), IES-R, SCL-90, STAI-Y	• 31.4% psychopathological symptoms • 37.2% anxiety • 27.7% PTSD symptoms
Gómez-Salgado et al;[94] Spain	General Spanish population n = 4,180 Age 40.3 ± 13.2 yr 74.0% female	GHQ-12	72.0% psychological distress
González-Sanguino et al;[95] Spain	General Spanish population n = 3,480 Age 37.82 yr 75% female	PHQ-2, GAD-2, PCL-C-2, InDI-D, UCLA-3	• 18.7% depression • 21.6% anxiety • 15.8% moderate to extreme PTSS
Hou et al;[96] China	HCWs n = 1,472 76.5% female	SSRS, CD-RISC, SCL-90	7% psychological abnormality
Huang & Zhao;[97] China	Chinese public n = 7,236 Age 35.3 ± 5.6 yr 54.6% female	GAD-7, CES-D, PSQI	• 35.1% anxiety • 20.1% depression • 18.2% poor sleep quality
Kang et al;[98] China	Doctors and nurses in Wuhan n = 994 85.5% female	Self-designed (COVID-19 knowledge and	• 34.4% mild disturbances (on all scales) • 22.4% moderate disturbances (on all scales) • 6.2% severe disturbances (on all scales)

	81.6% nurses; 18.4% doctors; 31.1% worked in high-risk departments	behaviour), PHQ-9, GAD-7, ISI, IES-R	
Khanna et al;[99] India	Ophthalmologists and ophthalmology trainees n = 2,355 Age 42.5 ± 12.1 yr 43.3% female	PHQ-9	• 32.6% some degree of depression • 6.9% moderate depression • 4.3% severe depression
Killgore et al;[100] USA	USA adults n = 1,013 55.9% female	UCLA-3, PHQ-9	• 43% reported high loneliness • 54.7% of lonely participants reported moderate to significant depression
Killgore et al;[101] USA	General USA population n = 1,013 56.0% female	PHQ-9, COVID-19 pandemic worry scale, ISI	• 56.0% insomnia • 19.8% moderate range • 5.2% severe range
Lai et al;[102] China	HCWs treating COVID-19 patients n = 1,257 96.4% female 60.8% nurses; 39.2% physicians	PHQ-9, GAD-7, ISI, IES-R	• 50.4% depressive symptoms • 44.6% anxiety symptoms • 34.0% insomnia symptoms • 71.5% distress symptoms
Lee & You;[103] Korea	Korean residents n = 973 Age 46.31 ± 14.94 yr 50.1% female	Self-designed (COVID-19 knowledge and behaviour)	• 51.3% perceived neither high nor low risk related to COVID-19 • Perceived severity of COVID-19 (48.6% high, 19.9% very high) • 67.8% reported practising hand hygiene • 63.2% reported always wearing a face mask outside
Li et al;[104] China	Female HCWs n = 4,369	PHQ-9, GAD-7, IES-R	• 14.2% depression • 25.2% anxiety • 31.6% acute stress symptoms
Li et al;[105] China	Chinese residents n = 3,637 Age 34.46 ± 9.62 yr 63% female	ISI, GAD-7, PHQ-9, IES-R	• 12.5% developed new-onset insomnia and worsened insomnia symptoms • 17.6% had COVID-19 related stress • Anxiety increased from 16.1% to 27.5% • Depression increased from 22.7% to 31.2%
Li et al;[106] China	Medical staff personnel in Wuhan n = 219 78.0% female Medical staff personnel in Ningbo n = 729 76.4% female	AIS, SRQ-20	• Staff in Wuhan: 58.9% insomnia • Staff in Ningbo: 25.0% insomnia
Liu et al;[107] China	Medical staff n = 512 84.5% female	Self-designed (COVID-19 knowledge and behaviour), SAS	12.5% anxiety (10.35% mild)
Liu et al;[108] China	General public in China n = 608 58.7% female	STAI, SDS, SCL-90	• 15.8% state anxiety • 4.0% trait anxiety • 27.1% depression • 7.7% psychological abnormalities
Liu et al;[109] China	Residents in Wuhan and surrounding cities n = 285 54.4% female 43.5% currently in Wuhan	PTSD Checklist for DSM-5 (PCL-5), PSQI	7.0% PTSS
Mazza et al;[110] Italy	General Italian population n = 2,766 Age 32.9 ± 13.2 yr 71.6% female	DASS-21, PID-5-BF	• Depression (17% high) • Anxiety (7.2% high) • Stress (14.6% high)
Mo et al;[111] China	Nurses treating COVID-19 n = 180 Age 32.7 ± 6.5 yr 90% female	SOS, SAS	• 14.4% not good or bad sleep quality • 39.9% score rate for total stress load • 22.2% scored > 50

Moccia et al;[112] Italy	General Italian population n = 500 59.6% female	K10, TEMPS-A, ASQ	• 38.0% psychological distress (19.4% mild likelihood • 18.6% moderate to severe likelihood)
Morgantini et al;[113] various	Healthcare professionals from 60 countries n = 2,707	–	51.4% burnout
Ni et al;[114] China	Community-based adults in Wuhan n = 1,577 Health professionals in Wuhan n = 214	GAD-2, PHQ-2, MOS-SSS	Community-based adults: • 23.84% probable anxiety • 19.21% probable depression Health professionals: • 22.0% probable anxiety • 19.2% probable depression
O¨zdin et al;[115] Turkey	Turkish people n = 343 Age 37.2 ± 10.3 yr 49.2% female	HADS, HAI	• 23.6% depression • 45.1% anxiety
Padala et al;[116] USA	Participants from ongoing geriatric clinical research studies n = 51 Age 69.3 ± 9.4 yr 47% female 60.7% veterans; 39.3% caregivers	Self-designed (COVID-19 knowledge and behaviour)	• 78.0% felt safe or very safe attending the scheduled research appointment • 86.0% felt that the general public was panicked or very panicked about the pandemic
Pedrozo-Pupo et al;[117] Columbia	Columbian adults n = 406 Age 43.9 ± 12.4 yr 61.8% female	PSS-10	14.3% high perceived stress
Podder et al;[118] India	Doctors in India n = 384 (144 dermatologists, 240 non-dermatologists) Age of dermatologists 33.7 ± 9.3 yr 52.4% female Age of non-dermatologists 30.8 ± 7.8 yr 40.0% female	PSS-10, self-designed (risk factors of stress)	• Dermatologists: 9.7% high stress • Non-dermatologists: 12.5% high stress
Qiu et al;[119] China	General Chinese population n = 52,370 64.73% female	CPDI	35.0% psychological distress
Ren et al;[120] China	General Chinese public n = 1,172	PHQ-9, GAD-7, SCL-90 (somatisation), PSS-10, CD-RISC-10, MINI-SD, ISI, PCL-5	• 18.8% depression • 13.3% anxiety • 2.8% high risk of suicidal behaviour • 7.2% clinical insomnia • 7.0% clinical PTSD symptoms • 67.9% moderate to high perceived stress
Roy et al;[121] India	Residents in India n = 662 Age 29.09 ± 8.83 yr 51.2% female	Self-designed (COVID-19 knowledge and behaviour)	• 82.2% preoccupied with thinking about the COVID-19 pandemic over the past week • 12.5% had difficulty sleeping as they were worried about the pandemic • 36.4% affected by posts on social media about the pandemic • 46.1% affected by news about the pandemic • 83.5% felt it would be beneficial if mental health professionals help people in dealing with the current pandemic • 82.9% would suggest for others to obtain mental health help if they were highly affected by the pandemic
Saccone et al;[122] Italy	Pregnant women n = 100	IES-R, STAI (short form), Visual analogue scale for anxiety	68.0% anxiety
Sahu et al;[123] India	Orthopaedic surgeons from India n = 611	Self-designed (COVID-19 knowledge and behaviour)	22.5% definitely stressed

Shacham et al;[124] Israel	Dentists and dental hygienists in Israel n = 338 Age 46.39 ± 11.2 yr 58.6% female, 58.6% dentists	COVID-19-related factors questionnaire, Demands Scale- Short Version, General Self-Efficacy Scale, K6	11.5% at risk of elevated psychological distress
Shapiro et al;[125] Israel	General population of Israelis n = 503 Age 47.0 yr 61.0% female	PHQ-2	• 24.1% high or very high anxiety levels • 13.0% at risk of depression
Shen et al;[126] China	Nurses in ICU ward in Wuhan n = 85	–	• 45.0% difficulty sleeping • 28.0% nervousness
Simpson et al;[127] USA	Board-eligible or board-certified psychiatrists in the United States or in an accredited training programme n = 101	–	• 76.0% worried about contracting COVID-19 • 95.0% worried about patients contracting COVID-19
Somma et al;[128] Italy	General Italian population n = 1,043 Age 32.8 ± 12.7 yr 81.5% female	SDQ EPS, PID-5-SF, CBQ	13.2% emotional problems
Sønderskov et al;[129] Denmark	Denmark residents n= 2,458 Age 49.1 yr 51% female	WHO-5 (wellbeing), questionnaire (anxiety and depression)	Entire sample: 25.4% probable depression
Song et al;[130] China	Medical staff working in emergency department of hospitals with COVID-19 wards n = 14,825 Age 34.0 ± 8.2 yr 64.3% female	PSSS, CES-D, PCL-5	• 25.2% depressive symptoms • 9.1% PTSD
Suleiman et al;[131] Jordan	Jordanian doctors who might be in first contact with COVID-19 patients n = 308 Age 30.3 ± 5.8 yr 36.7% female	Self-designed (COVID-19 knowledge and behaviour)	90.9% anxious about possibility of spread of COVID-19 and increase in number of positive patients
Sun et al;[132] China	Those working in a hospital in China n = 442 83.3% female	2019-nCOV impact questionnaire, IES	• 86.2% more stressed at work than before • 75.6% worried about being infected • 32.6% experienced stigma • 63.3% felt friends and family were worried about getting infected through them
Sun et al;[133] China	General Chinese population n = 6,416 Age 28.2 ± 9.2 yr 53.0% female	Self-designed (COVID-19 impact on addictive behaviours)	• 46.8% increased dependence on internet use • 16.6% longer internet use • 4.3% severe internet addiction • 18.7% of 331 ex-drinkers relapsed • 25.3% of 190 ex-smokers relapsed
Suzuki;[134] Japan	Postnatal mothers who gave birth to singleton healthy babies at Japanese Red Cross Katsushika Maternity Hospital Controls n = 148 100.0% female COVID-19 group n = 132 100.0% female	EPDS, Mother-to-Infant Bonding Scale Japanese version	COVID-19 patients vs. healthy controls: • 14.4% vs. 14.9% depression • 29.5% vs. 15.5% problems with bonding
Tan et al;[135] China	Members of the workforce living in Chongqing n = 673 Age 30.8 ± 7.4 yr 25.6% female	IES-R, DASS-21, ISI	• 10.8% PTSD • 3.8% anxiety • 3.7% depression • 1.5% stress

	18.1% management/executive staff		• 2.3% insomnia
Taylor et al;[136] Canada, USA	General public in Canada and America n = 5,854 57.7% USA; 42.3% Canada Age 49.8 ± 16.2 yr old 47% female	Self-designed (COVID-19 knowledge and behaviour), PHQ-4, SHAI, OCI-R, XS, MCSD-SF	• 28.0% elevated anxiety • 22.0% depressive symptoms
Temsah et al;[137] Saudi Arabia	Healthcare workers n = 582 Age 36.0 ± 8.5 yr 75.1% female	Self-designed (COVID-19 and MERS-CoV), GAD-7	11.0% moderate high or high anxiety
Tian et al;[138] China	Ordinary Chinese citizens n = 1,060 Age 35.01 ± 12.8 yr 48.2% female	SCL-90	• 3.1% (Scores of 4–5 on ≥ 1 SCL-90 dimension) • 62.8% (Scores of 3–4 on ≥ 1 SCL-90 dimension)
Uvais et al;[139] Gulf Cooperation Council countries	Malayalam-speaking expats in Gulf Cooperation Council countries n = 157 5.1% female	PHQ-9, GAD-7	• 22.4% anxiety • 29.7% depression
Van Agteren et al;[140] Australia	General population recruited during COVID-19 n = 673 Age 44.8 ± 14.7 yr 65.0% female General population recruited during non-COVID-19 period n = 1,624 Age 42.7 ± 11.4 yr 46.0% female General population help-seeking group recruited during non-COVID-19 period n = 340 Age 42.6 ± 11.8 yr 58.0% female	DASS-21, MHC-SF, Satisfaction With Life Scale, Brief Resilience Scale	• COVID-19 cohort: 79.0% had problematic mental health outcomes • General population: 52.0% had problematic mental health outcomes • General population help-seeking: 58.0% had problematic mental health outcomes
Varshney et al;[141] India	India residents n = 653 Age 41.82 ± 13.85 yr 24.8% female	IES-R	33.2% reported significant psychological impact
Voitsidis et al;[142] Greece	Greek general population n = 2,363 76.2% female	AIS, IUS-12, De Jong Gierveld Loneliness Scale, PHQ-2, self-designed (COVID-19 negative attitudes)	37.6% insomnia
Wang et al;[143] China	HCWs in Wuhan n = 123 Age 33.8 ± 8.4 yr 90% female	PSQI, SAS, SDS	• 38.0% sleep disturbances • 7.0% anxiety • 25.0% depression
Wang et al;[144] China	General population in China n = 600 Age 34 ± 12 yr 55.5% female	SAS, SDS	• 6.3% anxiety • 17.2% depression
Wu et al;[145] China	Pregnant women in their third trimester of pregnancy Group 1: investigated before January 21, 2020 n = 2,839 100.0% female Group 2: investigated after declaration of human	EPDS	• Group 1: 26.0% depression • Group 2: 29.6% depression • Overall: 26.0% vs. 34.2% (before 21 January 2020 vs. between 5 and 9 February 2020)

	transmission of COVID-19 on January 20, 2020 n = 1,285 100.0% female		
Wu et al;[146] China	Post-discharged COVID-19 survivors n = 370 Age 50.5 ± 13.1 yr 45.1% female	GAD-7, PHQ-9	• 13.5% anxiety • 10.8% depression • 6.2% comorbid anxiety and depression • 29.5% sleeping disorders • 39.2% feeling nervous, anxious or on edge • 1.1% suicidal thoughts
Xing et al;[147] China	Medical personnel with at least 1 year of work experience n = 548 72.1% female	SCL-90	• 33.0% somatisation • 37.2% obsessive-compulsive • 29.7% depression • 34.1% anxiety • 33.6% hostility • 40.0% phobic anxiety • 32.3% psychoticism • 32.7% overall average
Yang et al;[148] Korea	Physical therapists n = 65 47.6% female	Self-designed (COVID-19 knowledge and behaviour), GAD-7, PHQ-9	• 32.3% anxiety • 18.5% depression
Yassa et al;[149] Turkey	Non-infected women with a confirmed pregnancy over 30th gestational week n = 172 Age 27.5 ± 5.3 yr 100.0% female	–	• 80.2% were concerned about the coronavirus outbreak • 51.7% felt more vulnerable/weak during the outbreak because they were pregnant
Zanardo et al;[150] Italy	Mothers who gave birth during COVID-19 n = 91 Age 33.73 ± 5.01 yr	EPDS	28.6% postpartum depression
Zhang & Ma;[151] China	Chinese residents in Liaoning Province n = 263 Age 37.7 ± 14.0 yr 59.7% female	Self-designed (COVID-19 knowledge and behaviour), IES	7.6% moderate to severe traumatic stress
Zhang et al;[152] Iran	Healthcare staff n = 304 Age 35.1 ± 9.1 yr 58.6% female	SF-12, PHQ-4, K6	• 20.1% distress • 20.6% depression • 28.0% anxiety
Zhang et al;[153] China	Medical staff n = 1,563 82.7% female	ISI, PHQ-9, GAD-7, IES-R	• 36.1% insomnia • 50.7% depression • 44.7% anxiety • 73.4% stress
Zhao et al;[154] China	General public in China n = 1,630 Age 29.17 ± 10.58 yr	PSS, PSQI, SAS, RSE	36.38% were poor sleepers

AIS: Athens Insomnia Scale; ASQ: Attachment Style Questionnaire; ASR: acute stress reaction; AUDIT: Alcohol Use Disorder Identification Test; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BPAQ: Buss-Perry Aggression Questionnaire; CAPE-42: Community Assessment of Psychic Experiences-42; CAS: Coronavirus Anxiety Scale; CBQ: COVID-19 Causal Belief Questionnaire; CD-RISC: Connor-Davidson Resilience Scale; CD-RISC-10: Connor-Davidson Resilience Scale-10; CDIS: Children's Depression Inventory – Short Form; CD-QOL: Celiac Disease Quality of Life Measure; CES-D: Center for Epidemiological Studies Depression Scale; CGI: Clinical Global Impression; COPE: Coping Orientation to Problems Experienced; CPDI: COVID-19 Peritraumatic Distress Index; CPSS: Chinese Perceived Stress Scale; CSDC: Child Stress Disorders Checklist; DASS-21: Depression, Anxiety and Stress Scale; DES-II: Dissociative Experiences Scale; DSM: Diagnostic and Statistical Manual of Mental Disorders; EPDS: Edinburgh Postpartum Depression Scale; FCV-19S: Fear of COVID-19 Scale; FS-14: Fatigue Scale-14; GAD-2: Generalized Anxiety Disorder-2; GAD-7: Generalized Anxiety Disorder-7; GAF: Global Assessment of Functioning; GHQ-12: General Health Questionnaire-12; GHQ-28: General Health Questionnaire-28; GPS: Global Psychotrauma Screen; GSES: General Self-Efficacy Scale; HADS: Hospital Anxiety and Depression Scale; HAI: Health Anxiety Inventory; HAMA: Hamilton Anxiety Scale; HAMD: Hamilton Depression Scale; HCW: healthcare worker; HEI: Huaxi Emotional-Distress Index; IES: Impact of Event Scale; IES-R: Impact of Event Scale-Revised; InDI-D: Day-to-Day Discrimination Index; ISI: Insomnia Severity Index; IUS-12: Intolerance of Uncertainty Scale; K10: Kessler Psychological Distress Scale-10; K6: Kessler Psychological Distress Scale-6; MBI: Maslach Burnout Inventory; MCSD-SF: Marlowe-Crowne Social Desirability Scale Short Form; MERS-CoV: Middle East respiratory syndrome coronavirus; MHC-SF: Mental Health Continuum – Short Form; MINI-SD: Mini International Neuropsychiatric Interview for

Suicidality Disorders Studies; MOS-SSS: Medical Outcome Study Social Support Survey; MSPSS: Multidimensional Scale of Perceived Social Support; NPI-Q: Neuropsychiatric Inventory-Questionnaire; NRS: numeric rating scale; OCI-R: Obsessive-Compulsive Inventory-Revised; OER: Online Ecological Recognition; OSSS-3: Oslo Social Support Scale-3; PANSS: Positive and Negative Syndrome Scale; PCL-5: PTSD Checklist-5; PCL-C: PTSD Checklist-Civilian; PCL-C-2: PTSD Checklist-Reduced; PCS: Pain Catastrophizing Scale; PERMA: Positive emotion, Engagement, Relationships, Meaning and Accomplishment; PHQ-2: Patient Health Questionnaire-2; PHQ-4: Patient Health Questionnaire-4; PHQ-9: Patient Health Questionnaire-9; PID-5-BF: Personality Inventory for DSM-5-Brief Form-Adult; PID-5-SF: Personality Inventory for DSM-5 Short Form; PPE: personal protective equipment: PSAS: Psychological Stress and Adaptation at work Score; PSQ-8: Perceived Stress Questionnaire-8; PSQI: Pittsburgh Sleep Quality Index; PSS-10: Perceived Stress Scale; PSSS: Perceived Social Support Scale; PTSD: post-traumatic stress disorder; PTSS: post-traumatic stress symptoms; QIDS-SR: Quick Inventory of Depressive Symptomatology (Self-Report); RSE: Rosenberg Self-Esteem Scale; SAS: Self-Rating Anxiety Scale; SASR: Stanford Acute Stress Reaction Questionnaire; SCL-90-R: Symptom Checklist-90-Revised; SCSQ: Simplified Coping Style Questionnaire; SDQ: Strengths and Difficulties Questionnaire; SDQ EPS: Strengths and Difficulties Questionnaire emotional problems scale; SDS: Self-Rating Depression Scale; SF-12: short form-12; SF-36: short form-36; SHAI: Short Health Anxiety Inventory; SMSP-A: Severity Measure for Specific Phobia-Adult; SNAP-IV: Swanson, Nolan and Pelham Rating Scale-IV; SOS: Stress Overload Scale; SRQ: Stress Response Questionnaire; SRQ-20: Self-Reporting Questionnaire-20; SSRS: Social Support Rating Scale; STAI: State-Trait Anxiety Inventory; STAI-Y: State-Trait Anxiety Inventory (Form Y); SWLS: Satisfaction with Life Scale; TEMPS-A: Temperament Evaluation of Memphis, Pisa, Paris and San Diego Autoquestionnaire; UCLA-3: UCLA Loneliness Scale; USA: United States of America; VDAS: Van Dream Anxiety Scale; WEMWBS: Warwick-Edinburgh Mental Wellbeing Scale; WHO-5: World Health Organization-Five Well-Being Index; WSAS: Work and Social Adjustment Scale; XS: Xenophobia Scale; Y-BOCS: Yale Brown Obsessive Compulsive Scale