Received: 29 January 2024 | Revised: 7 June 2024 | Accepted: 13 June 2024

DOI: 10.1002/pcn5.223

REVIEW ARTICLE

PCN Reports
Psychiatry and Clinical Neurosciences
Open Access

Psychological treatments for mental health symptoms associated with COVID-19 infection: A scoping review

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Funding information
Japan Agency for Medical Research and Development (AMED), Grant/Award Number: JP22dk0307115h0001; Health Labor Sciences Research, Grant/Award Number: 22GC1005

Abstract

The aim of this scoping review was to synthesize published studies and ongoing clinical trials of psychological interventions for mental health problems associated with COVID-19 infection. The study protocol was developed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews. We conducted systematic searches for studies published or registered between January 2020 and October 2022 using eight scientific databases and clinical trial registries, which identified 40 complete published studies and 53 ongoing clinical trials. We found that most studies were randomized controlled trials (74%) while the remaining used study designs of lower methodological quality. Most studies investigated interventions for acute COVID-19 patients (74%) and others explored post-COVID conditions (PCC) or recovered patients. Cognitive and behavioral therapies were the main intervention approaches (31%), followed by multidisciplinary programs (21%) and mindfulness (17%). The most frequently evaluated outcomes were anxiety (33%), depression (26%), quality of life (13%), and insomnia (10%). No studies on youths, older people, or marginalized communities were found. These findings summarize the burgeoning research on a range of psychological interventions for individuals infected with COVID-19. However, the field is in its infancy and further research

to develop an evidence base for targeted care is necessary. The gaps identified in the current study also highlight the need for more research on youths, older people, and members of marginalized communities, and PCC patients. It is important to ascertain interventions and delivery strategies that are not only effective and affordable but also allow high scalability and accessibility.

KEYWORDS
anxiety, COVID-19, depression, psychotherapy, sleep initiation and maintenance disorders

INTRODUCTION

Coronavirus disease 2019 (COVID-19) has had an unprecedented effect on global mental health leading to a substantial increase in the prevalence of psychiatric disorders[1–4] and their associated disease burdens.[5] Individuals infected by COVID-19 are at substantially greater risk of developing mental health problems compared with the general population, healthcare workers,[4] and people with other respiratory infections.[6] Based on studies using self-report measures, pooled rates of depression, anxiety, insomnia, and post-traumatic stress disorder (PTSD) symptoms among acute COVID-19 patients have been estimated to range from 27% to 45%.[3] These mental health symptoms remain persistent at 1-year follow-up: 12% of recovered patients report insomnia and more than 22% report clinically relevant levels of depression and anxiety.[7]

Patients with COVID-19 face a range of interrelating biopsychosocial factors that increase their risk for mental health problems. Many experience substantial distress,[8,9] concerns about prognosis and support,[10] and threats to mortality and wellbeing.[11] Several psychosocial risk factors are associated with having a psychiatric diagnosis, including female gender, previous psychiatric diagnoses, outpatient status, unemployment, poor perceived health, low resilience, and low social support.[12–14] Furthermore, longer duration of hospitalization correlates with the severity of mental health symptoms, which is partly accounted for by infection severity.[3,14] In addition to these psychosocial factors, some neurobiological effects of COVID-19 have been found to potentially lead to depression and anxiety; namely, prolonged immune activation can cause neuroinflammation, which is implicated in various psychiatric conditions.[15,16] These factors may also hold bidirectional interplay,[6] thereby making the condition complex and positioning patients and survivors at particularly high risk of developing mental health problems.

In response to this global mental health emergency, calls to action have been issued by international organizations[17,18] and research communities[19–21] to emphasize the urgent need to develop targeted interventions. Early initiatives in research on interventions for COVID-19 patients have shown promising results. For instance, a multisite randomized controlled trial (RCT) demonstrated that self-delivered computerized cognitive behavioral therapy (CBT) can substantially reduce depression, anxiety, and insomnia among COVID-19 patients.[22] Studies have also reported the efficacy of eye movement desensitization and reprocessing[23] (EMDR) and narrative exposure therapy[24] for PTSD symptoms. More recently, one ongoing trial is investigating the effect of CBT for recovering COVID-19 survivors 1 year following hospitalization,[25] and a brief multidisciplinary program is being implemented for people with long-term COVID-19 symptoms (known as post-COVID conditions[26] [PCC]). However, these studies vary substantially, and it is unclear which mental health symptoms, interventions, and COVID-19 diagnostic groups they focused on. There is also a need to determine the levels of intensity of these interventions, where and how they were delivered, and identify research gaps and promising lines of inquiry. Therefore, to develop and deliver effective targeted interventions, a comprehensive review of the relevant literature is needed.

This scoping review provides a synthesis of research on broad categories of psychological interventions for mental health symptoms among individuals infected by COVID-19. The target population includes acute COVID-19 patients and survivors as well as those with PCC. The review focus is on individuals with newly onset mental health symptoms after COVID-19 infection; therefore, studies that explore interventions for individuals with a psychiatric diagnosis prior to COVID-19 infection were beyond our scope. The study aim was to summarize published studies and ongoing clinical trials to address key aspects of interventions and identify promising avenues of research as well as research gaps.

METHODS

Study design

This scoping review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews[27,28] (Appendix S1) and the Joanna Briggs Institute manual for evidence synthesis.[29] We also used the updated methodological guidance for the conduct of scoping reviews,[30] which is based on the framework and recommendations by Arksey and O'Malley[31] and Levac et al.[32] The protocol was completed on October 7, 2022, and published online in BMJ Open on March 2, 2023.[33] The approved protocol included inclusion and exclusion criteria, definitions, review questions, and the search strategy.

Research question

The boundaries of the research question were clearly defined through the development of inclusion and exclusion criteria using the Population, Concept, Context format recommended for scoping reviews.[29]

Population

This scoping review included individuals who (1) had been diagnosed with COVID-19 when the study was conducted or before, and (2) had been identified with a mental health symptom. This included acute COVID-19 patients, recovered or discharged patients, and PCC patients. The mental health symptoms included depression, anxiety, sleep disturbances, obsessive–compulsive disorder, and trauma- and stressor-related disorders. Neurological and other related symptoms, such as fatigue, brain fog, and headache, were beyond the study scope and were therefore not included. The selection for these two criteria were not limited to any specific diagnostic/assessment criteria or test. However, studies on participants with mental health problems before COVID-19 exposure were excluded.

Concept

All studies related to psychological interventions that targeted mental health symptoms were included. Psychological treatment as defined by the Medical Subject Headings for PubMed under "psychotherapy" was used to determine the boundaries of the intervention under investigation. This excluded pharmacological treatments, surgical interventions, and occupational therapy. Studies were included if they assessed at least one of the five mental health symptoms delineated earlier as a primary or secondary outcome. The selection for these two criteria were not limited to any specific diagnostic/assessment criteria or test.

Context

There were no limitations on cultural, geographic, racial, gender, or intervention settings. However, only English-language studies were included.

Additional exclusion criteria

The review was restricted to experimental studies. Theoretical, descriptive, and observational research were excluded from the review. Case studies and case series were also removed to control the quality of research. Books and gray literature were also not eligible. However, ongoing clinical trial records were included to capture the most current state of research.

Search strategy

We collaborated with an experienced librarian specializing in evidence synthesis to construct the search strategy. Relevant keywords, descriptors, and Medical Subject Headings were identified in PubMed and combined using the Boolean operators "AND" and "OR." Each source was investigated to identify an optimal search strategy and the search was translated into the most appropriate terminology for that source. The searches were conducted using the following scientific databases: PubMed, Web of Science, PsycINFO, and Scopus. The following databases were accessed to identify clinical trial registrations: ClinicalTrials.gov, World Health Organization International Clinical Trials Registry Platform (ICTRP), EU Clinical Trials Register, and Cochrane Central Register of Controlled Trials. The search was limited to studies published or registered from 2020 onwards. Detailed search strategies for all sources are included in Table S1. The searches were all conducted on October 14, 2022, and identified 17,855 potentially eligible sources published or registered. Manual searching of reference lists resulted in an additional 24 publications. Through a combination of automated and manual deduplication, 7817 duplicates were removed, leaving 10,038 items to be screened.

Study selection

Items were screened for relevancy in two stages using Covidence.[34] Covidence is a web-based collaboration software platform that streamlines the production of systematic and other literature reviews. During the first phase, all retrieved items were assessed for potential relevance based on the title and abstract uploaded into Covidence. Six reviewers were involved in the screening process. For each study, two reviewers were assigned blindly by Covidence, and each voted independently on whether the study was potentially relevant to the research question. Any studies that received two "no" votes were removed from the review and marked as "irrelevant"; any studies that received two "yes" votes were moved to the next stage of screening. Studies with conflicting votes were reviewed and given a deciding vote by a third reviewer. After this initial screening process, the remaining items were retrieved in full-text format and screened further to assess their relevance. Again, each of the remaining items was assigned blindly by Covidence to two reviewers and each voted independently. A third reviewer resolved any disagreements.

Data extraction

Data related to the included studies were extracted by six reviewers using a data-extraction form based on the Joanna Briggs Institute template[29] and adapted by the authors. The following study characteristics were recorded: study descriptors (title, year, authors, country, institution, funding, study design, screening method, sample

size, comparator) and data on the research questions (treatment type, target symptoms, treatment duration, delivery format, stages of COVID-19 infection when delivered, outcomes, and results). We used previously established nomenclature to define population, intervention, and outcome. Regarding diagnostic status, acute COVID-19 was defined as symptoms up to 4 weeks after infection; symptoms after 4 weeks were categorized as PCC.[35] This term describes the wide range of health consequences that can present 4 or more weeks after infection with SARS-CoV-2. This term was used as it is the most comprehensive umbrella definition and includes direct and indirect effects of the disease.[36] Unlike other similar terms, the definition does not leave a temporal gap between acute and long-term phases of the disease. Each study was blindly assigned by Covidence to two reviewers for extraction and any disagreements were resolved by a third reviewer. We contacted the authors of the publication for lack of information. The extracted data were subsequently exported to Microsoft Excel and relevant data were synthesized using frequencies.

Brief risk-of-bias assessment

Although this was not planned in the protocol, a brief ad-hoc risk-of-bias assessment was conducted since notable limitations in the quality of research were found during the extraction process. To allow a systematic yet brief assessment, we rated studies based on Domain 1 of the Cochrane Risk-of-Bias 2 tool,[36] which pertains to the randomization process, as a key criterion of study quality. Two reviewers independently rated the 69 RCTs and any disagreements between them were discussed until a full consensus was reached.

RESULTS

The database search retrieved a total of 17,855 records and 24 references were identified from previous studies. After removing duplicates, 10,034 studies were screened by title and abstract, and 258 were screened by full text. Reasons for exclusion were: (1) wrong study design ($n = 56$), (2) wrong population ($n = 53$), (3) wrong intervention ($n = 31$), (4) wrong outcome measures ($n = 21$), and (5) not in English ($n = 4$). A total of 93 studies met the inclusion criteria for this scoping review (Figure 1).

Study characteristics are shown in Table 1 and the full details of all the included studies are provided in Table S2. Overall, a total of 93 studies including 40 complete published studies and 53 ongoing clinical trials were identified. The majority of these studies used a randomized controlled study design ($n = 69$), while others used single-arm clinical trial ($n = 5$), nonrandomized controlled trial ($n = 4$), and quasi-experimental design ($n = 3$), while one clinical trial was unclear about whether it was randomized. Forty-three RCTs were small trials (studies with $n < 40$ per arm), and 29 were moderate to large (studies with $n \geq 40$ per arm) (Figure 2). The sample sizes of each study are provided in Table S2. The studies were conducted across 17 countries; many were conducted in Iran ($N = 22$), China ($N = 20$), and India ($N = 10$). We did not identify any studies targeting any other demographic group defined by age, race, ethnicity, gender, or socioeconomic status.

All studies excluding ongoing trials reported significant positive results. A summary of the patient population, interventions, and target outcomes is shown in Figure 3 and Table 2. Most studies investigated interventions for acute COVID-19 patients (74%) and less research investigated recovered COVID-19 patients (12%), PCC patients (7%), discharged patients (7%), and suspected COVID-19 patients (4%) (Figure 3a). Broadly, the investigated interventions mainly comprised cognitive and behavioral therapies (CBTs: 31%), followed by multidisciplinary programs (21%), and mindfulness and related approaches (17%). A few studied the efficacy of music therapy, EMDR, and supportive psychotherapy (Figure 3b).

Table 2 shows a breakdown of the studies categorized by these broad approaches and their sub-approaches. Among the published studies, CBTs ($n = 14$) and multidisciplinary programs ($n = 9$) were reported to be efficacious for anxiety, depression, sleep disturbances, PTSD symptoms, acute stress, quality of life, and functioning. Mindfulness and related approaches ($n = 2$) were found to be effective for depression and anxiety while EMDR ($n = 2$) was shown to improve depression, anxiety, and PTSD symptoms. Music therapy ($n = 1$) and supportive psychotherapy ($n = 1$) were each efficacious for anxiety and quality of life, and anxiety and depression. However, the intervention efficacy on each of the outcomes was often not supported by multiple studies, especially if the design was limited to RCTs, with CBTs for anxiety ($n = 6$), depression ($n = 4$), sleep ($n = 4$), functioning ($n = 3$), as well as multidisciplinary programs for anxiety ($n = 5$), depression ($n = 4$) being the exceptions.

Although most studies used previously developed interventions, a few developed unique protocols specifically developed for acute COVID-19 patients,[37] PCC patients,[38] or recovered individuals.[39] Kong and colleagues[37] reported the efficacy of a 10-day "psychological-behavioral intervention (PBI) program" for anxiety and depression, which included breathing exercises, emotion expression training, self-emotional management skills, and psychoeducation about COVID-19. Another ongoing pilot clinical trial[38] is testing a multi-disciplinary program called "Post-Acute COVID-19 Syndrome Coping and Recovery (PACS-CR)." This intervention integrates pulmonal, nutritional, and various rehabilitation strategies with the CHIME framework (Connectedness, Hope and optimism about future, Identity, Meaning in life and Empowerment dimensions)[40] to improve psychological and physical functioning. Finally, we also identified a study examining the efficacy of a self-delivered online intervention for anxiety, depression, and PTSD among recovered patients. The Recovering from Extreme Stressors Through Online Resources and E-health (RESTORE) program addresses the cognitive and behavioral factors maintaining prolonged distress associated with COVID-19 infection while also training participants in emotion expression, avoiding avoidance, and utilizing social supports.[39]

Many of the interventions were delivered via telehealth systems (33%) or in person (30%), but some were self-delivered (17%)

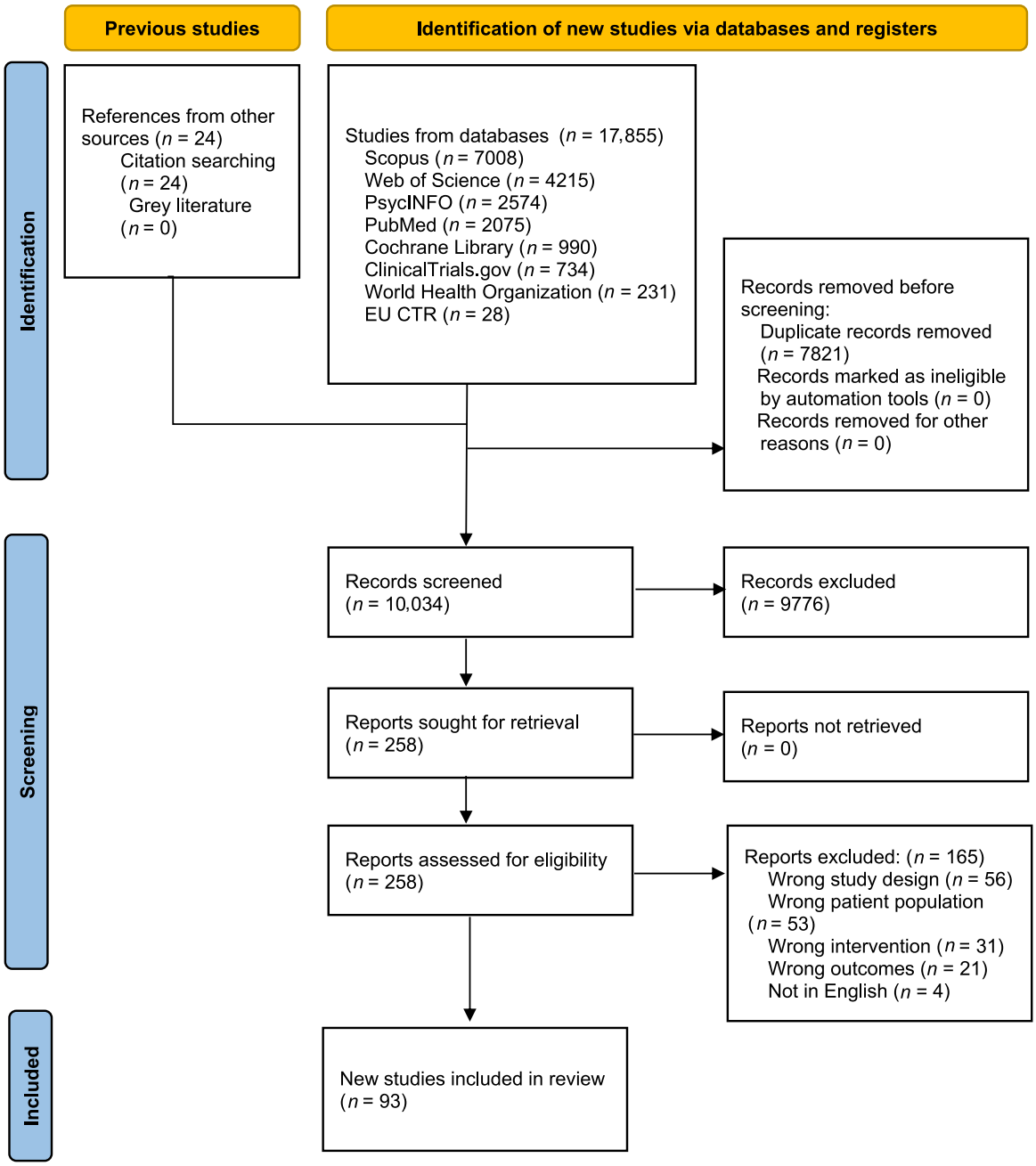

FIGURE 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram describing the selection and inclusion process. EU CTR, EU Clinical Trials Register.

(Figure 3c). Most interventions were shorter than 8 weeks (64%), while others lasted 8–12 weeks (13%) and a few interventions comprised a single session, more than 12 weeks, or had varying duration according to the patient's condition (Figure 3d). The most studied outcomes were anxiety (33%), depression (26%), quality of life (13%), and sleep (10%) (Figure 3e). There were also studies using post-traumatic stress symptoms, functioning, stress, and obsessive–compulsive symptoms. A complete list of the outcome measures used are shown in Table S3. Only a few studies used scales developed specifically for COVID-19; these included the Corona-Disease Anxiety Scale,[41] Coronavirus Anxiety Scale,[42] Obsession with COVID-19 Scale,[43] COV19—Impact on Quality of Life,[44] and the Post-COVID-19 Functional Status Scale.[45] Although we initially aimed to summarize the settings in which the interventions were delivered, few studies (14%) reported relevant information, and few researchers (26%) responded to our requests for more information. Therefore, we cannot provide an adequate estimate on the intervention settings.

Finally, the brief ad-hoc risk-of-bias assessment on the randomization process showed that 58% of the RCTs used a random component, and 29% used an allocation-concealment procedure. Consequently, only 20 studies achieved a low-risk rating for Domain

TABLE 1 Study characteristics.

Type of source	*n*
Ongoing research	53
Outcome paper	40
Year of registration or publication of protocol	
2020 (Ongoing)	17
2021 (Ongoing)	21
2022 (Ongoing)	14
2023 (Ongoing)	1
Year of publication of results	
2020 (Outcome)	10
2021 (Outcome)	15
2022 (Outcome)	15
Countries	
Iran	22
China	20
India	10
Italy	6
USA	5
Turkey	4
Canada	3
Indonesia	3
South Korea	3
Sweden	3
Thailand	3
UK	3
France	2
Netherlands	2
Peru	2
Brazil	1
Denmark	1
Age range	
<18 years	0
18–64 years	93
≤65 years	0
Study design	
Randomized controlled trial	69
Pre–post study design	11
Single-arm clinical trial	5
Nonrandomized controlled trial	4
Quasi-experimental design	3
Clinical trial (randomization unknown)	1

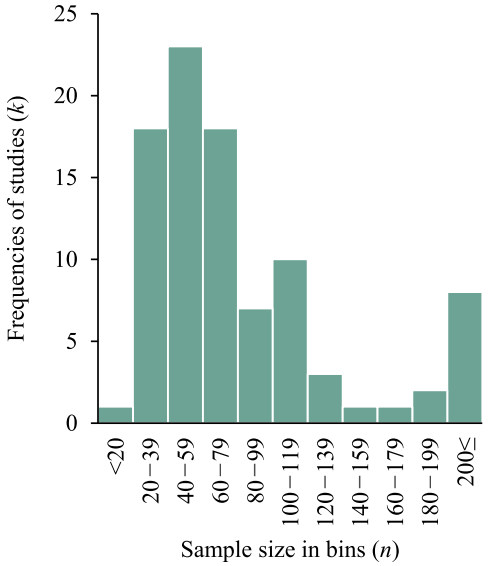

FIGURE 2 Frequencies of sample size in bins.

1. This suggests that, even if all the other domains were assumed to be of low risk, only 22 studies would obtain a low overall risk of bias (a summary is also presented in Table S4; and assessment for each study is detailed in Table S5). Although readers should exercise caution when interpreting these results as this is a partial assessment, this finding demonstrates the lack of methodological rigor in these clinical trials.

DISCUSSION

Here, we present a synthesis of the current state of research on psychological interventions targeting mental health symptoms among individuals affected by COVID-19. Over the last 3 years, a recognizable body of research on this topic has developed. We identified 40 complete published studies and 53 ongoing clinical trials in 17 countries. Most of these studies used RCT designs. Their primary focus was on acute COVID-19 patients, and their aim was to address symptoms such as anxiety, depression, insomnia, and overall quality of life. Among the various interventions, CBTs, multidisciplinary programs, and mindfulness were the most studied. Given the substantial prevalence of COVID-19,[2,3] its potential for leading to long-term disability,[7,12] and the possibility of novel coronavirus variants,[26] continuing efforts are needed to investigate targeted treatments and build an evidence base for this population. Below, we describe key findings and suggest areas of future research.

First, we found that many of the studies identified were from Iran, China, and India. This finding may be attributed to differences in the research environment. National trial registries in these countries may have enacted more quickly for approving trials, while Western countries may put emphasis on quality, which is at a trade-off relationship with the speed and number of studies being carried out.

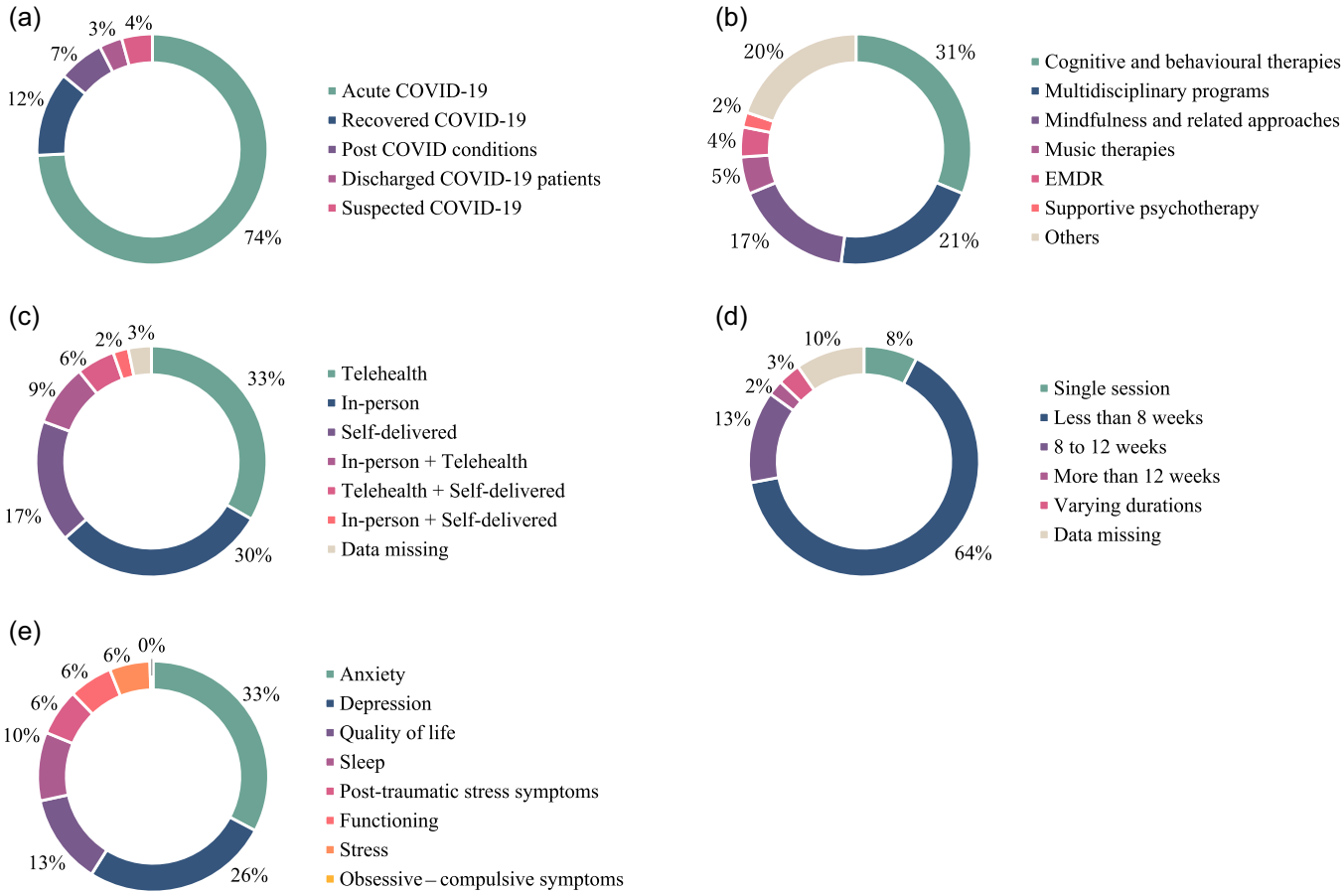

FIGURE 3 Characteristics of interventions are illustrated according to: (a) COVID-19 status of the patient population, (b) types of interventions, (c) intervention modality, (d) intervention duration, and (e) target mental health symptoms. In (d), studies are counted more than once if it includes multiple outcomes. EMDR, eye movement desensitization and reprocessing.

Such differences in the regulatory environment and speed of approval may also partially account for the limitations found in the quality of the included research, although these interpretations are speculative.

This review identified several understudied demographic populations, the most prominent of which were age-specific groups, notably youths and older people. There is evidence that younger individuals have an increased risk of conditions such as PTSD,[13] depression, and severe insomnia.[12] Older patients are also more predisposed to severe COVID-19, which can in turn increase their risk of experiencing mental health issues.[3,14] Furthermore, COVID-19 patients have an elevated risk of suicidal ideation and suicide attempts,[46] with both younger[47] and older populations[48] being particularly susceptible. In addition to these age-related findings, we found a lack of studies targeting specific demographic groups defined by race, ethnicity, gender, or socioeconomic status. This dearth is worrying given the disproportionate effect of the pandemic on marginalized groups.[21] Addressing these gaps and tailoring interventions for these at-risk populations is necessary.

Furthermore, there are insufficient interventions for PCC patients. Mental health symptoms among survivors can persist beyond 1 year,[7,12] and their support needs may differ from those of patients with acute conditions. For example, while recently infected individuals often struggle with anxiety about their current illness and its uncertainties,[10] PCC patients face challenges such as symptom management, the emotional strain of extended illness, lifestyle adjustments, and PTSD symptoms.[49] Notably, individuals with physical PCC symptoms show a heightened risk for mental health issues compared with those without such symptoms[50] owing to the complex interplay between physical and mental symptoms.[51] Thus, understanding the process underlying the development and persistence of PCC is essential for developing targeted interventions.

The use of telehealth services and self-delivered interventions is an important response to the extraordinary circumstances of the pandemic, which were also reflected in the large proportion of studies investigating these types of interventions. These strategies provide logistical benefits, extending care to remote regions and reducing costs while maintaining efficacy comparable to in-person interventions.[52–54] For instance, a multicenter RCT of 252 acute COVID-19 patients demonstrated substantial improvements in depression, anxiety, and insomnia after a 1-week computerized CBT using tablet PCs, with effects maintained at a 1-month follow-up.[22] Telehealth was also widely used during the pandemic[17] in response to the disruption in face-to-face healthcare services and to

TABLE 2 Breakdown of intervention approaches.

Design	*n*	Subtypes	*n*	Duration	*n*	Delivery format	*n*	Target symptoms	*n*
Cognitive and behavioral therapies									
Randomized controlled trial	21	Eclectic	9	Single session	1	Telehealth	8	Anxiety	17
Pre–post study design	4	Cognitive behavioral therapy (CBT)	8	<8 weeks	19	In-person	11	Depression	23
Quasi-experimental design	2	Progressive muscle relaxation (PMR)	5	8–12 weeks	6	Self-delivered	8	Sleep	12
Single-arm clinical trial	1	Mindfulness-based stress reduction (MBSR)	4	>12 weeks	0	In-person + Telehealth	2	Post-traumatic stress symptoms	5
Clinical trial (randomization unknown)	1	Acceptance and commitment therapy (ACT)	2	Varying durations	1	Telehealth + Self-delivered	0	Obsessive–compulsive symptoms	6
Nonrandomized controlled trial	1	Narrative exposure therapy (NET)	1	Data missing	3	In-person + Self-delivered	1	Stress	0
		Compassion-focused therapy (CFT)	1			Data missing	0	Quality of life	8
								Functioning	6
Multidisciplinary programs									
Randomized controlled trial	13	Multidisciplinary rehabilitation	13	Single session	0	Telehealth	6	Anxiety	13
Pre–post study design	3	Yoga and complementary and alternative medicine	4	<8 weeks	13	In-person	2	Depression	16
Quasi-experimental design	0	Traditional Chinese medicine psychotherapy	2	9–12 weeks	0	Self-delivered	2	Sleep	4
Single-arm clinical trial	1	Multidisciplinary rehabilitation and support group	1	More than 12 weeks	1	In-person + Telehealth	4	Post-traumatic stress symptoms	3
Clinical trial (randomization unknown)	0			Varying durations	1	Telehealth + Self-delivered	2	Obsessive–compulsive symptoms	1
Nonrandomized controlled trial	3			Data missing	3	In-person + Self-delivered	1	Stress	0
						Data missing	3	Quality of life	11
								Functioning	5
Mindfulness and related approaches									
RCT	16	Mindfulness training	7	Single session	0	Telehealth	7	Anxiety	11
Pre–post study design	0	Combined meditation and breathing techniques	3	<8 weeks	13	In-person	4	Depression	13
Quasi-experimental design	0	Yoga	3	10–12 weeks	0	Self-delivered	1	Sleep	2
Single-arm clinical trial	0	Breathing techniques	2	More than 12 weeks	0	In-person + Telehealth	1	Post-traumatic stress symptoms	2

TABLE 2 (Continued)

Design	*n*	Subtypes	*n*	Duration	*n*	Delivery format	*n*	Target symptoms	*n*
Clinical trial (randomization unknown)	0	Meditation	1	Varying durations	0	Telehealth + Self-delivered	3	Obsessive–compulsive symptoms	4
Nonrandomized controlled trial	0			Data missing	1	In-person + Self-delivered	0	Stress	0
						Data missing	0	Quality of life	5
Music therapy								Functioning	1
RCT	5	Relaxation/sleep-aid music	3	Single session	3	Telehealth	0	Anxiety	2
Pre–post study design	0	Music type/genre not specified	1	<8 weeks	2	In-person	2	Depression	5
Quasi-experimental design	0	Receptive music therapy	1	11–12 weeks	0	Self-delivered	3	Sleep	1
Single-arm clinical trial	0			More than 12 weeks	0	In-person + Telehealth	0	Post-traumatic stress symptoms	0
Clinical trial (randomization unknown)	0			Varying durations	0	Telehealth + Self-delivered	0	Obsessive–compulsive symptoms	0
Nonrandomized controlled trial	0			Data missing	0	In-person + Self-delivered	0	Stress	0
						Data missing	0	Quality of life	1
EMDR								Functioning	0
RCT	2	Standard EMDR protocol	2	Single session	0	Telehealth	1	Anxiety	1
Pre–post study design	1	Eight-session protocol (not otherwise specified)	1	<8 weeks	1	In-person	3	Depression	2
Quasi-experimental design	0	Recent Traumatic Episode Protocol (R-TEP)	1	12–12 weeks	0	Self-delivered	0	Sleep	0
Single-arm clinical trial	1			More than 12 weeks	0	In-person + Telehealth	0	Post-traumatic stress symptoms	2
Clinical trial (randomization unknown)	0			Varying durations	0	Telehealth + Self-delivered	0	Obsessive–compulsive symptoms	0
Nonrandomized controlled trial	0			Data missing	0	In-person + Self-delivered	0	Stress	0
						Data missing	0	Quality of life	1
Supportive psychotherapy								Functioning	0
RCT	1	N/A	2	Single session	0	Telehealth	1	Anxiety	2
Pre–post study design	0			<8 weeks	2	In-person	1	Depression	2
Quasi-experimental design	0			13–12 weeks	0	Self-delivered	0	Sleep	0

(Continues)

TABLE 2 (Continued)

Design	*n*	Subtypes	*n*	Duration	*n*	Delivery format	*n*	Target symptoms	*n*
Single-arm clinical trial	1			More than 12 weeks	0	In-person + Telehealth	0	Post-traumatic stress symptoms	0
Clinical trial (randomization unknown)	0			Varying durations	0	Telehealth + Self-delivered	0	Obsessive–compulsive symptoms	0
Nonrandomized controlled trial	0			Data missing	0	In-person + Self-delivered	0	Stress	0
						Data missing	0	Quality of life	0
Other								Functioning	0
RCT	14	Psychotherapy, not otherwise specified	5	Single session	3	Telehealth	9	Anxiety	15
Pre–post study design	3	Psychoeducation, not otherwise specified	3	<8 weeks	10	In-person	7	Depression	17
Quasi-experimental design	1	Aromatherapy	1	17–12 weeks	0	Self-delivered	2	Sleep	3
Single-arm clinical trial	1	Brief intervention	1	More than 12 weeks	1	In-person + Telehealth	1	Post-traumatic stress symptoms	3
Clinical trial (randomization unknown)	0	Crisis intervention	1	Varying durations	1	Telehealth + Self-delivered	0	Obsessive–compulsive symptoms	2
Nonrandomized controlled trial	0	Emotion regulation group intervention	1	Data missing	2	In-person + Self-delivered	0	Stress	1
		Guided imagery	1			Data missing	0	Quality of life	3
		Intensive-care-unit-specific virtual reality (ICU-VR)	1					Functioning	3
		Intervention developed for COVID patients: PACS Coping and Recovery (PACS-CR)	1						
		Intervention developed for COVID patients: Psychological-Behavioral Intervention (PBI)	1						
		Intervention developed for COVID patients: Recovering from Extreme Stressors Through Online Resources and E-health (RESTORE)	1						
		Progressive muscle relaxation (PMR) and psychoeducation, not otherwise specified	1						
		Self-management skills training	1						

minimize contact between patients and healthcare workers in inpatient settings.[55] In a broader context, digital technologies have gained popularity in recent decades for their potential to bridge health disparities among individuals with restricted healthcare access or resources. As the COVID-19 pandemic has highlighted inequities in healthcare,[17,56,57] digital technology is a priority in future research. Taken together, the advantages of the approaches identified here, together with the existing previous evidence base, strongly support the use of telehealth services and self-delivered interventions. Moving forward, research is needed to ascertain optimal delivery methods, as a wide range of services and means of delivery are currently available. Furthermore, implementation barriers, such as low technological literacy and lack of resources,[58] also require further exploration to enable effective translation into practice.

CBTs, multidisciplinary programs, and mindfulness and related approaches have attracted considerable attention in the field. There is a large body of research supporting the use of CBTs for respiratory conditions, such as chronic obstructive pulmonary disease[59,60] and asthma,[61] as well as various other physical health problems.[62–65] CBT is known for its strong evidence base,[66,67] which may account for the substantial interest in this therapy, but it is also structured and manualized, making it easy to train providers while ensuring greater consistency and fidelity for widespread delivery.

The second most studied approach comprised multidisciplinary programs. This approach has been recommended by expert consensuses as providing comprehensive care for COVID-19 patients generally[68,69] and specifically for PCC.[20,70] However, this review identified just one integrated model of care, which aimed to improve sleep, diet, activity, energy, stress, and breathing though a 7-week integrated rehabilitation program delivered by a psychology-led specialist multidisciplinary team.[49] A framework has also been proposed that defines clinical pathways (from standardized assessment, clinical decisions, and personalized care, to follow-up)[71]; however, this framework awaits empirical evaluation. Integrated systems improve accessibility to mental health services and ensure interprofessional communication, allowing the provision of the comprehensive care necessary to address the complex bio-psychological interactions inherent to PCC.

The third most studied group was mindfulness and related approaches. Mindfulness has been shown to be effective for general distress[72] as well as for clinical outcomes relevant to COVID-19, such as chronic pain, depression, anxiety, trauma, and insomnia.[73] However, at the time of review, the findings of only two RCTs had been published. These studies focused on 6–7-day breathing and meditation programs, and reported improvements in anxiety, sense of weakness, and physical symptoms, such as headaches and dyspnea.[74] Benefits were also noted for depression, stress, and sleep quality outcomes.[64] Overall, despite the growing interest in these promising COVID-19 interventions, evidence for each intervention remains scarce, and high-quality RCTs are needed to thoroughly evaluate their safety and efficacy.

Given the magnitude of the pandemic, brief and highly scalable interventions are also highly relevant. Most identified interventions lasted up to 8 weeks; only seven single-session interventions were identified. These comprised CBT,[75] music therapy,[76–78] and interventions that did not feature any established approaches.[37,79,80] None of the reviewed studies used interventions known for their high scalability, such as psychological first aid. Although there is some debate over its efficacy for infectious diseases,[81] psychological first aid is considered the gold standard of disaster responses,[82] and its adaptability across various settings and deliverability by minimally trained laypersons makes it an invaluable tool for addressing the widespread mental health repercussions of the pandemic. During the pandemic, the rapid increase in people with mental health problems and the shortage of practitioners highlighted the urgent need for structured and low-intensity care interventions that were highly scalable and affordable. Psychological first aid is just one of the many interventions with these advantages, but it is important to explore, develop, and empirically validate similarly practical and effective interventions for future crises of comparable magnitude.

This scoping review had several limitations. First, although Embase is recommended for systematic searches,[83] it was not available for the current study. Books and gray literature were also removed from this study, which could have limited the comprehensiveness of the search. Second, we included ongoing trials, which precludes any conclusions about treatment efficacies in these trials. Finally, this scoping review was developed to encompass a broad range of intervention approaches and COVID-19 diagnostic statuses, therefore a systematic review with a narrower scope is needed once sufficient findings are available to provide a more focused evaluation of intervention safety and efficacy.

CONCLUSION

There has been substantial growth in research on psychological interventions for COVID-19 patients and survivors. Despite growing interest, the field is in its infancy (as indicated by the high number of ongoing clinical trials) and continued research efforts are essential. This scoping review identified gaps and areas that warrant attention in future investigations. These include (1) interventions for understudied demographic groups, such as youths, older people, and marginalized communities; (2) targeted strategies for PCC patients; (3) optimization and implementation of telehealth solutions; (4) a sustained effort to substantiate promising interventions through high-quality RCTs; and (5) interventions that are scalable, accessible, and cost-effective and thus could benefit a wider population.

AUTHOR CONTRIBUTIONS

So Sugita and Masaya Ito conceptualized the study; So Sugita, Christian Miller, and Kotone Hata developed the methodology; So Sugita, Kotone Hata, Krandhasi Kodaiarasu, Naoki Takamatsu, Kentaro Kimura, and Lecsy Gonzalez conducted the formal analysis and investigation; Christian Miller provided resources; So Sugita drafted the first manuscript; all authors contributed to the review and editing; So Sugita and Krandhasi Kodaiarasu were involved in the

visualization; So Sugita provided leadership; Masaya Ito supervised the core team, and Ikue Umemoto, Keitaro Murayama, Tomohiro Nakao, Shinsuke Kito, and Hironori Kuga provided consultations when necessary; So Sugita, Masaya Ito, and Hironori Kuga were involved in project administration; Shinsuke Kito and Hironori Kuga acquired funding for this project.

ACKNOWLEDGMENTS

We thank Diane Williams, PhD, from Edanz (https://jp.edanz.com/ac) for editing a draft of this manuscript. This research was supported by the Japan Agency for Medical Research and Development (AMED) (Grant No. JP22dk0307115h0001) and a Health Labor Sciences Research grant (Grant No. 22GC1005).

CONFLICTS OF INTEREST STATEMENT

Masaya Ito has received royalties for books and writings on psychological treatment from Shindan to Chiryo sha, Sogen sha, and several publishing companies in Japan. He has also received honorariums for workshops and supervision related to psychological treatments. Hironori Kuga is an Editorial Board member of *Psychiatry and Clinical Neurosciences Reports* and a co-author of this article. To minimize bias, they were excluded from all editorial decision-making related to the acceptance of this article for publication.

DATA AVAILABILITY STATEMENT

All relevant data are available in the manuscript or in the supplementary materials. All data relevant to the study are included in the article or uploaded as supplemental information.

ETHICS APPROVAL STATEMENT

Ethical approval was not required for this review as secondary sources of information (i.e., academic journals and clinical trials) were used in this study.

PATIENT CONSENT STATEMENT

N/A

CLINICAL TRIAL REGISTRATION

N/A

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Sugita S, Hata K, Kodaiarasu K, Takamatsu N, Kimura K, Miller C, et al. Psychological treatments for mental health symptoms associated with COVID-19 infection: A scoping review. Psychiatry Clin Neurosci Rep. 2024;3:e223. https://doi.org/10.1002/pcn5.223