Traditional Chinese medicine for promoting mental health of patients with COVID-19: a scoping review

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Abstract

Objective: This study aimed to systematically review and depict the current studies of traditional Chinese medicine for the mental health of patients with coronavirus disease 2019 (COVID-19).

Methods: A scoping review was conducted by searching PubMed, Web of Science, CNKI, Wanfang database, VIP database, and SinoMed, with the retrieval time being from the establishment of the database to April 18, 2022. The basic information of the included studies, objective, design, types of patients, interventions, outcomes, etc., was reviewed and summarized narratively. Methodological quality was assessed using the Cochrane Risk of Bias assessment tool, the methodological index for non-randomized studies or the Newcastle–Ottawa scale.

Results: We identified 30 traditional Chinese medicine (TCM) studies from six databases. Among them, finished randomized controlled trials (n = 16) accounted for most of the studies, followed by single-arm studies (n = 9). In terms of study theme, 20 studies defined the mental health of patients with COVID-19 as the research theme. Psychological assessment was included in the inclusion criteria (performed before participation) of nine studies, whereas the other studies only mentioned the mental outcomes. TCM interventions included TCM exercises (Yijinjing, Baduanjin, Liuzijue, Taichi), acupoint stimulation (auricular and body points), moxibustion, decoction, or granules based on TCM syndrome differentiation, decoction, or granules with fixed formulae (Baidu Jieduan granules, Xuanfei Baidu decoction, and Qingfei Paidu decoction), Chinese patent medicine (Jinhua Qinggan granules), TCM psychological therapy (TCM ideological therapy, TCM five-tone therapy, and TCM psychological sand table), and TCM nursing (dialectical care, dialectical diet, and psychological counseling). Anxiety and depression were the main outcomes evaluated in regard to mental health in patients with COVID-19. The limitations of methodological quality were predominantly from follow-up, blinding, and registration. Positive results were reported by 27 studies (90%, n = 30).

Conclusion: We summarized the existing literature about the impact of TCM on mental health in patients with COVID-19. The number of studies evaluating the impact of TCM on mental health is encouraging, but overall methodological quality was low. Several TCM interventions warrant further evaluation, particularly among populations outside of China, for the purpose of establishing supporting evidence. More importantly, research with stronger methodological quality needs to be developed.

Keywords: COVID-19, Mental health, Psychological health, Scoping review, Traditional Chinese medicine

Graphical abstract: http://links.lww.com/AHM/A36.

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic, a major global public health issue, is still unfolding. As of April 14, 2022, there were more than 500 million confirmed cases of COVID-19 and 6.3 million deaths[1]. The COVID-19 pandemic has caused emotional and social burdens on individuals. Although these effects have been predicted, the quantitative evaluation of these effects is lacking[2–3].

Mental health is defined by the World Health Organization as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community"[4]. According to statistics, this state of well-being is perturbed in one in four individuals[5–6]. One study reported higher severity and mortality among COVID-19 patients who had mental disorders than those who did not[7].

Traditional Chinese medicine (TCM), which has a long history, has been widely implemented in the management of the COVID-19 epidemic in China. To date, national

treatment guidelines for COVID-19 have been updated nine times, which were released by the National Health Commission of the People's Republic of China; it is worth noting that TCM remedies have been highlighted in the third version released on January 23, 2020[8–9]. Owing to developments in the treatment of COVID-19, the psychological health of patients has received growing attention. The effects of TCM on the psychological health of COVID-19 patients have received increasing attention from many scholars, and corresponding clinical studies have been performed[10–11].

This scoping review aimed to systematically identify and describe the current studies that tested or observed one or more TCM interventions for improving the mental health of patients with COVID-19 and to identify promising TCM therapies to provide a reference for the mental health management of COVID-19 patients.

Methods

Study design

This is a systematic scoping review. This study was conducted according to Johanna Briggs Institute methodological manual[12–13]. The study report was written according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) extension for scoping reviews[14].

Search strategy

Four Chinese databases, namely, the SinoMed, VIP database, China National Knowledge Infrastructure, Wanfang database and two international databases, namely, PubMed and Web of Science, were searched. The retrieval period was from database establishment to April 18, 2022. The search terms consisted of herbal injection, Chinese patent medicine, herbal medicine, TCM, traditional Chinese medicine, acupuncture, moxibustion, COVID-19, SARS-CoV-2, etc. The search strategy is provided in Supplemental Digital Content 1, http://links.lww.com/AHM/A29.

Inclusion criteria

The types of studies included were clinical studies published in English or Chinese regardless of the presence of a control group. The included patients were patients with COVID-19. The patients with COVID-19 were diagnosed by relevant diagnostic criteria prescribed in the Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia Trial[9]. There were no restrictions on factors such as age, sex, nationality, birthplace, and ethnicity. All the studies had to focus on TCM, a traditional medicine system originating from China, characterized by holism and treatments based on pattern identification/syndrome differentiation[15]. For randomized controlled trials (RCTs), the following intervention comparisons were considered: TCM single arm, TCM *vs.* conventional Western medicine (CWM), TCM + CWM *vs.* CWM, or TCM *vs.* Placebo. TCM interventions include Chinese herbal medicines, Chinese patent medicines, acupuncture, moxibustion, and TCM exercises.

CWM included oxygen therapy, antiviral medications, antibiotics, etc. No limitations on outcomes were applied.

Exclusion criteria

Papers that described "integration of TCM and CWM" and "TCM-A or TCM-B" as interventions and those that lacked detailed intervention names were excluded. Manuscripts with unavailable full text and duplicate publications were also excluded.

Study screening and data extraction

The study screening procedure was as follows: (1) use of Note-Express software to exclude duplicate studies, (2) initial screening after reading of titles and abstracts according to inclusion and exclusion criteria, and (3) reading of full text if additional information was needed for screening.

The basic information in the included studies, such as title, authors, authors' region and affiliation, publication date, research objectives, registration information, sample size, patients' age and sex, diagnosis, interventions and controls, course of treatment, and outcomes included the improvement of stress, affective disorders, sleep quality, quality of life, etc., were required to be extracted. For cases with insufficient information, we attempted to contact the study authors by e-mail or phone for missing information. The aforementioned information was summarized and analyzed narratively.

Quality assessment

Evaluating the methodological quality of the included studies, including trials, reviews, and overviews, is an integral part of research at all levels of evidence[16]. The Cochrane Risk of Bias (ROB) assessment tool[17] was used to assess the quality of the RCTs on seven dimensions. The evaluation results were indicated as "low risk," "high risk," or "unclear risk." The Methodological Index for Non-Randomized Studies (MINORS)[18] was used to assess single-arm studies (SAs) and non-randomized controlled clinical trials (CCTs), which comprised 12 items. The quality of observational studies (such as cohort studies) was assessed using the Newcastle–Ottawa scale (NOS)[19]. The NOS assesses the study quality based on three domains, with a maximum score of nine points.

Results

Characteristics of included TCM studies

Initially, 2,291 studies of TCM for the mental health of patients with COVID-19 were identified from six databases. Among these studies, 600 were duplicates. The remaining 1,691 articles were screened, the titles and abstracts were read, and a total of 1,537 articles did not meet the inclusion criteria (objective, type, population, interventions). Among 154 articles that full-text assessed, 124 were excluded for the following reasons: non-human studies, non-TCM intervention, non-psychological outcomes, patients without COVID-19 patients, and non-full-text. A final total of 30 articles were included in this scoping review. The flowchart of the literature

screening is presented in Figure 1. The basic information of the included literature is presented in Table 1.

The 30 included TCM studies (28 in Chinese and 2 in English) comprised 28 studies and 2 protocols (hereafter referred to as "studies"), which were performed in China; the total sample size was 3,184 (range: 28–374; average: 106; median: 82). The publication year ranged from 2020 to 2022 (2020: 14 studies; 2021: 14 studies; 2022: 2 studies). TCM hospitals were the predominant research funders, followed by TCM colleges and Western medicine hospitals. The samples of 18 studies were mainly from Hubei Province. With regard to geographical distribution, eight studies were published by research groups in Hubei (n = 4) and Guangdong (n = 4). We identified four multi-center trials, three of which were related to Hubei, and a maximum of four centers participated in a single trial. The included studies can be divided into five types: RCTs, SAs, cohort studies, protocols, and non-randomized CCTs. Finished RCTs (n = 16, 53.3%) accounted for most of the studies, followed by SAs (n = 9, 30%) which included prospective single-arm studies (n = 8) and single-arm case series studies (n = 1).

Among the 30 studies, registered information was reported by six studies[25,27,31,33,36,40], ethical approval was reported by 14 studies[20,24–25,27,30–33,36,40,43,46,48–49], informed consent was reported by 25 studies[20–25,27–36,38–43,46,48–49], sample size estimation was reported by four studies[22,27,36,40], funding was reported by 16 studies[22,24–25,28–34,36–37,40,43,46–47], and Good Clinical Practice (GCP) training was performed by two studies[36,40]. The conflict-of-interest statement was reported by two studies published in English[33,36].

In terms of study theme, 20 studies (66.7%) considered the psychological health of COVID-19 patients as the research theme. Psychological assessments were included in the inclusion criteria (psychological assessment performed before participation) of nine studies[25–26,28–29,33–34,38,43,49], whereas the remaining studies only mentioned the mental outcomes. All included studies were classified into therapy, nursing, and rehabilitation based on the main research objective, which included 11 subtypes. "External treatment of TCM for the mental health of patients with COVID-19" and "TCM nursing for the mental health of patients with COVID-19" accounted for 60% of the 30 studies. In real-world clinical studies, participant disease severity, interventions received by patients, and duration of drug treatment were determined by physicians on a case-by-case basis.

In terms of comparisons, there was considerable variation among the 30 TCM studies. In total, 24 designs of comparison were classified into eight types: A + B vs. B, A + B vs. C, A + B + C vs. C, A + B + C vs. C + D, A + B + C vs. A + C vs. C, A + B + C + D vs. D, A vs. B, and single arm. A, B, C, and D refer to different interventions. The details of each comparison can be viewed in Table 2. The same letter "A" refers to the same intervention in a specific comparison. However, the same letter "A" refers to different interventions in different comparisons. Among them, A + B vs. B (n = 10) and single arm (n = 9) were the most commonly used. Eight TCM interventions were used in the 30 studies, including TCM exercises, acupoint stimulation (skin contact), TCM psychological therapy, moxibustion (non-skin contact), decoction or
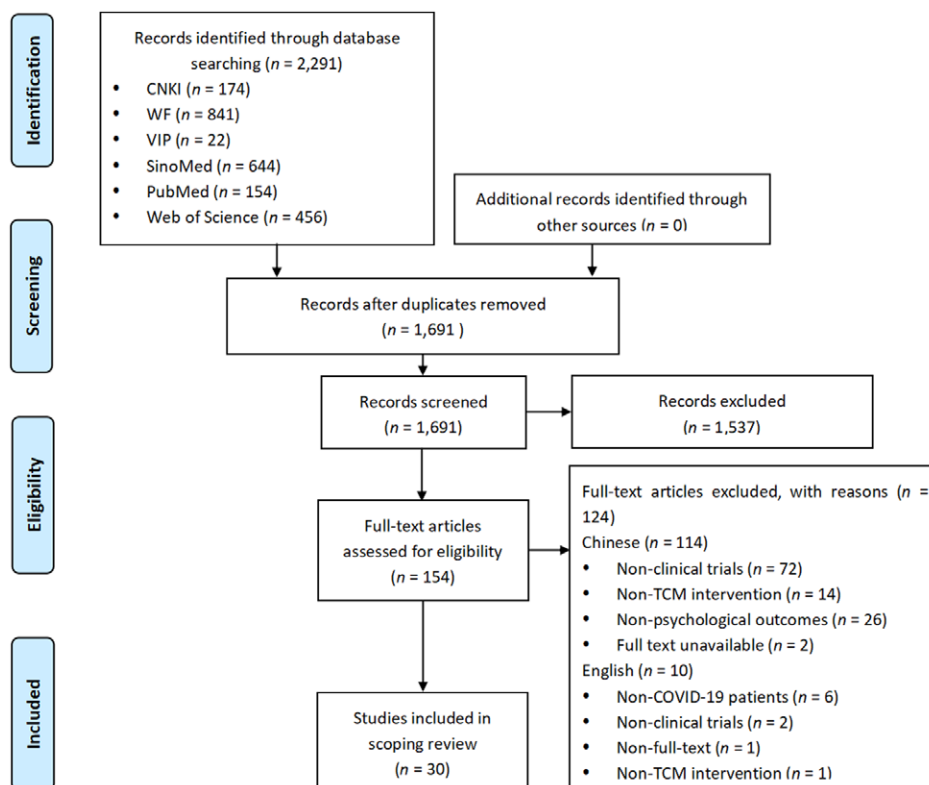

Figure 1. Flowchart of literature screening.

Table 1

Basic information of included studies

Author (year)	Type of study	Samples	Interventions (T vs. C)	Outcomes measures of mental health conditions
Chen 2020[20]	RCT	60	TCM nursing+CWM vs. CWM	③
Chen 2020[21]	RCT	32	TCM exercises+CWM vs. CWM	①②
Duan2020[22]	RCT	123	Chinese patent medicine+CWM vs. CWM	③
Gao 2020[23]	SA	132	Acupoint stimulation+TCM exercises+CWM (single arm)	④⑤⑧
Huang 2020[24]	SA	42	Moxibustion+CWM (single arm)	⑪
Ju 2022[25]	RCT	63	TCM psychological therapy+TCM exercises+CWM vs. CWM	⑥⑨
Li 2020[26]	SA	374	TCM psychological therapy + characteristic technology assisted treatment (single arm)	②③⑩
Li 2021[27]	Prospective cohort study	108	TCM exercises+CWM vs. CWM	③
Li 2021[28]	RCT	160	Acupoint stimulation+TCM exercises+CWM vs. Acupoint stimulation+CWM vs. CWM	①②
Li 2021[29]	RCT	60	TCM psychological therapy+TCM exercises vs. CWM	①③④
Li 2021[30]	RCT	64	Acupoint stimulation vs. CWM	①⑲
Li2021[31]	RCT	118	Decoction or granules based on TCM syndrome differentiation+Moxibustion+CWM vs. CWM	①②⑭
Luo 2021[32]	SA	28	Acupoint stimulation+TCM exercises+CWM (single arm)	①②④⑬
Luo2021[33]	Retrospective cohort study	84	Acupoint stimulation+CWM vs. CWM	⑰⑱
Shi 2020[34]	RCT	60	TCM nursing+CWM vs. CWM	①②
Wu 2020[35]	RCT	120	TCM exercises+CWM vs. CWM	①
Wu2020[36]	Retrospective cohort study(protocol)	300	Decoction or granules of fixed formulae+CWM vs. CWM	⑥⑮
Wei 2021[37]	SA	34	Decoction or granules based on TCM syndrome differentiation+CWM (single arm)	③
Xu 2020[38]	SA	80	TCM exercises+CWM (single arm)	①②
Xu 2020[39]	SA	213	TCM exercises (single arm)	⑤⑧
Yan 2020[40]	RCT(protocol)	120	Decoction or granules of fixed formulae+Moxibustion+CWM vs. CWM	①②⑦
Yang 2020[41]	RCT	110	Acupoint stimulation+TCM exercises+CWM vs. CWM	①②⑦
Yang 2021[42]	RCT	88	Decoction or granules based on TCM syndrome differentiation+Acupoint stimulation vs. CWM	①②
Yang 2021[43]	RCT	90	Acupoint stimulation+TCM exercises+CWM vs. CWM+Estazolam Tablets	①②④
Zeng 2020[44]	CCT	229	Decoction or granules of fixed formulae+CWM vs. CWM	①②
Zhang 2021[45]	SA	42	TCM nursing (single arm)	⑯
Zheng 2021a[46]	RCT	60	TCM psychological therapy+Acupoint stimulation+TCM exercises+CWM vs. CWM	①②
Zheng2021b[47]	RCT	60	TCM psychological therapy+Acupoint stimulation+TCM exercises+ TCM nursing vs. TCM nursing	③
Zhou 2021[48]	SA	72	Decoction or granules based on TCM syndrome differentiation+CWM (single arm)	⑫
Zhao 2022[49]	RCT	58	Moxibustion+CWM vs. CWM	①②

RCT: Randomized controlled trial; SA: Single-arm study; CCT: Non-randomized controlled clinical trial; TCM: Traditional Chinese medicine; CWM: Conventional western medicine; ① SAS: Self-rating anxiety scale; ② SDS: Self-rating depression scale; ③ HAMA/HAMD: Hamilton anxiety scale/Hamilton depression scale; ④ PSQI: Pittsburgh sleep quality index; ⑤ PHQ-9: Patient health questionnaire; ⑥ DASS: Depression, anxiety and stress scale; ⑦ Medical Outcomes SF-36: Medical Outcomes Study 36-Item Short-Form Health Survey; ⑧ HHI: Herth hope index; ⑨ Questionnaire based on the five moods of TCM; ⑩ SCL90: The self-report symptom inventory-symptom checklist 90; ⑪ PANAS: The Positive and Negative Affect Scale; ⑫ WHOQOL-BREF: The World Health Organization Quality of Life; ⑬ GQOLI-74: Generic Quality of Life Inventory 74; ⑭ SF-12: Medical Outcomes Study 12-Item Short-Form Health Survey; ⑮ LSAs: Liebowitz social anxiety scale; ⑯ Analysis of nursing effect—insomnia and anxiety; ⑰ The SMH(St. Mary's Hospital) sleep questionnaire; ⑱ The GAD-7 scale (range, 0–21): 7-Item Generalized Anxiety Disorder; ⑲ ISI: Insomnia severity index.

granules based on TCM syndrome differentiation, TCM nursing, decoction or granules with fixed formulae, and Chinese patent medicine. TCM exercises (Yijinjing, Baduanjin, Liuzijue, and Taichi, $n = 14$), and acupoint stimulation (auricular and body points, $n = 10$) were the most frequently used.

In terms of outcomes, these study focused on the analysis of mental health outcome measures. The self-rating anxiety scale (SAS) ($n = 16$), self-rating depression scale (SDS) ($n = 14$), and Hamilton anxiety scale/Hamilton depression scale (HAMD)($n = 7$) were the main outcome assessment tools. Among the 30 studies, 27 studies reported positive outcomes, and 2 protocols and 1 study did not report significant results.

Details of the included TCM studies (study type, objective, theme, sample size, participants, comparisons, primary funder, and study status) are presented in Table 2. The TCM interventions and mental health outcome measures included in the TCM studies are presented in Table 3.

TCM interventions with potential value

The components of TCM interventions are presented in Supplemental Digital Content 2, http://links.lww.

Table 2
The characteristics of included TCM studies

	Items	Details	Number of study	Percent (%)
Study type		RCT	16	53.3
		SA (prospective study 8, case series 1)	9	30.0
		Cohort study (prospective cohort study 1, retrospective cohort study 1)	2	6.7
		Protocol (retrospective cohort study 1, RCT 1)	2	6.7
		CCT	1	3.3
Objective	Therapy[a]	Mental health of COVID-19 patient-external treatment of TCM[d]	14	46.7
		The period of COVID-19-TCM	2	6.7
		The period of COVID-19-integrated TCM and WM	2	6.7
		Mental health of COVID-19 patient-TCM	1	3.3
		Mental health of COVID-19 patient-integrated TCM and WM	1	3.3
		The period of COVID-19-external treatment of TCM	1	3.3
	Nursing[b]	Mental health of COVID-19 patient-TCM nursing[e]	4	13.3
		The period of COVID-19-TCM nursing	1	3.3
		The period of COVID-19 recovery-TCM nursing	1	3.3
	Rehabilitation[c]	The period of COVID-19 recovery-TCM	2	6.7
		The period of COVID-19 recovery-integrated TCM and WM	1	3.3
Theme		Mental health of COVID-19 patients	20	66.7
		Others	10	33.3
Sample size		>200	4	13.3
		101–200	8	26.7
		50–100	13	43.3
		<50	5	16.7
Participants		Psychological assessment was included in the inclusion criteria	9	30.0
		Psychological assessment was not included in the inclusion criteria	21	70.0
Comparisons (T vs. C)	A + B vs. B[*]	TCM exercises + CWM vs. CWM[f]	3	10.0
		Decoction or granules of fixed formulae + CWM vs. CWM	2	6.7
		TCM nursing + CWM vs. CWM	2	6.7
		Moxibustion + CWM vs. CWM	1	3.3
		Chinese patent medicine + CWM vs. CWM	1	3.3
		Acupoint stimulation + CWM vs. CWM	1	3.3
	A + B vs. C[*]	TCM psychological therapy + TCM exercises vs. CWM	1	3.3
		Decoction or granules based on TCM syndrome differentiation + Acupoint stimulation vs. CWM	1	3.3
	A + B + C vs. C[*]	Decoction or granules of fixed formulae + Moxibustion + CWM vs. CWM	1	3.3
		TCM psychological therapy + TCM exercises + CWM vs. CWM	1	3.3
		Decoction or granules based on TCM syndrome differentiation + Moxibustion + CWM vs. CWM	1	3.3
		Acupoint stimulation + TCM exercises + CWM vs. CWM	1	3.3
	A + B + C vs. C + D[*]	Acupoint stimulation + TCM exercises + CWM vs. CWM + Estazolam Tablets	1	3.3
	A + B + C vs. A + C vs. C[*]	Acupoint stimulation + TCM exercises + CWM vs. Acupoint stimulation + CWM vs. CWM	1	3.3
	A + B + C + D vs. D[*]	TCM psychological therapy + Acupoint stimulation + TCM exercises + CWM vs. CWM	1	3.3
		TCM psychological therapy + Acupoint stimulation + TCM exercises + TCM nursing vs. TCM nursing	1	3.3
	A vs. B[*]	Acupoint stimulation vs. CWM	1	3.3
	Single arm	Decoction or granules based on TCM syndrome differentiation + CWM	2	6.7
		Acupoint stimulation + TCM exercises + CWM	2	6.7
		TCM psychological therapy + Characteristic technology assisted treatment	1	3.3
		TCM exercises + CWM	1	3.3
		TCM exercises	1	3.3
		Moxibustion + CWM	1	3.3
		TCM nursing	1	3.3
Primary sponsor		TCM hospital	14	46.7
		TCM college	7	23.3
		WM hospital	7	23.3
		TCM and WM hospital	2	6.7
Study status		Finished	28	93.3
		Protocol	2	6.7

RCT: Randomized controlled trial; SA: Single-arm study; CCT: Non-randomized controlled clinical trial; CWM: Conventional western medicine; a: reported to be used for treatment or hospitalized patients, without rehabilitative stage. b: reported to be used for rehabilitation, discharged patients, or convalescent patients. c: reported to be used for nursing care explicitly. d: TCM exercise, acupuncture, moxibustion, massage, or TCM psychological therapy. e: dialectical care, dialectical diet, and psychological counseling, etc. f: regular nursing, conventional psychological care (Western Medicine), western medicine, isolation/symptomatic treatment, health education, nutritional intervention, oxygen therapy.
*A, B, C, and D refer to different interventions. Take the letter "A" as an example. The same letter "A" refers to the same intervention in a specific comparison. However, the same letter "A" refers to different interventions in different comparisons.

com/AHM/A29. The interventions found in all included studies were categorized into eight main groups: TCM exercises, acupoint stimulation, moxibustion, decoction or granules based on TCM syndrome differentiation, decoction or granules with fixed formulae, Chinese patent medicine, TCM psychological therapy, TCM nursing.

TCM Exercises

Yijinjing consists of 12 forms and is a new fitness technique created by the Fitness Qigong Management Center of the General Administration of Sport of China. This technique stretches muscles and regulates breathing[50]. One SA[32] reported the effect of auricular acupoint combined with Yijinjing on the psychological health of COVID-19 patients. The outcomes revealed that auricular acupoint + Yijinjing significantly improved the stress, affective disorders, sleep quality, and quality of life of patients who suffered from mild COVID-19 ($P < 0.05$). It is emphasized that patients should start learning Yijinjing after their condition becomes stable. The main points of the exercise include the regulation of breathing and the coordination of movement and consciousness.

Baduanjin is a traditional Qigong breathing exercise in TCM[51]. Baduanjin was mentioned by 11 studies[20–21,23,27–28,35,38,41,43,46–47], of which seven considered the mental health effects of COVID-19 patients who practiced Baduanjin as the research theme[21,23,28,35,38,41,43]. One trial was a Sitting-Baduanjin (in bed) trial[21]. Results from seven studies suggested that Baduanjin combined with CWM or acupoint stimulation could improve mental health in patients with COVID-19 patients ($P < 0.05$).

Liuzijue, one of the TCM exercises in China, can regulate one's breathing by Qigong and is considered as good alternative home exercise program. Elderly individuals undergoing rehabilitation for chronic obstructive pulmonary disease (COPD) should practice Liuzijue[52]. A 6-month study reported that lung function and quality of life of elderly patients suffering from COPD improved after practicing Liuzijue[52]. One study observed the effects of TCM five-tone therapy combined with Liuzijue on negative emotions in patients with COVID-19[29]; this trial showed that TCM five-tone therapy + Liuzijue relieved negative emotions such as depression and anxiety measured by the HAMD, SAS ($P < 0.05$). Moreover,

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Table 3

TCM interventions and outcome of mental health in included TCM studies

Items	Details	Frequency
TCM interventions	TCM exercises (Yijinjing, Baduanjin, Liuzijue, Taichi)	14
	Acupoint stimulation(Auricular points, Body points)	10
	TCM psychological therapy (TCM idea therapy, TCM five-tone therapy, TCM psychological sand table)	5
	Moxibustion	4
	Decoction or granules based on TCM syndrome differentiation	4
	TCM nursing (dialectical care, dialectical diet, psychological counseling, etc)	4
	Decoction or granules of fixed formulae (Baidu Jieduan Granule, Xuanfei Baidu decoction, Qingfei Paidu decoction)	3
	Chinese patent medicine (Jinhua Qinggan granules)	1
Outcome measure of mental health	SAS	16
	SDS	14
	HAMA/HAMD	7
	PSQI	4
	PHQ-9	2
	DASS	2
	SF-36	2
	HHI	2
	Questionnaire based on the five moods of TCM	1
	The self-report symptom inventory-symptom checklist 90, SCL90	1
	PANAS	1
	WHOQOL-BREF	1
	GQOLI-74	1
	SF-12	1
	LSAs	1
	Analysis of nursing effect—Insomnia and anxiety	1
	The SMH sleep questionnaire	1
	The GAD-7 scale (range, 0–21)	1
	ISI	1

TCM:Traditional Chinese medicine; SAS: Self-rating anxiety scale; SDS: Self-rating depression scale; HAMA/HAMD: Hamilton anxiety scale/Hamilton depression scale; PSQI: Pittsburgh sleep quality index; PHQ-9: Patient health questionnaire; DASS: Depression, anxiety and stress scale; SF-36: Medical Outcomes Study 36-Item Short-Form Health Survey; HHI: Herth hope index; SCL90: The self-report symptom inventory-symptom checklist 90; PANAS: The Positive and Negative Affect Scale; WHOQOL-BREF: The World Health Organization Quality of Life; GQOLI-74: Generic Quality of Life Inventory 74; SF-12: Medical Outcomes Study 12-Item Short-Form Health Survey; LSAs: Liebowitz social anxiety scale; GAD-7: 7-Item Generalized Anxiety Disorder; SMH: St. Mary's Hospital; ISI: Insomnia severity index.

this treatment improved sleep quality, measured by Pittsburgh sleep quality index (PSQI), relaxed the body and mind, and promoted patient recovery ($P < 0.05$).

Taichi, which is a type of traditional Chinese shadow boxing, was named for its variable boxing forms, and its theory originated from ancient Chinese philosophical theories of "*yin* and *yang*" and "Taichi." Patients with moderate COVID-19 who were admitted to shelter hospitals during the COVID-19 epidemic were trained in Taichi regularly by experienced TCM doctors[53]. Taichi was mentioned in four studies[20,39,46–47], one of which examined the roles that Taichi played on the resilience and level of hope in patients with COVID-19 in shelter hospitals[39]. The results revealed that Taichi relieved psychological pressure (relieved depression, improved hope levels, and promoted a positive attitude towards the disease) in patients with COVID-19 ($P < 0.05$).

Acupoint stimulation

In this study, "TCM Massage" was defined as "Body Acupoint." Body acupoint was mentioned in four studies[20,23,41–42]. Three studies used integrated interventions that evaluated the effects of body acupoint combined with another TCM intervention on the psychological health state of patients with COVID-19 as the research theme[23,41–42]. The outcomes revealed that body acupoint + Baduanjin improved hope levels, sleep quality, and nursing satisfaction and alleviated depression for patients with COVID-19 ($P < 0.05$)[23,41]. Moreover, body acupoint + TCM nursing improved the anxiety and depression expressed by patients who suffered from COVID-19 ($P < 0.05$)[42].

Auricular acupoints are the acupoints distributed on the auricle and are stimulated in acupuncture therapy, which is one of the commonly used TCM therapies. The acupoints are stimulated by sticking a small seed of *Vaccaria segetalis* on the applicable acupressure point of the ears for a period of time with an adhesive material to free neurotransmitters from neurons and regulate the functions of the endocrine system and viscera. Uncomfortable symptoms could be alleviated using this simple treatment, which applies to a variety of diseases[54]. Auricular acupoint was mentioned by seven studies[28,30,32–33,43,46–47], with two studies evaluating the role of auricular acupoint on the psychological health state of patients with COVID-19 as the research theme[30,33]. Two studies reported that the symptoms of patients with COVID-19, including insomnia, sadness, depression, and anxiety, were alleviated by stimulating auricular acupoints. Three studies[28,32,43] investigated the role of auricular acupoint combined with another TCM intervention influenced the psychological health state of patients who were infected by COVID-19 as the study theme. Three studies reported that the mental state and sleeping quality of patients with COVID-19 were ameliorated by compound therapy (auricular acupoints + Baduanjin) during hospitalization or recovery. Auricular acupoints + Baduanjin was superior to conventional psychological interventions, auricular acupoints alone[28] or Western medicine ($P < 0.05$)[43]. Moreover, auricular acupoints + Yijinjing significantly improved the stress affective disorder, sleep quality, and quality of life of patients with mild COVID-19 ($P < 0.05$)[27]. The other two studies[46–47] focused on the effects of auricular acupoints + comprehensive TCM interventions on the psychological health state of patients with COVID-19. The studies' results demonstrated that treatment could reduce the fear and negative emotions of patients with COVID-19($P < 0.05$).

Moxibustion

Moxibustion, which is a simple and inexpensive method of TCM treatment, stimulates acupoints to dredge meridians by using the heat generated by burning moxa and is one of the traditional therapies recommended by the China Association of Acupuncture-Moxibustion[55]. Moxibustion was mentioned by four studies[24,31,40,49], two of which focused on the influence of moxibustion on the psychological health state of patients who suffered from COVID-19[24,49]. The results demonstrated that moxibustion could alleviate not only the passive moods but also the chest stuffiness and inappetence accompanied by patients with COVID-19 ($P < 0.05$). This approach is widely used by clinicians because of its non-invasive nature and is generally recognized by patients, thus making it easy to recommend. One study focused on the treatment outcome of comprehensive TCM interventions applied to patients recovering from COVID-19, but the outcomes did not exhibit statistical significance[31]. The other study was a protocol[40].

Decoction or granules based on TCM syndrome

Four kinds of decoctions or granules formulated by TCM syndrome differentiation were included in this study. Shenling Baizhu granules[40], Qingzao Jiufei decoction[48], Shenling Baizhu granules + Yiqi Huoxue granules[31], and Yinqiao granules + Dayuan decoction[37] were the basic formulae used in TCM syndrome differentiation. The outcomes indicated that the quality of life of patients with COVID-19 could be improved by using Qingzao Jiufei decoction combined with Western medicine ($P < 0.05$)[48], and Yinqiao granules + Dayuan decoction combined with Western medicine could improve negative syndrome and anxiety ($P < 0.05$)[37]. The study of Shenling Baizhu granules[40] was a protocol, and the study of Shenling Baizhu granules + Yiqi Huoxue granules[31] did not report statistically significant results.

Decoction or granules with fixed formulae

Three kinds of decoction or granules with fixed formulae were included in this study. Qingfei Paidu decoction has been listed as a recommended recipe in the guidelines for the treatment of mild, moderate, severe, and critical COVID-19 on February 7, 2020[56]. In combination with Western medicine, this treatment improved negative psychology and reduced the emergence of complications in patients with COVID-19 who had phlegm-heat obstruction of the lungs ($P < 0.05$)[44]. Xuanfei Baidu decoction was also an effective intervention for

COVID-19[57]. In combination with Western medicine, this treatment improved negative syndrome and anxiety ($P < 0.05$)[37]. The study of Baidu Jieduan granule was a protocol[36].

Chinese patent medicine

Jinhua Qinggan granules have been listed as a recommended recipe in the Novel Coronavirus Diagnosis and Treatment Protocol (Trial Edition 5), which was jointly released by the National Health Commission and National Administration of TCM in China[58]. Jinhua Qinggan granules combined with CWM significantly improved the clinical symptoms and anxiety of patients with mild COVID-19 ($P < 0.05$)[22].

TCM psychological therapy

TCM idea therapy is based on the theory of five elements and uses mutual generation and restriction of five elements to regulate the balance of five emotions (anger, joy, anxiety, sadness, and fear). A nurse acts as the intervener to perform treatment on patients instead of the patient performing self-regulation. TCM idea therapy is usually combined with other TCM interventions and was mentioned in three studies[20,25,34]. The outcomes revealed that TCM idea therapy alleviated negative emotions (depression, anxiety, and stress) and promoted treatment efficacy ($P < 0.05$).

TCM 5-tone therapy was mentioned in four studies[29,34,46–47], with one study investigating the effect of TCM 5-tone therapy on the psychological health state of patients with COVID-19[29]. The outcomes revealed that TCM five-tone therapy + Liuzijue reduced the HAMD, SAS, and PSQI scores, thus relieving the depression, anxiety, and other negative emotions, improving the sleep quality, and relaxing the body and mind of patients with COVID-19 ($P < 0.05$).

TCM psychological sand table is a type of game intervention technology that diverts the attention of patients to regulate emotions *via* the accumulation of sand[26]. One study focused on the effects of TCM psychological sand table on the improvement of depression and anxiety in patients with COVID-19. The outcomes revealed that the mental symptoms of patients with COVID-19 improved after treatment ($P < 0.05$)[26].

TCM nursing

Dialectical care originates from "Holism" and "Treatment Based on Syndrome Differentiation". It was included in a treatment plan of TCM featuring humanistic care[47] that exerted positive effects improving the psychological health state of patients with COVID-19 ($P < 0.05$).

TCM believes that diet is the source of energy for the body's limbs and viscera. Dialectical diet refers to providing reasonable dietary guidance according to the symptoms and characteristics of COVID-19 patients, so as to regulate the human body's *qi*, blood, *yin* and *yang* and promote the rehabilitation. For example, patients with lung-heat congestion need to eat food (lotus seeds and lily bulbs, etc.) that nourish their lungs. Dialectical

diet was mentioned in three studies[20,34,45] that reported positive effects on the psychological health state of patients with COVID-19 ($P < 0.05$). However, dialectical diet was one of the TCM nursing methods applied to the patients, no study has only used dialectical diet as a research theme. The studies reported that diet design need to be based on symptoms or TCM constitution, and the dietary principle was "eating less, more meals, easy digestion, and rich nutrition."

Psychological counseling was mentioned by four studies that reported positive effects on the psychological health state of patients with COVID-19 ($P < 0.05$). However, psychological counseling was one of the TCM nursing methods applied to the patients, and no study has only used psychological counseling as a research theme. The interventions predominantly involved communication[20], watching videos[42], and health education (knowledge of COVID-19[34] and building confidence[38]).

Quality assessment

ROB assessment tool

The assessment results of bias risk based on the ROB assessment tool related to the 17 included RCTs are shown below. The results are depicted in Supplementary Appendix 1, http://links.lww.com/AHM/A29. For the generation of random sequence, 13 studies were rated as low risk because the authors detailed how to correctly generate random sequence numbers[20–22,25,28–31,35,40–43]. Three RCTs lacking this description were considered as unclear risk[34,46,49]. One was considered high risk because of random method errors[47].

In terms of allocation concealment, 15 RCTs were considered unclear risk[20–22,25,28–31,34,35,40–42,46,49] because of the lack of adequate description, whereas two RCTs implemented allocation concealment by using the closed envelope method or one dedicated person and were considered low risk[43,47].

For the blinding of participants and personnel, one RCT reported the details to hide the interventions to the researchers and was assessed as low risk[43], whereas 16 RCTs did not blind the investigator and the subject and were assessed as high risk[20–22,25,28–31,34–35,40–42,46–47,49].

In terms of outcome assessment blinding, the outcomes of five RCTs were detected without subjectivity[20–21,35,40,49], and one RCT arranged a dedicated person to assess and analyze outcomes[29]; these RCTs were considered low risk. The 11 remaining RCTs evaluated results by using both subjective and objective indicators and were considered unclear risk[22,25,28,30–31,34,41–43,46–47].

In the terms of the integrity of outcome data, no missing data appeared in the outcome of 15 RCTs; hence, these studies were considered low risk[20–22,25,28–30,34–35, 41–43,46–47,49]. One RCT was assessed as high risk because of high drop-out rates[31], and one RCT was unable to assess this item because it was a protocol[40].

In regard to selective reporting, 16 RCTs were considered low risk by evaluating if these studies have differences in the methods and outcomes sections[20–22,25,28–31,34–35,41–43,46–47,49], and one RCT was not assessed because it was a protocol[40].

For other biases, three RCTs were considered low risk because of detailed information on registration and

conflict of interest[25,31,40], seven RCTs were considered unclear risk because of the absence of registration or conflict-of-interest description[22,29–30,34,43,46–47], and seven RCTs were considered high risk because of the absence of descriptions related to registration and conflict of interest[20–21,28,35,41–42,49].

MINORS

MINORS includes 12 items. Among them, the first eight items are applicable to SA (the total score is 16 points). All 12 items are applicable to CCT (the total score is 24 points). The assessment results of nine SAs and one CCT are depicted in Supplementary Appendix 2, http://links.lww.com/AHM/A29.

The lowest and highest scores of the included SAs were five and eight points, respectively. The average score was 7.33 points. Among the SAs, nine clearly stated the study aim at the beginning of the article and gained two points. With regard to the inclusion of consecutive patients, seven SAs described the detailed process of patient screening and gained two points[23–24,32,38–39,45,48], whereas two SAs only described the inclusion or exclusion details and gained one point[26,37].

In regard to prospective data collection, the data of seven SAs were gathered according to a pre-designed protocol; thus, these studies gained two points in this item[23–24,32,37–39,48]. One SA merely collected a portion of the data and was given one point[26], and the remaining SA did not report data collection in the methods section and was given 0 points[45]. With regard to endpoints appropriate for the study aim, eight SAs introduced the evaluation criteria of outcomes and were given two points[23–24,32,37–39,45,48], whereas the evaluation criteria in one SA were unclear and was rated with one point[26]. With regard to the rest of the items (unbiased assessment of the study endpoint, follow-up period appropriate to the study aim, loss to follow-up less than 5%, and prospective calculation of study size), nine SAs gained 0 points.

The included CCTs gained 16 points in total[44]. The first and last four items were both rated with two points. This CCT did not implement the blinding of outcome assessment, estimate sample size in advance, or report follow-up situations; thus, the other items were rated with 0 points.

Newcastle–Ottawa scale

The quality assessment of three cohort studies is depicted in Supplementary Appendix 3 http://links.lww.com/AHM/A29. The NOS includes eight items, and the ideal global score is nine points. Among the three cohort studies, one was a protocol, and the other two studies each scored six points. Regarding the representativeness of the exposed cohort, three cohort studies included the exposed population with representativeness and were rated with one point. For the selection of the non-exposed cohort, the non-exposed and exposed groups were obtained from the homogeneous population; thus, the three cohort studies were rated with one point.

With regard to the ascertainment of exposure, the exposed population was hospitalized patients with

reliable medical records; thus, three cohort studies were rated with one point. No outcome was observed before the study, and the three cohort studies were rated with one point. For comparability, two cohort studies were rated with one point because they were comparable in the baseline of groups[27,36], and one cohort study was rated with two points because other key confounding factors were controlled[33].

For outcome assessment, two cohort studies blinded assessors to the study outcomes and were rated with one point[27,36]; another study was rated with 0 points[33]. Regarding follow-up duration, one cohort study followed up patients for 1 year and was rated with one point[36]; the other two studies were rated with 0 points[27,33]. In terms of adequacy of follow-up of cohorts, two cohort studies did not follow up patients and were rated with 0 points[27,33], whereas one study was a protocol and was unable to be assessed for this item[36].

Discussion

We conducted a scoping review on TCM interventions for the psychological health state of patients with COVID-19. The results of the included studies provided ponderable evidence for the role of TCM on the psychological health state of patients who suffered from COVID-19. TCM treatments were a more common research theme than TCM nursing interventions. Yijinjing, Baduanjin, Liuzijue, Taichi, body acupoint (TCM massage), auricular acupoint, and moxibustion are non-drug interventions with standardized operations that were considered safe and reliable by the included studies. In particular, Baduanjin combined with auricular point sticking therapy improved the mental health of patients with COVID-19, as shown by the SAS, SDS, and PSQI scores. Although the overall quality of all included studies was low, the Baduanjin studies obtained the better-quality assessment comparing with other interventions. TCM psychological therapy, TCM nursing, and their sub-interventions are based on TCM theory. Their therapeutic features were pattern identification and syndrome differentiation, which can vary for each individual, as well as improved clinical efficacy. What's more, decoction or granules based on TCM syndrome differentiation, fixed formulae, or Chinese patent medicine produced positive effects on the mental health of patients who suffered from COVID-19. However, the studies were deficient, which focus on the improvement of psychological problems majorly, instead of the variation of symptoms and signs. Hence, more research is required before implementation in clinical practice.

There were several studies on the field, which are important, because many researchers are trying to shed light on this topic. But, due to the currently methodological quality of the included studies, the evidence level is not robust enough. For RCTs, "Blinding of patients and personnel" and "Other bias" were predominantly evaluated as "high risk." For SAs and CCTs, none of the studies performed "Unbiased assessment of the study endpoint," "Follow-up period appropriate to the aim of the study," "Loss to follow-up less than 5%," and "Prospective calculation of the study size."

Furthermore, for the included cohort studies, the follow-up was not performed. This could be due to the particularity of COVID-19 (such as concentrative isolation and rotation of medical workers), thus precluding the possibility to perform an adequate follow-up. Notably, the reliability of the evidence was also affected by following: in the list of key details, the reported ethics approval rate did not reach 50%. Moreover, the rates of registered information, sample size estimation, conflict-of-interest statement, and GCP training were less than 20%, thus highlighting gaps in the studies process that need to be addressed. The propose of conducting more studies with higher methodological quality needs to be emphasized.

Considering that the standard for judging outcomes were non-objective (evaluation scales), the presentation of pivotal details in certain studies was inadequate, and opportunely updates on the current situation of research were absent. Therefore, evaluation biases probably exist in the clinical value of TCM for patients who suffered from COVID-19 in the aspect of psychological health state.

Strength and limitations

This study has several strengths and limitations. To our knowledge, this is the first study giving an overview of the literature published on this topic and can constitute a starting point for future research. We collected TCM interventions comprehensively and evaluated the quality of evidence to explore the evidence status and further development. This study focuses on the outcome to reflect the TCM clinic value, some of the included studies' theme was not mental health, but their outcomes included mental health assessment, which can provide more explorative possibilities for TCM improving the mental health of patient with COVID-19. Specifically, we also paid close attention to some TCM interventions that usually were ignored in other studies, such as TCM exercise.

Also, several limitations should be considered. We included solely articles with available full text, thus potentially limiting the number of studies included. Moreover, this scoping review did not consider gray literature, which may have excluded some of the existing literature published on this topic. Individual included studies directly compared one or more TCM with one or more CWM. For these studies, the conclusions that TCM interventions can relieve mental health were with a potential bias on the interpretation of the results[29–30,42–43]. Thus, suggesting more studies that focus on an adequate comparison. The overall methodological quality of included studies was low, the evidence level was not robust enough.

Conclusions

In conclusion, our review summarized the existing literature outcomes of studies demonstrating the effect about the impact of TCM focus on the mental health of patients with COVID-19. The number of studies evaluating the impact of TCM on mental health is encouraging, but the overall methodological quality was low and some comparisons were inappropriate. Therefore, several TCM interventions warrant further evaluation, particularly among populations outside of China, to establish supporting evidence. More importantly, studies with stronger methodological quality need to be developed.

Conflict of interest statement

This article only represents the authors' personal opinions, and does not represent any involvement of the bodies or authorities of affiliation. All authors have not received any fee or reimbursement for participating in the study and writing this article.

Author contributions

Zhaochen Ji and Haiyin Hu conceived, designed, and drafted this article. Hui Wang conceived, designed the study and revised the manuscript. Alice Josephine Fauci performed the methodological design and revised the manuscript. Masayoshi Okada gave suggestions and revised the manuscript. Marco Di Nitto polished the manuscript. Danlei Wang and Kai Li retrieved the database, screened the literature, extracted the data, and assessed the data quality.

Ethical approval of studies and informed consent

Not applicable.

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