


# How Can Alternative Exercise Traditions Help Against the Background of the COVID-19 in Cancer Care? An Overview of Systematic Reviews

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**Purpose:** To evaluate the quality of systematic reviews/meta-analyses (SR/MAs) on alternative exercise traditions in cancer care.

**Methods:** PubMed, Cochrane Library, Web of Science, Ovid, EBSCOhost, WanFang Database, China National Knowledge Infrastructure, and VIP Database were searched from their inception to June 30, 2020. The search used a combination of subject words and free words. The search terms included “Tai Chi,” “Qigong,” “Baduanjin,” “Yoga,” “Pilates,” “Cancer,” “Meta-analysis,” and “Systematic review.” Two researchers independently performed literature screening and data extraction and used AMSTAR scale and PRISMA statement to evaluate the methodology and the quality of the evidence.

**Results:** A total of 26 SR/MAs were included. The AMSTAR scale score was 5–10 points, with an average of 7.46±1.33 points. Overall, the methodological quality was considered to be moderate. The PRISMA list score was 13–24 points, with an average of 19.19±2.86 points. Among the papers evaluated, eight reports were relatively complete. A total of 15 papers indicated certain defects. A total of three papers showed relatively serious information defects.

**Conclusion:** Relative to the control group, alternative exercise traditions may be effective in improving the quality of life, anxiety, depression, distress, and fatigue of cancer patients. However, they may not necessarily improve patients' sleep outcome, body mass index, and pain. During convalescence, cancer patients can be encouraged to start engaging in physical exercise, and professionals can develop appropriate exercise alternatives to ensure the expected effect of exercise while ensuring the safety of patients. The methodological quality of the systematic evaluations of the intervention effects of alternative exercise traditions on cancer patients is not satisfactory. Hence, focus should be directed to the improvement of the preliminary design scheme, publication status, literature retrieval, conflict of interest, and other aspects.

**Keywords:** alternative exercise traditions, cancer care, COVID-19, overview

## Introduction

Cancer is one of the deadliest diseases in the 21st century.<sup>1</sup> It is characterized by high morbidity, high mortality, high treatment costs, and great difficulty in curing.<sup>2</sup> It has become a global public health burden.<sup>3</sup> In the United States alone, nearly 1,685,210 new cancer cases were detected in 2016, and nearly 595,690 people died of cancer.<sup>4</sup> Although treatment options have progressed well, the incidence and mortality of cancer are still increasing.<sup>5</sup> Estimates indicate that by 2025, the number

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of cancer patients could reach 20 million.<sup>4</sup> Those who survive cancer may experience persistent difficulties, including treatment side effects and physical, cognitive, and sociopsychological struggles.<sup>6</sup>

The World Health Organization recently declared coronavirus disease 2019 (COVID-19) as a global health emergency.<sup>7</sup> As malignant tumors and anticancer treatments (such as chemotherapy and surgery) reduce the immunity of cancer patients, cancer patients are more susceptible to infection than those who do not have cancer, and their prognosis is worse.<sup>8</sup> The pandemic has changed the routine cancer care, and clinicians must adapt and find the best way to deliver patient care.<sup>9</sup> In China, alternative exercise traditions play an important role in the fight against COVID-19. At the Wuhan Fangcang Hospital, patients with COVID-19 practiced alternative exercise traditions, such as Qigong and Tai Chi, under the guidance of Chinese medicine physicians and nurses.<sup>10</sup> This approach not only enhances the body's ability to resist pathogens but also helps improve the mood of medical staff and patients and establish confidence in jointly defeating the epidemic.<sup>11</sup>

In recent years, the number of related systematic reviews/meta-analyses (SR/MAs) of alternative exercise traditions for cancer patients has gradually increased. However, different SR/MAs have varying outcome indicators, literature quality, analysis methods, and levels of evidence. In general, the evaluation method is to conduct a comprehensive and systematic evaluation of the effects of alternative exercise traditions on cancer patients so as to provide a synthesis of clinical evidence and a basis for decision-making. As alternative forms of exercise are relatively easy to perform, patients with chronic diseases, such as cancer, may benefit from them, particularly in the context of the ongoing COVID-19 pandemic. This article attempts to explore this topic comprehensively to provide rehabilitation guidance and recommendations for patients in the recovery period.

## Materials and Methods

### Inclusion and Exclusion Criteria

#### Research Design

This research is about published SR/MAs of alternative exercise traditions for cancer.

#### Research Objects

Patients diagnosed with cancer are not limited by gender, age, race, time of onset, and source of cases.

### Intervention Measures

The intervention measures mainly involve at least one of the following alternative exercise traditions: Tai Chi, Qigong, Baduanjin, yoga, and Pilates, all of which can be supplemented by other forms of therapy.

### Outcome Indicators

The main outcome indicators include at least one of the following: 1) quality of life (QOL), 2) pain, 3) anxiety, 4) body mass index (BMI), 5) sleep outcome, 6) depression, 7) distress, and 8) fatigue.

### Exclusion Criteria

The exclusion criteria are as follows: 1) duplicate publications, 2) systematic review plan, 3) systematic review without a quantitative analysis in the included original research, and 4) non-Chinese or English literature.

## Search Strategy

A computer search of PubMed, Cochrane Library, Web of Science, Ovid, EBSCOhost, WanFang Database, China National Knowledge Infrastructure, and VIP Database was performed to filter and extract the SR/MAs that meet the inclusion criteria. The retrieval date was from the establishment date of each database to June 30, 2020. The search used a combination of subject words and free words. The search terms included "Tai Chi," "Qigong," "Baduanjin," "Yoga," "Pilates," "Cancer," "Meta-analysis," and "Systematic review." Take PubMed as an example.

Figure 1 shows the specific retrieval strategy.

## Literature Screening and Data Extraction

Two researchers (Yang Zhang and Fang Yao) conducted two independent rounds of screening by reading the title, abstract, and full text. They then extracted the data according to a predesigned Excel data extraction table. In case of a disagreement, the researchers conducted discussions and

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#1 Tai Ji OR T'ai Chi OR Tai Chi Chuan OR Tai Chi OR Tai Chi
  Quan OR Tai-ji OR Taiji OR Taijiquan
#2 Neoplasms OR Benign Neoplasms OR Cancer OR Malignancy
  OR Malignant Tumors OR Neoplasms OR Neoplasia OR
  Neoplasm OR Neoplasms OR Benign Tumors
#3 meta-analysis OR systematic review
#4 #1 AND #2 AND #3
```

Figure 1 PubMed search strategy.

consulted a third party to resolve the issue. The data extraction content included 1) basic information, including the first author's name, publication year, first author's country of origin, number of included articles, sample size, quality evaluation tools, intervention measures, control measures, outcome indicators, and research results; 2) methodology of SR/MAs, including the literature search, included studies, research samples, and methodological quality evaluation of included studies; and 3) statistical analysis results, mainly the quantitative analysis results for each outcome indicator.

## Evaluation of Methodological Quality and Evidence Quality of Included Studies

The AMSTAR scale was used to carry out the evaluation of the methodological quality of the included SR/MAs. The PRISMA scale was utilized to evaluate the report quality. The items in the AMSTAR scale indicated "full report," "partial report," or "not reported." Fully meeting the AMSTAR item explanation and the comprehensive consideration of the unsatisfied parts will not cause significant deviations in the results; hence, the use of the label "full report," which is equivalent to 1 point. A "partial report" means that a part of the AMSTAR item meets the AMSTAR scale but suffers from major defects; the score in this case is 0.5. The label "not reported" is counted as 0 point. The scale

has a total of 11 points. The AMSTAR scale scores of 0–3 indicate low quality, scores of 4–7 indicate moderate quality, and scores of 8–11 indicate high quality.<sup>12,13</sup>

Each item of the PRISMA scale is described with 1 point for "complete report," 0.5 point for "partial report," and 0 point for "unreported"; the total score is 27 points. When the literature score is 21–27, the report is considered to be relatively complete. When the score is 15–21, the report is considered to be flawed. When the score is  $\leq 15$ , the report lacks sufficient information.<sup>14</sup>

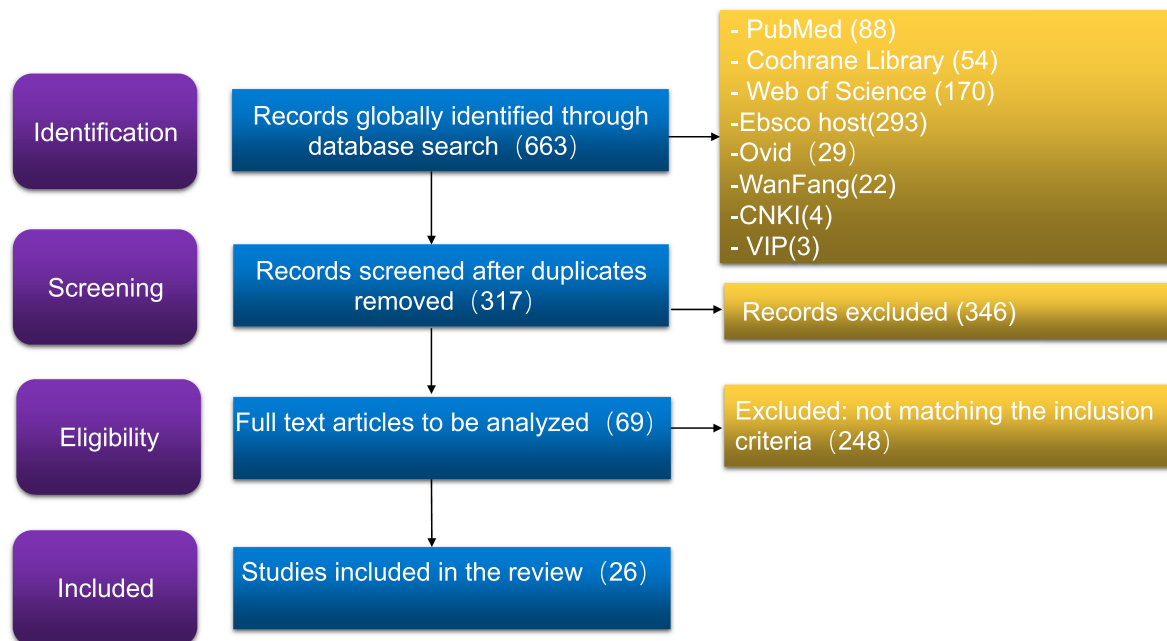
## Results

### Identification and Selection of Reviews

The total number of related articles in the database was 663; 317 of these articles were retained after removing the duplicates. After reading the titles and abstracts of the remaining articles to exclude irrelevant ones, 69 documents were obtained. Reading the full text content yielded 26 articles, which were finally included in the study. The literature screening process and results are shown in Figure 2.

### Characteristics of Included Reviews

The 26 SR/MAs included 22 English articles<sup>15–36</sup> and 4 Chinese articles.<sup>37–40</sup> The publication years ranged from 2007 to 2020, with 12 articles published in the last 5 years. Of the 26 SR/MAs, 13 focused on yoga,



**Figure 2** The PRISMA flow diagram of study inclusion in the review.

**Notes:** PRISMA figure adapted from Liberati A, Altman D, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *Journal of clinical epidemiology*. 2009;62(10). Creative Commons.<sup>41</sup>

12 focused on Tai Chi, 5 focused on Qigong, and 2 focused on Pilates. All SR/MAs evaluated the methodological quality of the included original studies; 17 used the Cochrane criteria, 3 did not mention the quality criteria of their evaluation, 2 used the Jadad scale, 3 used the PEDro criteria, and 1 used the NIH Quality Assessment. The basic characteristics included in the SR/MAs are shown in Table 1. The clear outcome results of the included SR/MAs are shown in Table 2.

## AMSTAR Evaluation Results

The AMSTAR scale was used to evaluate the methodological quality of the included SR/MAs. As shown in Table 3, the AMSTAR scale scores of the 26 SR/MAs ranged from 5 points to 10 points, with an average of  $7.46 \pm 1.33$  points. Among them, 16 received  $\geq 8$  points, which indicated high-quality studies that accounted for 61.5% of the total number; 10 of the articles were moderate-quality studies (4–7 points), and they accounted for 38.5%. Generally, the methodological quality was regarded as moderate. No literature fully met the requirements of the 11 items in the AMSTAR scale. Relatively complete reports ( $\geq 70\%$ ) included entry 2 (80.8%), entry 5 (88.5%), entry 6 (100%), entry 7 (96.2%), entry 8 (100%), and entry 9 (100%).

## PRISMA Evaluation Results

As shown in Table 4, the PRISMA scores of the 26 SR/MAs ranged from 13.0 to 24.0, with an average of  $19.19 \pm 2.86$  points. Among them, 8 reports were relatively complete (21–27 points, including 27 points), accounting for 30.8%; 15 reports were flawed (15–21 points, including 21 points), accounting for 57.7%; 3 reports had relatively serious information deficiency ( $\leq 15$  points), accounting for 11.5%. No literature fully met the requirements of the 27 items in the PRISMA scale. Report information was lacking ( $< 50\%$ ) in the following 13 entries: entry 2 (7.7%), entry 3 (30.8%), entry 5 (11.5%), entry 7 (34.6%), entry 8 (26.9%), entry 9 (30.8%), entry 10 (38.5%), entry 12 (19.2%), entry 15 (38.5%), entry 16 (15.4%), entry 19 (30.8%), entry 22 (23.1%), and entry 23 (11.5%).

## Discussion

### The Methodological Quality of the SR/MAs of Alternative Exercise Traditions for Cancer Treatment Needs to be Improved

This study included 26 SR/MAs of alternative exercise traditions for cancer treatment. All included SR/MAs

were mainly published from 2007 to 2020. Among these articles, 12 were published in the last 5 years; hence, the popularity of alternative exercise traditions for cancer treatment is on the rise. Only high-quality systematic reviews can provide relatively unbiased and scientific evidence for clinical practice and health decision-making. Therefore, systematic reviews need to strictly control the quality of the included studies and methodologies. In the current work, the AMSTAR scale was used to evaluate the methodological quality of the included SR/MAs. The results showed that 16 articles were of high quality, and they accounted for 61.5%; 10 articles were of moderate quality, and they accounted for 38.5%.

A total of 23 papers (88.5%) lacked preliminary design plans; 4 papers (15.4%) did not pay attention to the repeatability of document extraction; 15 papers (57.7%) did not search the necessary databases, such as the Cochrane Library, Web of Science, and PubMed; 22 papers (84.6%) did not consider the unpublished status in the inclusion criteria (if gray literature was not fully considered); 3 papers (11.5%) lacked a specific list of included and excluded studies (if specific reasons for exclusion were not included); 1 paper (3.8%) did not evaluate and report the scientific nature of the included research; 8 papers (30.8%) did not evaluate the publication deviation (such as a one-sided description); 14 papers (53.8%) did not state the relevant funding sources and the presence of relevant conflicts of interest. The above methodological quality defects may affect the rigor of the system evaluation, the accuracy of the results, and the overall objectivity.

Therefore, the quality of methodology needs to be further improved. For example, if only electronic retrieval is performed and paper journals and books are not manually retrieved, then relevant articles may be missed. In such a case, the included articles may not be comprehensive enough. This deficiency may affect the accuracy of the results and reduce the quality of the methodology.

### The Quality of the Reports on Alternative Exercise Traditions for Cancer Treatment Needs to be Strengthened

This study used the PRISMA scale to evaluate the quality of the reports. The results showed that 8 reports (30.8%) were relatively complete, 15 reports (57.7%)

**Table I** Characteristics of Included SR/MAs

Authors, Year	Country	Number of Studies/ Sample Size	Quality Criteria	Duration of Studies	Intervention Group	Control Group	Main Outcome	Outcome Results
Luo et al, 2020 <sup>15</sup>	China	15/885	Cochrane criteria	2006–2019	RRT+8-form TCC; Usual care +8-form TCC; RRT + Chen-style TCC; Usual care +18-form TCC; RRT + 24-form simplified TCC;RRT + Tai Chi Yunshou; 15-move short-form of Yang-style TCC	Usual care; Cognitive behavioral therapy; RRT; Standard support Therapy; Psychosocial support therapy	①②③	TCC is effective on quality of life, pain and anxiety in breast cancer patients.
Lee et al, 2010 <sup>16</sup>	South Korea	7/235	Cochrane criteria	2003–2009	Tai Chi;Yang style;Combining Yang and Sun style	No treatment; Psychosocial support therapy; Spiritual growth; Standard health Care; Walking; Education Program	①	Tai Chi is not effective on quality of life for supportive breast cancer care.
Pan et al, 2015 <sup>17</sup>	China	19/322	Cochrane criteria	2004–2013	Tai Chi; Yang-style TCC; 8-form TCC	Health education; Psychosocial Therapy; Standard support therapy; Usual care; Spiritual growth and standard health care	②④	Tai Chi is not effective on pain and BMI in breast cancer patients.
Yan et al, 2014 <sup>18</sup>	China	5/407	Jadad scale	2004–2012	15-move short-form of Yang-style TCC; 24-form of TCC; 8-move short form of TCC	Psychosocial Therapy; Standard support therapy; Usual care; Standard rehabilitation	①④	Tai Chi is not effective on quality of life (except emotional well-being) and BMI in breast cancer patients.
Zhang et al, 2012 <sup>19</sup>	China	6/382	Cochrane criteria	2007–2012	Hatha yoga; Restorative yoga; Iyengar yoga; Vini yoga; Patanjali's yoga	Wait-list; Nontreatment	①③⑤⑥⑦	Yoga is effective on quality of life, but not effective on anxiety, depression, distress and sleep outcome in women with breast cancer

(Continued)

Table I (Continued).

Authors, Year	Country	Number of Studies/ Sample Size	Quality Criteria	Duration of Studies	Intervention Group	Control Group	Main Outcome	Outcome Results
Buffart et al, 2012 <sup>20</sup>	Netherlands	13/695	Not mentioned	2003–2011	Integrated yoga program; Viniyoga; Yoga asanas; Savasana; Tibetan yoga	Non-exercise; Wait-list	③⑤⑥⑦⑧	Yoga is effective on anxiety, depression and distress, but not effective on sleep outcome and fatigue in cancer patients and survivors.
Cramer et al, 2012 <sup>21</sup>	Germany	12/742	Cochrane criteria	2003–2011	Iyengar Yoga; Integrated yoga; Yoga of Awareness; Patanjali's yoga Sutras; Integrated yoga; Hatha yoga; Restorative yoga; Viniyoga	Wait-list; Supportive counseling and advice to take light exercise; Health education	①③⑥	Yoga is effective on quality of life, and short-term yoga is effective on anxiety and depression in breast cancer patients.
Dong et al, 2019 <sup>22</sup>	China	12/2183	Cochrane criteria	2009–2018	Hatha yoga+home-based yoga; Integrated yoga; Restorative yoga; Iyengar yoga; Viniyoga+home-based yoga; Satyananda yoga; Anusara yoga; Classical yoga; Home-based yoga; Classical yoga; Dru yoga+home-based breathing and relaxation exercise; Tibetan yoga +booster class +home-based practice; Yoga +usual care; Yoga+Aerobic exercise	Standard care; Supportive counseling; Wait-list Non-intervention; Health education ; Usual self-care; Usual care; Strengthening exercise Conventional physical exercise; Aerobic exercise	⑧	Yoga is effective on fatigue in patients with breast cancer.
Ford et al, 2020 <sup>23</sup>	USA	17/666	NIH Quality Assessment	2000–2017	Taichi; Qigong; Yoga	Usual care; Wait-list; Education groups; Attention controls	①	TaiChi/Qigong and Yoga are effective on quality of life in male cancer survivors.
Hashimi et al, 2019 <sup>24</sup>	Canada	8/545	Not mentioned	2008–2018	Vivekananda Yoga Anusandhana Samsthana; Hatha yoga; Anusandhana Samsthana; Tibetan yoga; Iyengar yoga; Integrated Yoga; Classic yoga	Stretching; Standard exercise; Physical exercise; Shoulder exercise; Strength training; Physical exercise; Aerobic exercise	①	Yoga is not effective on quality of life of women with breast cancer.

(Continued)

Table I (Continued).

Authors, Year	Country	Number of Studies/ Sample Size	Quality Criteria	Duration of Studies	Intervention Group	Control Group	Main Outcome	Outcome Results
Harder et al, 2012 <sup>25</sup>	UK	18/164	PEDro criteria	2006–2012	Integrated yoga; Lyengar yoga; Hatha yoga; Restorative yoga; Yoga of Awareness; Lyengar yoga; Integrated yoga; Modified Hatha yoga; Patanjali yoga	Supportive therapy; Wait-list; Health education; Standard care	①	Yoga may be a useful practice in improving the quality of life of women with breast cancer.
Lee et al, 2007 <sup>26</sup>	UK	4/226	Jadad Assessment	2003–2006	Tai Chi	Walking exercise; Psychosocial support; Education program	①	Tai Chi is not effective on quality of life for cancer.
Pan et al, 2015 <sup>27</sup>	China	16/930	Cochrane criteria	2007–2012	Integrated yoga; lyengar yoga; Yoga of awareness Program; Patanjali's yoga; Modified yoga; Restorative yoga; Viniyoga	Supportive therapy; Wait-list; Health education; Usual care; Standard physiotherapy; Brief supportive therapy	①③⑤⑥⑧	Yoga is effective on sleep outcome, quality of life, anxiety and depression, but not effective on fatigue for patients recovering from breast cancer.
Wang et al, 2020 <sup>28</sup>	China	19/1832	Cochrane criteria	2009–2019	lyengar Yoga; Asanas yoga; Viniyoga; Restorative yoga; Hatha yoga; Tibetan yoga; Mindful yoga; Yoga breathing exercise in warm water	Wait-list; Health education; Usual care; Social support	⑤	Yoga is an effective supportive treatment for cancer in sleep outcome.
Sadja et al, 2013 <sup>29</sup>	USA	10/583	Not mentioned	2004–2012	lyengar yoga; Tibetan yoga; Yoga of awareness; Patanjali's yoga tradition; Based on Hatha; Integrated yoga program	Wait-list; Health education	⑧	Yoga may be beneficial for reducing fatigue in women with breast cancer.
Liu et al, 2020 <sup>30</sup>	China	16/1268	PEDro criteria	2003–2017	Tai Chi; Tai Chi+Standard rehabilitation training	Cognitive behavior therapy; Standard rehabilitation training; Usual care; Walking; Psychosocial support therapy; Spiritual growth group	①④⑤⑥ ⑧	Tai Chi is effective on quality of life, but not effective on sleep outcome, BMI, depression and fatigue in breast cancer patients.

(Continued)

Table I (Continued).

Authors, Year	Country	Number of Studies/ Sample Size	Quality Criteria	Duration of Studies	Intervention Group	Control Group	Main Outcome	Outcome Results
Espíndula et al, 2017 <sup>31</sup>	Brazil	4/150	Cochrane criteria	2010–2016	Pilates; Pilates+home exercise	Home exercise; No exercise	②③	Pilates may be beneficial for reducing pain and fatigue of breast cancer patients.
Carral et al, 2018 <sup>32</sup>	Spain	4/246	Cochrane criteria	2008–2013	Pilates exercise+home pilates; Pilates mat exercise+ information and home drainage and walking exercise; Pilates mat exercise; Pilates MVe Fitness Chair; Pilates mat exercise+Pilates-based theraband exercises; Pilates+ home standard lymphedema exercises	Information and drainage and walking exercise; No exercise; Information and drainage and walking exercise; Traditional resistance training; Conventional exercise and breast prosthesis counseling; Exercise programme; Lumbopelvic stability	①②	Pilates has a certain effect on quality of life and pain for women with breast cancer.
Zeng et al, 2014 <sup>33</sup>	China	13/592	Cochrane criteria	2003–2013	Taichi; Guolin new qigong; Yang style of taichi; Medical qigong	Health education; Wait-list; Walking exercise; Psychosocial support; Usual medical care; Standard support therapy	①③④⑥	Qigong/Tai Chi are effective on quality of life and anxiety, but not effective on BMI and depression of cancer patients.
Wayne et al, 2017 <sup>34</sup>	USA	15/1283	Cochrane criteria	2008–2013	Taichi; Qigong	Psychosocial support; Usual care; Health education; No treatment; Spiritual growth; Stretching exercise	①②⑤⑥	Qigong/Tai Chi are effective on sleep outcome, quality of life, depression and fatigue, but not effective on pain of cancer patients.

(Continued)



Table I (Continued).

Authors, Year	Country	Number of Studies/ Sample Size	Quality Criteria	Duration of Studies	Intervention Group	Control Group	Main Outcome	Outcome Results
Zeng et al, 2019 <sup>35</sup>	China	12/915	Cochrane criteria	2014–2018	Taichi; Qigong; Taichi +Qigong; Medical qigong	Usual care; Support groups; Wait-list	①③⑤⑧	Qigong/Tai Chi are effective on sleep outcome and fatigue, but not effective on quality of life, anxiety, depression of cancer patients.
Lin et al, 2011 <sup>36</sup>	China	10/788	PEDro criteria	2000–2009	Restorative yoga; Integrated yoga; Gentle yoga; Hatha yoga; Asanas+shevasana; Tibetan yoga	Wait-list; Support therapy	③⑥⑦	Yoga is effective on anxiety, depression and distress of cancer patients.
Pan et al, 2016 <sup>37</sup>	China	12/1979	Cochrane criteria	2004–2013	19-move short-form of TCC; Qigong + Short-form of Yang-style TCC; Short-form of Yang-style TCC; 24-form of TCC	Rehabilitation nursing; Health education; Psychosocial therapy; Standard rehabilitation; Usual care; Music Rehabilitation exercise	①②④	Tai Chi is effective on BMI, but not effective on quality of life and pain of postoperative patients with breast cancer.
Yan et al, 2013 <sup>38</sup>	China	4/169	Cochrane criteria	2003–2010	Yang-style TCC; Short form of TCC; 24-move short form of TCC	Psychosocial Therapy; Walking; Standard Therapy; Usual rehabilitation	①④	Tai Chi is not effective on quality of life and BMI in breast cancer patients.
Zhang et al, 2015 <sup>39</sup>	China	9/623	Cochrane criteria	2007–2014	Anusara yoga; Lyengar yoga; Patanjali's yoga; Restorative yoga; Hatha yoga; Viniyoga	Usual care; Health education; One-to-one meeting	⑧	Yoga is effective on fatigue of breast cancer patients.
Wu et al, 2018 <sup>40</sup>	China	7/671	Cochrane criteria	2015–2017	Yoga	Wait-list; Health education; Usual care; Social support	①③⑤⑥	Yoga is effective on quality of life, anxiety and depression, but not effective on sleep outcome in patients with breast cancer.

**Notes:** TCC, Tai Chi; ①quality of life;②pain;③anxiety;④BMI;⑤sleep outcome; ⑥ depression; ⑦ distress; ⑧ fatigue.

**Table 2** Outcome Results of Included SR/MAs

Outcome	Authors, Year	Outcome Results	Outcome	Authors, Year	Outcome Results	Outcome	Authors, Year	Outcome Results
Quality of life	Luo et al, 2020 <sup>15</sup>	*	Pain	Luo et al, 2020 <sup>15</sup>	*	BMI	Pan et al, 2015 <sup>17</sup>	#
	Lee et al, 2010 <sup>16</sup>	#		Pan et al, 2015 <sup>17</sup>	#		Yan et al, 2014 <sup>18</sup>	#
	Yan et al, 2014 <sup>18</sup>	#		Espindula et al, 2017 <sup>31</sup>	*		Liu et al, 2020 <sup>30</sup>	#
	Zhang et al, 2012 <sup>19</sup>	*	Carral et al, 2018 <sup>32</sup>	*	Zeng et al, 2014 <sup>33</sup>	#		
	Cramer et al, 2012 <sup>21</sup>	*	Wayne et al, 2017 <sup>34</sup>	#	Pan et al, 2016 <sup>37</sup>	*		
	Ford et al, 2020 <sup>23</sup>	*	Pan et al, 2016 <sup>37</sup>	#	Yan et al, 2013 <sup>38</sup>	#		
	Hashimi et al, 2019 <sup>24</sup>	#	Anxiety	Luo et al, 2020 <sup>15</sup>	*	Sleep outcome	Zhang et al, 2012 <sup>19</sup>	#
	Harder et al, 2012 <sup>25</sup>	*		Zhang et al, 2012 <sup>19</sup>	#		Buffart et al, 2012 <sup>20</sup>	#
	Lee et al, 2007 <sup>26</sup>	#		Buffart et al, 2012 <sup>20</sup>	*		Pan et al, 2015 <sup>27</sup>	*
	Pan et al, 2015 <sup>27</sup>	*		Cramer et al, 2012 <sup>21</sup>	*		Wang et al, 2020 <sup>28</sup>	*
	Liu et al, 2020 <sup>30</sup>	*		Pan et al, 2015 <sup>27</sup>	*		Liu et al, 2020 <sup>30</sup>	#
	Carral et al, 2018 <sup>32</sup>	*		Zeng et al, 2019 <sup>35</sup>	#		Wayne et al, 2017 <sup>34</sup>	*
Zeng et al, 2014 <sup>33</sup>	*	Lin et al, 2011 <sup>36</sup>		*	Zeng et al, 2019 <sup>35</sup>		*	
Wayne et al, 2017 <sup>34</sup>	*	Wu et al, 2018 <sup>40</sup>		*	Wu et al, 2018 <sup>40</sup>		#	
Zeng et al, 2019 <sup>35</sup>	#	Depression	Zhang et al, 2012 <sup>19</sup>	#	Fatigue	Buffart et al, 2012 <sup>20</sup>	#	
Pan et al, 2016 <sup>37</sup>	#		Buffart et al, 2012 <sup>20</sup>	*		Dong et al, 2019 <sup>22</sup>	*	
Yan et al, 2013 <sup>38</sup>	#		Cramer et al, 2012 <sup>21</sup>	*		Pan et al, 2015 <sup>27</sup>	#	
Wu et al, 2018 <sup>40</sup>	*		Pan et al, 2015 <sup>27</sup>	*		Sadja et al, 2013 <sup>29</sup>	*	
Distress	Zhang et al, 2012 <sup>19</sup>	#		Liu et al, 2020 <sup>30</sup>	#		Liu et al, 2020 <sup>30</sup>	#
	Buffart et al, 2012 <sup>20</sup>	*		Zeng et al, 2014 <sup>33</sup>	#		Espindula et al, 2017 <sup>31</sup>	*
	Lin et al, 2011 <sup>36</sup>	*		Wayne et al, 2017 <sup>34</sup>	*		Zeng et al, 2019 <sup>35</sup>	*
				Lin et al, 2011 <sup>36</sup>	*		Zhang et al, 2015 <sup>39</sup>	*
				Wu et al, 2018 <sup>40</sup>	*			

**Note:** \*, Alternative exercise traditions are useful; #, Alternative exercise traditions are useless.

had certain defects, and 3 reports (11.5%) had relatively serious information defects. Most of the researchers did not write a plan and performed registration before their systematic reviews, and the complete report rate of plans and registrations was only 11.5%. In the results, only three articles (11.5%) discussed the results of other analyses (such as sensitivity analysis or subgroups). In terms of the methodology, only five articles (19.2%) described the bias in the evaluation of a single study (such as the suitability for random allocation sequence, blinding, and proportion of patients lost to follow-up). In conducting an SR/MA, the PRISMA statement should be used as basis in preparing a normative report to improve the overall report quality.

Therefore, report quality needs to be further improved. For example, the randomization and allocation concealment schemes included in the original study were not perfect, and the loss to follow-up and adverse events were not fully reported. Specific information, such as the individuals who conducted the search and those who implemented it and the details about resolving disagreements, was lacking.

## The Effectiveness of Alternative Exercise Traditions in Cancer Treatment Should be Discussed Further

QOL is a multidimensional assessment with physical significance and is a commonly used indicator to measure the effect of cancer treatment.<sup>42</sup> The 18 SR/MAs included in this study analyzed the intervention effects of alternative exercise traditions on QOL. Among the 18 articles, 11 reports showed that alternative exercise traditions can improve the QOL of cancer patients. Tai Chi, Qigong, yoga, and others that serve as traditional exercise activities can increase a person's strength, improve one's physical flexibility, and promote relaxation and well-being.<sup>24,42</sup> Pain is one of the most common symptoms of cancer, and it may be due to tumors, surgery, chemotherapy, radiation therapy, targeted therapy, supportive care, and diagnostic procedures.<sup>43</sup> The evaluation of control-related and nonsurgical pain is essential for cancer patients. From the 26 articles, 6 reports analyzed the intervention effects of alternative exercise traditions on pain, and 3 of them showed that alternative exercise traditions may not necessarily improve the pain of cancer patients. Pain has

**Table 3** Quality Assessment of the Included Reviews Using the AMSTAR Tool (n = 26)

Authors, Year	AMSTAR Items											Total		
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Y	N	C
Luo et al,2020 <sup>15</sup>	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	9	2	0
Lee et al, 2010 <sup>16</sup>	N	Y	Y	N	Y	Y	Y	Y	Y	N	N	7	4	0
Pan et al, 2015 <sup>17</sup>	N	Y	N	N	Y	Y	Y	Y	Y	N	N	6	5	0
Yan et al, 2014 <sup>18</sup>	N	N	N	N	Y	Y	Y	Y	Y	Y	N	6	5	0
Zhang et al, 2012 <sup>19</sup>	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10	1	0
Buffart et al,2012 <sup>20</sup>	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	8	3	0
Cramer et al,2012 <sup>21</sup>	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	8	3	0
Dong et al, 2019 <sup>22</sup>	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	9	2	0
Ford et al, 2020 <sup>23</sup>	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	9	2	0
Hashimi et al,2019 <sup>24</sup>	N	Y	Y	N	Y	Y	Y	Y	Y	N	Y	8	3	0
Harder et al, 2012 <sup>25</sup>	N	Y	Y	N	Y	Y	Y	Y	Y	N	Y	8	3	0
Lee et al, 2007 <sup>26</sup>	N	N	Y	N	N	Y	Y	Y	Y	N	N	5	6	0
Pan et al, 2015 <sup>27</sup>	N	Y	N	N	Y	Y	Y	Y	Y	N	N	6	5	0
Wang et al, 2020 <sup>28</sup>	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	8	3	0
Sadja et al, 2013 <sup>29</sup>	N	Y	N	N	Y	Y	Y	Y	Y	Y	N	7	4	0
Liu et al, 2020 <sup>30</sup>	N	Y	Y	N	Y	Y	Y	Y	Y	Y	N	8	3	0
Espindula et al,2017 <sup>31</sup>	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	8	3	0
Carral et al, 2018 <sup>32</sup>	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	9	2	0
Zeng et al, 2014 <sup>33</sup>	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	8	3	0
Wayne et al, 2017 <sup>34</sup>	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	8	3	0
Zeng et al, 2019 <sup>35</sup>	N	C	N	C	N	Y	Y	Y	Y	Y	Y	6	3	2
Liu et al, 2011 <sup>36</sup>	N	C	N	N	Y	Y	Y	Y	Y	N	N	5	5	1
Pan et al, 2016 <sup>37</sup>	N	Y	Y	N	N	Y	N	Y	Y	Y	N	6	5	0
Yan et al, 2013 <sup>38</sup>	N	Y	Y	N	Y	Y	Y	Y	Y	Y	N	8	3	0
Zhang et al, 2015 <sup>39</sup>	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	8	3	0
Wu et al, 2018 <sup>40</sup>	N	Y	N	N	Y	Y	Y	Y	Y	N	N	6	5	0
Percentage of systematic reviews meeting each criteria	11.5	80.8	42.3	11.5	88.5	100.0	96.2	100.0	100.0	69.2	46.2			

**Notes:** AMSTAR items: Q1, a-priori design; Q2, duplicate study selection and data extraction; Q3, search comprehensiveness; Q4, status of publication (eg, non-English articles or dissertations); Q5, listing included and excluded studies; Q6, characteristics of the primary studies provided; Q7, scientific quality of the primary studies assessed and documented; Q8, scientific quality of the included data used appropriately in drawing conclusions; Q9, appropriateness of methods used to combine the findings of the primary studies; Q10, assessment of publication bias; and Q11, acknowledgement of conflicts of interest and potential sources of support in both the systematic review and the primary studies. Y, yes; N, no; C, cannot answer. We assigned 1 point to each “yes” item. The sub-column “Y”, the AMSTAR score, represents the quality of each included study which is the most important column in the table. The last row in the table indicates the percentage of included studies which met each item in AMSTAR scale. Bases on this, the methodological issues of included studies were identified.

a psychological impact as it may cause a patient to develop anxiety, neuroticism, and anger.<sup>44</sup> A total of eight reports analyzed the intervention effects of alternative exercise traditions on anxiety, and six of them showed that alternative exercise traditions can improve anxiety in cancer patients. A total of nine reports analyzed the intervention effects of alternative exercise traditions on depression, and six of them showed that alternative exercise traditions can improve depression in cancer patients. A total of three reports analyzed the intervention effects of alternative exercise traditions on distress, and two of them showed that alternative exercise traditions can improve distress in cancer patients. In summary, alternative forms of exercise

can be used as a supplementary therapy to help cancer patients with their social and psychological suffering. Tai Chi, Qigong, yoga, and others encourage patients to pay attention to their breathing, calm their mind, and concentrate.<sup>45,46</sup> For anxiety or depression that affects sleep, psychological counseling should be combined with physical and mental exercise. A total of eight reports analyzed the intervention effects of alternative exercise traditions on sleep outcomes, and four of them showed that alternative exercise traditions may not necessarily improve the sleep outcomes of cancer patients. Sleep disorders are known to be related to inflammation.<sup>47</sup> Studies have shown that exercise is an effective intervention to

**Table 4** PRISMA Statement Score/Point

Topic	PRISMA Items	Luo et al, 2020 <sup>15</sup>	Lee et al, 2010 <sup>16</sup>	Pan et al, 2015 <sup>17</sup>	Yan et al, 2014 <sup>18</sup>	Zhang et al, 2012 <sup>19</sup>	Buffart et al, 2012 <sup>20</sup>	Cramer et al, 2012 <sup>21</sup>	Dong et al, 2019 <sup>22</sup>	Ford et al, 2020 <sup>23</sup>	Hashimi et al, 2019 <sup>24</sup>	Harder et al, 2012 <sup>25</sup>	Lee et al, 2007 <sup>26</sup>	Pan et al, 2015 <sup>27</sup>	
Title	1 Title	1	1	1	1	1	1	1	1	1	1	1	1	1	
Abstract	2 Structured summary	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Introduction	3 Rationale	0.5	0.5	1	0.5	0.5	0.5	1	1	0.5	0.5	0.5	0.5	1	
	4 Objectives	1	1	1	1	1	1	1	1	1	1	1	1	1	
Methods	5 Protocol and registration	1	0	0	0	0	0	0	0	0	0	0	0	0	
	6 Eligibility criteria	1	1	1	1	1	1	1	1	1	1	1	1	1	
	7 Information sources	1	0.5	1	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	1	
	8 Search	0	0	0	0	0.5	0.5	0	1	1	0	0	0	1	
	9 Study selection	0.5	0.5	1	0.5	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	
	10 Data collection process	0.5	0.5	1	0.5	1	0.5	0.5	0.5	1	1	0	0	1	
	11 Data items	1	1	1	1	1	1	1	1	1	1	1	1	1	
	12 Risk of bias in individual studies	0.5	0.5	0.5	0.5	0.5	0.5	0	0.5	0.5	0.5	0.5	0.5	0.5	
	13 Summary measures	1	1	1	1	1	1	1	1	1	1	1	1	1	
	14 Synthesis of results	1	1	1	1	1	1	1	1	1	1	1	1	1	
	15 Risk of bias across studies	1	0.5	0.5	1	1	0.5	0.5	0.5	1	1	0	0	0.5	
	16 Additional analyses	1	0	0.5	0	0	0	0	0	0	0	0	0	0	
	Results	17 Study selection	1	1	1	0.5	1	1	1	0.5	1	0.5	1	0.5	1
		18 Study characteristics	1	1	1	1	1	1	1	1	1	1	1	1	1
		19 Risk of bias within studies	1	0.5	0.5	0.5	0.5	0	0	1	1	0.5	0.5	0.5	0.5
		20 Results of individual studies	1	1	1	1	1	0.5	0.5	1	1	1	0.5	0	1
21 Synthesis of results		1	1	1	1	1	0.5	0.5	1	1	1	0.5	0	1	
22 Risk of bias across studies		0.5	0.5	0.5	0.5	0.5	0	1	1	1	0.5	0.5	0	0.5	
23 Additional analysis		1	0	0	0	0	0	0	0	0	0	0	0	0	
Discussion	24 Summary of evidence	1	1	1	1	1	0.5	1	1	1	1	1	0.5	1	
	25 Limitations	1	0.5	1	0.5	1	1	0.5	0.5	1	1	0.5	1	1	
	26 Conclusions	1	1	1	1	1	1	1	1	1	1	1	1	1	



**Table 4 (Continued).**

Topic	PRISMA Items	Luo et al, 2020 <sup>15</sup>	Lee et al, 2010 <sup>16</sup>	Pan et al, 2015 <sup>17</sup>	Yan et al, 2014 <sup>18</sup>	Zhang et al, 2012 <sup>19</sup>	Buffart et al, 2012 <sup>20</sup>	Cramer et al, 2012 <sup>21</sup>	Dong et al, 2019 <sup>22</sup>	Ford et al, 2020 <sup>23</sup>	Hashimi et al, 2019 <sup>24</sup>	Harder et al, 2012 <sup>25</sup>	Lee et al, 2007 <sup>26</sup>	Pan et al, 2015 <sup>27</sup>
Funding	26 Conclusions 27 Funding	1	1	1	1	1	1	1	1	1	1	1	1	1
		1	0	0	0	1	1	1	0	0	1	1	0	0

**Notes:** PRISMA statement from Liberati A, Altman D, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *Journal of clinical epidemiology*. 2009;62(10). Creative Commons.<sup>41</sup>

control inflammation,<sup>48</sup> but the mechanism of how exercise affects sleep is still unclear. At the same time, due to insufficient intensity, exercise may not trigger changes that promote better sleep (such as body changes, melatonin release, and reduction of inflammation). A total of six reports included in this study analyzed the intervention effects of alternative exercise traditions on BMI. Of these reports, five showed that alternative exercise traditions cannot reduce the BMI of cancer patients. This result may be related to differences in race, region, and age.<sup>49–51</sup> A proper extension of exercise time may be effective in reducing the BMI of cancer patients.<sup>52</sup> At the same time, BMI reflects the overall body weight and does not distinguish between adipose tissue and nonfat tissue.<sup>53,54</sup> In the future, other physical measurement indicators for evaluating obesity are expected. A total of eight reports analyzed the intervention effects of alternative exercise traditions on fatigue, and five of them showed that alternative exercise traditions can improve fatigue in cancer patients. Alternative exercise traditions integrate exercise (body posture), meditation (concentration), and breathing to achieve a state of mental calm and relaxation to reduce fatigue.<sup>55–57</sup>

In summary, alternative exercise traditions have the potential to improve the negative psychological conditions of cancer patients and improve their QOL. However, whether or not they are more advantageous than conventional rehabilitation training still needs to be supported by a large sample size and strict standardized trials. At the same time, Tai Chi, yoga, and Qigong cannot be used as intervention methods in general without distinguishing the characteristics of different schools and movements. Future research should incorporate a large number of samples (in the baseline and follow-up phases), long-term follow-up evaluations (eg, 6 months or more), and clearly defined targeted measurement indicators into the design.

### Alternative Exercise Traditions in the Context of the COVID-19 Pandemic may be an Effective Intervention That is Easy to Promote

COVID-19 is the most widespread global pandemic to affect humans in the last 100 years.<sup>58</sup> In the early stage of the epidemic, academician Zhong Nanshan spoke highly of Tai Chi for strengthening one’s body and fitness.<sup>59</sup> In particular, Tai Chi has been regarded as capable of improving cardiopulmonary function, thereby

attracting people's attention.<sup>60</sup> The National Health Commission of the People's Republic of China issued the "Rehabilitation Plan for Discharged COVID-19 Patients (Trial)" on March 4, 2020.<sup>61</sup> The section on "Rehabilitation treatment methods" pointed out that a series of aerobic prescriptions have been formulated for patients with combined underlying diseases and residual dysfunction. These prescriptions include Tai Chi and Baduan Jin. According to the plan, patients are encouraged to begin with low-intensity exercise and progress gradually, engaging in exercise for 20–30 min each time and 3–5 times a week. The appropriate exercise intensity is one that does not cause fatigue the next day.

COVID-19 is not only a public health incident but also a psychological crisis.<sup>62</sup> The UK Household Longitudinal Study (UKHLS) revealed that 1 month after the implementation of the British football ban, the prevalence of people with clinically significant mental pain rose from 18.9% in 2018–2019 to 27.3% in April 2020.<sup>63</sup> In cancer patients, reduced parasympathetic tone may also be related to a long disease course and short survival.<sup>64,65</sup> Yoga, Tai Chi, Qigong, and others can change the structure of the brain, regulate physiological activities, help alleviate psychological pressure, improve autonomic nervous system balance,<sup>66,67</sup> and regulate sympathy by improving central activity under the stress–parasympathetic nerve output. Practicing Tai Chi and Qigong may reduce the sympathetic nerve tension, increase the parasympathetic nerve tension, and improve the peripheral autonomic nerve activity.<sup>68,69</sup> In addition, the training content of alternative exercise traditions is simple and requires minimal equipment and venues. In the context of the COVID-19 pandemic, these forms of exercise are safer and more natural than other sports activities. Moreover, they may be easy to promote and can alleviate the subhealth of the public.

In summary, this study re-evaluated the published SR/MAs of alternative exercise traditions for cancer treatment and provided an important reference for the application of alternative forms of exercise in the field of cancer treatment. However, as this study only included Chinese and English literature, the research conclusions obtained may have certain limitations. Moreover, the methodological quality and standardized treatment reporting of the SR/MAs included in this study need to be improved. Researchers are recommended to strictly follow the AMSTAR scale and PRISMA statement when writing SR/MAs so as to provide high-quality research and

provide a scientific and reliable reference for clinical diagnosis and treatment decisions. The topic of alternative exercise tradition for cancer intervention is still a hotspot in international research. Researchers can pay close attention to the improvement of the preliminary design plan, publication status, literature search, conflict of interest, etc.

## Conclusions

In conclusion, the methodological quality of the systematic evaluations of the intervention effects of alternative exercise traditions on cancer patients is not highly satisfactory. Therefore, we suggest that focus should be directed to the improvement of the preliminary design scheme, publication status, literature retrieval, conflict of interest, and other aspects. Under the current situation of strict prevention and control of the epidemic and the promotion of self-isolation at home, alternative exercise traditions should be encouraged and promoted as early as possible. Professionals can develop appropriate exercise alternatives to ensure the expected effect of exercise while ensuring the safety of patients. At the same time, the application of alternative exercise traditions to the prevention of COVID-19, its auxiliary treatment, and the rehabilitation of affected patients should be strengthened so as to continuously optimize the program.

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## Disclosure

The authors have declared that they have no competing interests.

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