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Keywords:	COVID-19, REHABILITATION MEDICINE, Protocols & guidelines < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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Clinical practice guidelines and experts consensuses of rehabilitation for coronavirus disease 2019 (COVID-19): a protocol of systematic review

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YZ, YXL and DLZ contributed equally to this work and shared first authorship.

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Word count: 1918 words

Abstract

Introduction: Coronavirus disease 2019 (COVID-19) is a highly infectious disease, characterized by respiratory, physical and psychological dysfunctions. Rehabilitation could effectively alleviate the symptoms and promote the recovery of physical and mental health of COVID-19 patients. Recently, rehabilitation medical institutions have issued clinical practice guidelines (CPGs) and experts consensuses involved recommendations of rehabilitation assessment and therapy for COVID-19. This systematic review aims to assess the methodological quality and reporting quality, and summarize the recommendations of rehabilitation assessment and therapy for COVID-

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19, so as to give quick references for front-line clinicians, therapists and patients, and provide reasonable suggestions for future guideline makers.

Methods and analysis: We will search electronic databases and websites of governments or organizations for eligible CPGs and expert consensuses. Two reviewers will independently select study, extract data, and assess methodological quality and reporting quality by the Appraisal of Guidelines for Research & Evaluation (AGREE) II tool and the Reporting Items for Practice Guidelines in healthcare (RIGHT) statement. The above results will be narratively described and presented as tables or figures.

Ethics and dissemination: Ethics approval is not necessary for this protocol of systematic review because we will use information from published documents. Our findings will be published in a peer-reviewed journal according to the PRISMA guidelines.

Systematic review registration: PROSPERO (CRD42020190761)

Keywords: COVID-19, rehabilitation, clinical practice guidelines, expert consensuses, systematic review

Strengths and limitations of this study

- This is the first systematic review to assess the methodological quality and reporting quality of included CPGs and expert consensuses strictly following the AGREE II instrument and the RIGHT tool.
- This systematic review will provide comprehensive summry of recommendations in CPGs and expert consensuses for COVID-19, so as to give quick references for

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front-line clinicians, therapists and patients, and provide reasonable suggestions for future guideline makers.

- This study will only include CPGs and expert consensuses published in Chinese and English, the language bias is inevitable.
- We can't solve the inconsistency of the recommendations of rehabilitation for patients with COVID-19, and we plan to conduct a meta-analysis to solve the problem later.

Introduction

Coronavirus disease 2019 (COVID-19) was declared as a pandemic by the World Health Organization (WHO) on 11 March 2020, which has affected more than 200 countries, with 404,910,528 confirmed cases and 5,783,776 deaths worldwide until February 11, 2022.[1-3] COVID-19 has posed a huge threat to the global public health, economy, and other aspects of people's daily life. During hospitalization, COVID-19 patients may suffer from respiratory, cardiopulmonary, exercise and psychological dysfunctions.[4 5] Furthermore, discharged COVID-19 patients may continue to suffer from different degrees of multiple dysfunction, limitation in ability of daily living (ADL) and social participation.[6 7]

In order to reduce the complications and disability rate and improve the overall function of patients at different stages of COVID-19, rehabilitation should be carried out early.[4 8 9] At present, a number of professional institutions have successively formulated clinical practice guidelines (CPGs) and expert consensuses of rehabilitation for COVID-19, including recommendations of rehabilitation assessment and therapy.[10-14]

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However, front-line clinicians could not make quick and proper choices among numerous CPGs and expert consensuses with different quality.

Therefore, it is critical to summarize recommendations of rehabilitation for COVID-19 and identify the quality of CPGs and expert consensuses of rehabilitation, so as to provide some valuable suggestions for guideline users and the formulation of related guidelines of rehabilitation for COVID-19 in the future. The purpose of this systematic review is to assess the methodological quality and reporting quality of these CPGs and expert consensuses with the Appraisal of Guidelines for Research & Evaluation (AGREE) II tool and the Reporting Items for Practice Guidelines in healthcare (RIGHT) statement, and summarize the current recommendations of rehabilitation for COVID-19.

Methods

Protocol registration and reporting

This protocol was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis-Protocol (PRISMA-P) statement (see checklist in Additional file 1),[15] and has been registered on the International Prospective Register Of Systematic Reviews (PROSPERO) (Registration number CRD42020190761).

Eligibility criteria

Inclusion criteria

Study design We will include CPGs and expert consensuses of rehabilitation for COVID-19 issued by nationally or internationally recognized government authorities, medical/academic societies, or organizations.

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Participants Patients who were clinically diagnosed (using any recognized diagnostic criteria, such as real-time quantitative polymerase chain reaction detection of new coronavirus nucleic acid was positive, and highly homologous with known new coronavirus[16]) with COVID-19 will be included. There will be no restrictions on age, gender, race or nation.

Study contents CPGs and expert consensuses that provide recommendations of traditional Chinese medicine (TCM) rehabilitation techniques (e.g. Tuina/massage, acupuncture and moxibustion, Taichi, Baduanjin etc.) and morden functional recovery techniques (e.g. respiratory and peripheral muscle training, psychosocial evaluation and support, exercise training, occupational therapies etc.) will be included.

Exclusion criteria

We will exclude CPGs and expert consensuses that are not published in Chinese and English, the review and interpretation, old versions, and the management of other diseases during the epidemic.

Search strategy

We will search PubMed, Embase, Chinese Biomedical Literature Database (CBM), Chinese Science and Technology Periodical Database (VIP), Wanfang database (Wanfang Data) and China National Knowledge Infrastructure (CNKI) databases from inception to October 2021. In addition, we will search other sources of guidelines, including the National Guideline Clearinghouse (NGC), Guidelines International Network (GIN), Scottish Intercollegiate Guidelines Network (SIGN), National Institute for Health and Clinical Excellence (NICE), and WHO. Search terms will include words

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related to rehabilitation therapy, COVID-19, guidelines and expert consensuses. The search strategy for PubMed is shown in Additional file 2, and the modified strategies will be applied to other electronic databases. We will search the relevant websites of advising body or healthcare organization and review the reference lists of potentially eligible citations.

Study selection

All the retrieved records will be imported into EndNote X9 reference management software. After filtering the duplicates, two reviewers (YZ and YXL) will independently screen the titles and abstracts to identify eligibile records and then download full texts for further screening. Any disagreements will be resolved in discussion with a third reviewer (JL) to reach consensus.

Quality assessment

We will evaluate methodological quality and reporting quality of included CPGs and expert consensuses using the AGREE II tool and the RIGHT statement, respectively. Trained assessors (YZ and YYZ) will pre-assess and discuss the samples of eligible records. After that, they will independently appraise the quality of included CPGs and expert consensuses. Discrepancies will be discussed and resolved through consulting a third reviewer(RJJ).

methodological quality

The AGREE II instrument was developed to evaluate the development and methodological quality of guidelines that has been found to have high construct validity.[17] The AGREE II consists of two overall assessment and 23 items arranged into

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six domains: 1) scope and purpose, 2) stakeholder involvement, 3) rigour of development, 4) clarity of presentation, 5) applicability and 6) editorial independence. Each item is ranked on a seven-point scale (1: strongly disagree to 7: strongly agree). To assess the degree of agreement between reviewers, the intraclass correlation coefficient (ICC) will be calculated using Statistical Package for Social Sciences(SPSS) 25.0. The scores will be defined as: poor 0.0-0.2, fair 0.21-0.4, moderate 0.41-0.6, good 0.61-0.8 and very good 0.81-1.00.[18]

reporting quality

The RIGHT statement was used to evaluate the reporting quality of the CPGs and expert consensuses, which helped guideline makers to write and report guidelines transparently and standardly.[19] It included seven domains as follows: 1) basic information, 2) background, 3) evidence, 4) recommendations, 5) review and quality assurance, 6) funding, declaration and management of interest, and 7) other information.

Data extraction

Two reviewers (DLZ and XBL) will extract data independently using a standardized data extraction form. We will extract the following items: (1) characteristics of CPGs and expert consensuses: title, country of origin and publication year; (2) stage of disease; (3) recommended rehabilitation assessment; (4) recommended rehabilitation treatment; (5) related contents of methodological quality and reporting quality. The extracted data will be cross-checked by two reviewers. Any disagreements will be resolved through team discussion.

Data analysis

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Textual descriptive synthesis and tables will be used to present the recommended rehabilitation assessment and therapy for different stages or different dysfunctions of patients with COVID-19. We will list the reporting rate of each items and overall rate in tables to reflect the methodological quality and reporting quality of included CPGs and expert consensuses.

Patient and public involvement

Patients and public were not involved in the design and conduction of this study.

Discussion

Studies showed that 80% of COVID-19 patients suffered from one or more dysfunctions, mainly including fatigue (58%), dyspnea (24%), muscle/joint pain (43.8%) and anxiety/sadness (46.1%).[20 21] Rehabilitation played an significant role in the prognosis of COVID-19 patients. [9 22 23] Numerous CPGs and expert consensuses of rehabilitation for COVID-19 patients have been published with varying quality.[22-25] CPGs and expert consensuses are developed to assist practitioners and patients to make decisions about appropriate healthcare for specific circumstances.[26] However, low methodological quality may reduce the reliability of CPG and expert consensuses, decrease compliance of CPG and expert consensuses in clinical practice, cause waste of medical resources and lead to confusion to clinicians, therapists and patients. The reporting quality of CPG and expert consensuses is also important, non-standard reporting could decrease the clarity and integrity of the content, and could not provide clear guidance for guidelines users.

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AGREE II tool has become an internationally accepted guidelines appraisal tool, which could identify the methodological limitations of current guidelines.[27] In our previous study, we used AGREE II tool to appraise the methodological quality of guidelines for the treatment of COVID-19 patients with Chinese herbal medicine, the results showed that the methodological quality of most guidelines was poor, especially in the fields of rigour of development and editorial independence, which suggested that evidence quality and recommendation strength, the views and preferences of the target population, conflicts of interest should be considered more in the development of guidelines.[28] RIGHT instrument has been developed to improve the reporting quality of the guidelines and promote the dissemination and implementation of the guidelines.[19] RIGHT checklist covers the most important information to be reported in the guidelines, which could be used as a reference tool to help guideline developers to report the guidelines in a standard, explicit and transparent way, so as to help clinicians, therapists and patients better understand and apply the guidelines. Researchers could also use RIGHT tool to assess the reporting quality of CPGs and expert consensuses. High quality CPGs and expert consensuses could save medical resources and costs, and improve patient care and safety. As we known, CPGs and expert consensuses of rehabilitation for COVID-19 patients are developing rapidly, which help clinicians, therapists and patients to make clinical decisions and assist patients to carry out home rehabilitation independently, so it is necessary to evaluate the methodological and reporting quality of CPGs and expert consensuses. Therefore, we will conduct quality assessment to aid clinicians, therapists and patients choose high quality CPGs and

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expert consensuses, and summarize recommendations according to stages of COVID-19 or different body-dysfunctions.

To our knowledge, this is the first systematic review to evaluate the methodological and reporting quality of CPGs and expert consensuses on rehabilitation for patients with COVID-19 according to AGREE II and RIGHT tools, respectively. The protocol amendments on PROSPERO will be updated if necessary and we intend to publish this study in peer-reviewed journal. It is hoped that our results could provide reasonable suggestions for guideline makers to develop higher quality CPGs and expert consensuses or improve existing ones, and give quick references of rehabilitation therapy for clinicians and patients who are in the battle against COVID-19.

Abbreviations:

COVID-19: Coronavirus disease 2019; WHO: World Health Organization; ADL: activities of daily living; CPGs: Clinical Practice Guidelines; TCM: traditional Chinese medicine; AGREE: the Appraisal of Guidelines for Research & Evaluation; RIGHT: Reporting Items for Practice Guidelines in healthcare; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analysis; PROSPERO: Prospective Register of Systematic Reviews; CBM: Chinese Biomedical Literature Database; VIP: Chinese Science and Technology Periodical Database; Wanfang Data: Wanfang database; CNKI: China National Knowledge Infrastructure; NGC: The National Guideline Clearinghouse; GIN: Guidelines International Network; SIGN: Scottish Intercollegiate

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Guidelines Network; NICE: National Institute for Health and Clinical Excellence; ICC: Intraclass Correlation Coefficient; SPSS: Statistical Package for Social Sciences.

Declarations

Ethics approval and consent to participate

No ethics approval is required for this systematic review because we will be using information from published documents. Our findings will be published in a peer-reviewed journal according to the PRISMA guidelines.

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Authors' contributions

Rongjiang Jin and Juan Li designed the study. Yue Zhang, Yuxi Li and Dongling Zhong drafted the manuscript. Yuxi Li and Yue Zhang searched the literature. Yue Zhang and Yuanyuan Zhu conducted the quality assessment. Dongling Zhong and Xiaobo Liu analyzed the data. Yue Zhang, Yuxi Li and Dongling Zhong contributed equally to this work and shared first authorship. All authors approved the manuscript.

Funding statement

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Competing interests

The authors declare that they have no competing interests.

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Acknowledgements

Not applicable.

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Additional file 1. PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Location where item is reported
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	Not applicable	Not applicable
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	2
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	11
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	Not applicable
Support:			
Sources	5a	Indicate sources of financial or other support for the review	11
Sponsor	5b	Provide name for the review funder and/or sponsor	11
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	11
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known	3-4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	5
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	5
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	5-6
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	Appendix 2

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Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	6
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	6
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	7
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	7
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	8
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	6-7
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	8
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	8
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	Not applicable
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	Not applicable
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Not applicable

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

Additional file 2. Search Strategy for PubMed

#1	Search COVID-19[Title/Abstract]
#2	Search COVID-19 pneumonia[Title/Abstract]
#3	Search novel coronavirus[Title/Abstract]

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#4	Search novel coronavirus pneumonia[Title/Abstract]
#5	Search 2019-nCoV[Title/Abstract]
#6	Search 2019-nCoV pneumonia[Title/Abstract]
#7	Search #1 OR #2 OR #3 OR #4 OR #5 OR #6
#8	Search rehabilitation[MeSH Terms]
#9	Search respiratory rehabilitation [Title/Abstract]
#10	Search pulmonary rehabilitation [Title/Abstract]
#11	Search exercise therap* [Title/Abstract]
#12	Search traditional Chinese medicine rehabilitation[Title/Abstract]
#13	Search #8 OR #9 OR #10 OR #11 OR #12
#14	Search (guideline OR practice guideline OR consensus development conference OR consensus OR consensus statement OR expert consensus OR standards OR recommendation)[Title/Abstract]
#15	Search #7 AND #13 AND #14

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PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Location where item is reported
ADMINISTRATIVE INFORMATION			
Title:			
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Update	1b	Not applicable	Not applicable
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	2
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	11
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	Not applicable
Support:			
Sources	5a	Indicate sources of financial or other support for the review	11
Sponsor	5b	Provide name for the review funder and/or sponsor	11
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	11
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known	3-4
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	5
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	5
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	5-6
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	Appendix 2

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Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	6
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	6
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	7
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	7
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	8
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	6-7
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	8
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	8
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	Not applicable
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	8
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	Not applicable
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Not applicable

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

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Clinical practice guidelines and expert consensus statements on rehabilitation for patients with COVID-19: protocol for a systematic review

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Keywords: Methodological quality, reporting quality, AGREE II, RIGHT statement, systematic review

Word count: 2375words

Abstract

Introduction: Coronavirus disease 2019 (COVID-19) is a highly infectious disease, characterized by respiratory, physical and psychological dysfunctions. Rehabilitation

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could effectively alleviate the symptoms and promote the recovery of physical and mental health of patients with COVID-19. Recently, rehabilitation medical institutions have issued clinical practice guidelines (CPGs) and expert consensus statements involved recommendations of rehabilitation assessments and therapies for COVID-19. This systematic review aims to assess the methodological quality and reporting quality, evaluate the heterogeneity of the recommendations and summarize the recommendations of rehabilitation assessments and therapies for COVID-19, so as to give quick references for front-line clinicians, therapists and patients, and provide reasonable suggestions for future guideline makers.

Methods and analysis: We will search electronic databases [PubMed, Embase, Chinese Biomedical Literature Database (CBM), Chinese Science and Technology Periodical Database (VIP), Wanfang database and China National Knowledge Infrastructure (CNKI)] and websites of governments or organizations [e.g. The National Guideline Clearinghouse (NGC), Guidelines International Network (GIN), National Institute for Health and Clinical Excellence (NICE), Scottish Intercollegiate Guidelines Network (SIGN), and WHO] for eligible CPGs and expert consensus statements issued from inception to August 2022. The CPGs and expert consensus statements published in Chinese and English, and presenting recommendations of traditional Chinese medicine rehabilitation techniques and modern functional recovery techniques for COVID-19 will be included. While, reviews, interpretations, old versions of CPGs and expert consensus statements, or the management of other diseases during the epidemic will be excluded. Two reviewers will independently scrutinize

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study, extract data, appraise the methodological quality following the Appraisal of Guidelines for Research & Evaluation (AGREE) II tool, and assess the reporting quality with the Reporting Items for Practice Guidelines in healthcare (RIGHT) statement. We will use the Measurement Scale of Rate of Agreement (MSRA) to evaluate the heterogeneity of the recommendation in different CPGs and expert consensus statements. And we will also summarize the recommendations of rehabilitation for COVID-19. The above results will be narratively described and presented as tables or figures. Besides, the degree of agreement between reviewers will be calculated using intraclass correlation coefficient (ICC).

Ethics and dissemination: Ethics approval is not necessary for this protocol of systematic review because we will use information from published documents. Our findings will be published in a peer-reviewed journal according to the PRISMA guidelines.

Systematic review registration: PROSPERO (CRD42020190761)

Strengths and limitations of this study

- This is the first systematic review to comprehensively evaluate the methodological quality and reporting quality of included CPGs and expert consensus statements strictly following the AGREE II instrument and the RIGHT statement.
- We will use the MSRA to compare the heterogeneity of recommendations in different CPGs and expert consensus statements.
- The reviewers will be trained to use the AGREE II instrument and RIGHT tool, and ICC will be calculated to test the consistency between two assessors.

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- This study will include CPGs and expert consensus statements published in Chinese and English, the language bias is inevitable.
- The validity of the recommendations on rehabilitation for patients with COVID-19 can not be evaluated.

Introduction

Coronavirus disease 2019 (COVID-19) was declared as a pandemic by the World Health Organization (WHO) on 11 March 2020, which has affected more than 200 countries, with 524,339,768 confirmed cases and 6,281,260 deaths worldwide until May 25, 2022.[1-3] COVID-19 has posed a huge threat to the global public health, economy, and other aspects of people's daily life.[4] During hospitalization, patients with COVID-19 may suffer from dysfunctions of multisystem, including respiratory, cardiovascular, hematological, renal, digestive, neurological, psychiatric and metabolic system etc.[5-7] Among discharged patients with COVID-19, 76% of them have at least one or more symptoms, the most common symptoms were fatigue or muscle weakness (63%) and sleep difficulties (26%), accompanied by anxiety or depression (23%).[8] Meanwhile, COVID-19 vaccination as a safe and effective strategy has been developed to reduce mortality and severe ICU admission (both in general healthy population and clinically special population).[9] Recently, long COVID-19 syndrome has been used to describe persistent or developmental symptoms and signs after acute COVID-19.[10] Long COVID-19 syndrome is manifested as fatigue or muscle weakness, sleep difficulties, palpitations, joint/muscle pain, dizziness, chest pain and so on.[8 11] Long COVID-19 affects people's ability to resume normal life and work, increases the

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medical burden and the loss of economy and productivity.[10] Therefore, infection with COVID-19 and its long-term sequelae worth attention because the function of these people may deteriorate and require social welfares/medical health care in the future.[12] A systematic review of 5 randomized controlled trials have confirmed rehabilitation could improve dyspnea, muscle strength, walking capacity, sit-to-stand performance, anxiety and quality of life of patients with COVID-19.[13] In order to reduce the complications and disability rate and improve the overall function of patients at different stages of COVID-19, rehabilitation therapies should be carried out as early as possible.[5 14 15] So far, numerous CPGs and expert consensus statements of rehabilitation for COVID-19 patients have been published.[16-19] CPGs and expert consensus statements are developed to assist practitioners and patients to make decisions about appropriate healthcare for specific circumstances.[20] Notwithstanding, the different emphases of the guidelines, inconsistent or biased recommendations, low certainty of evidences in CPGs and expert consensus statements may decrease clinical application.[21 22] Moreover, low methodological quality may reduce the reliability of CPGs and expert consensus statements, attenuate compliance of CPGs and expert consensus statements in clinical practice, cause waste of medical resources and lead to confusion to clinicians, therapists and patients.[23 24] The reporting quality of CPGs and expert consensus statements is also important. Non-standard reporting could decrease the clarity and integrity of the content, and could not provide clear guidance for guidelines users.[25] Therefore, CPGs and expert consensus statements with high

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methodological quality and reporting quality can save medical resources and costs, and improve patients care and safety.

To the best of our knowledge, the methodological quality and reporting quality of CPGs and expert consensus statements have not been evaluated. Thus, the purpose of this systematic review is to assess the methodological quality and reporting quality of CPGs and expert consensus statements with the Appraisal of Guidelines for Research & Evaluation (AGREE) II tool and the Reporting Items for Practice Guidelines in healthcare (RIGHT) statement. Moreover, the heterogeneity of recommendations in different CPGs and expert consensus statements will be investigated using the Measurement Scale of Rate of Agreement (MSRA) and the current recommendations of rehabilitation for COVID-19 will be summarized, so as to provide some valuable suggestions for guideline users and the formulation of related guidelines of rehabilitation for COVID-19 in the future.

Methods and analysis

Protocol registration

This protocol has been registered on the International Prospective Register of Systematic Reviews (PROSPERO) (registration number CRD42020190761).

Eligibility criteria

Inclusion criteria

The inclusion criteria are as following: (1) CPGs and expert consensus statements of rehabilitation for COVID-19 are issued by nationally or internationally recognized government authorities, medical/academic societies, or organizations; (2) CPGs and

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expert consensus statements focus on patients with COVID-19. Patients with COVID-19 who are clinically diagnosed using any recognized diagnostic criteria (such as real-time quantitative polymerase chain reaction detection of new coronavirus nucleic acid was positive, and highly homologous with known new coronavirus[26]). There are no restrictions on age, gender, race or nation; (3) CPGs and expert consensus statements that provide recommendations of traditional Chinese medicine rehabilitation techniques (e.g. tuina, acupuncture, moxibustion, and taichi etc.) and modern functional recovery techniques (e.g. respiratory training, peripheral muscle training, psychosocial support and occupational therapies etc.). (4) If there are multiple versions of the CPGs and expert consensus statements, we will include the latest version.

Exclusion criteria

We will exclude CPGs and expert consensus statements that are not published in Chinese and English, the reviews, interpretations or the management of other diseases during the epidemic.

Search strategy

We will search PubMed, Embase, Chinese Biomedical Literature Database (CBM), Chinese Science and Technology Periodical Database (VIP), Wanfang database and China National Knowledge Infrastructure (CNKI) databases from inception to August 2022. In addition, we will search other sources of guidelines, including the National Guideline Clearinghouse (NGC), Guidelines International Network (GIN), Scottish Intercollegiate Guidelines Network (SIGN), National Institute for Health and Clinical Excellence (NICE), and WHO. Search terms will include words related to rehabilitation

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therapy, COVID-19, guidelines and expert consensus statements. The full search strategy is shown in supplementary file 1. We will also search the relevant websites of advising body or healthcare organization and review the reference lists of potentially eligible citations. The PRISMA flow chart is shown in supplementary file 2.

Study selection

All the retrieved records will be imported into EndNote X9 reference management software. After filtering the duplicates, two reviewers (YZ and YXL) will independently review the titles and abstracts to identify eligibile records and then download full texts for further screening. Any disagreements will be resolved in discussion with a third reviewer (JL) to reach consensus.

Data extraction

Two reviewers (DLZ and XBL) will extract data independently using a standardized data extraction form. We will extract the following items: (1) characteristics of CPGs and expert consensus statements: title, country of origin and publication year; (2) stages of disease; (3) recommended rehabilitation assessment; (4) recommended rehabilitation treatment; (5) related contents of methodological quality and reporting quality. The extracted data will be cross-checked by two reviewers. Any disagreements will be resolved through team discussion.

Quality assessment

We will evaluate methodological quality and reporting quality of included CPGs and expert consensus statements using the AGREE II tool and the RIGHT statement, respectively. Two assessors (YZ and YYZ) will study the AGREE II User's Manual

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and appraise guidelines with the My AGREE PLUS online appraisal platform (www.agreetrust.org) to practice the use of AGREE Ⅱ tool. Two assessors (YXL and DLZ) will study RIGHT checklist and detailed explanatory documents with examples (www.annals.org). Trained assessors will pre-assess and discuss the samples of eligible records. After that, they will independently assess the methodological quality and reporting quality of included CPGs and expert consensus statements. Discrepancies will be discussed and resolved through consulting a third reviewer(RJJ).

methodological quality

The AGREE II instrument is developed to evaluate the development and methodological quality of guidelines with high construct validity.[27] The AGREE II consists of two overall assessment with 23 items covering six domains: 1) scope and purpose (items 1-3), 2) stakeholder involvement (items 4-6), 3) rigour of development (items 7-14), 4) clarity of presentation (items 15-17), 5) applicability (items 18-21) and 6) editorial independence (items 22-23). Each item is ranked on a seven-point scale (1: strongly disagree to 7: strongly agree). The standardized score of each domain is calculated using the AGREE II formula [(Obtained score from all raters − Minimum possible score from all raters) / (Maximum possible score for all raters − Minimum possible score for all raters)] × 100. According to the criteria of previous guideline appraisals, 5 or 6 domains score > 60% are usually considered as high quality, 3 or 4 domains score > 60% are usually considered as moderate quality, 2 or fewer domains score > 60% are usually considered as low quality.[28 29]

reporting quality

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The RIGHT statement is used to evaluate the reporting quality of the CPGs and expert consensus statements, which helps guideline makers to report guidelines transparently and standardly.[25] It includes seven domains (22 items in total) as following: 1) basic information (items 1–4), 2) background (items 5–9), 3) evidence (items 10–12), 4) recommendations (items 13–15), 5) review and quality assurance (items 16–17), 6) funding, declaration and management of interest (items 18–19), and 7) other information (items 20–22). Each item will be judged as "Yes" (relevant information is sufficiently reported) or "No" (relevant information is lacking).[30]

Heterogeneity assessment in rehabilitation entries

If at least 4 CPGs and expert consensus statements recommend similar rehabilitation suggestion for patients with COVID-19, we will use the Measurement Scale of Rate of Agreement (MSRA) to compare the heterogeneity of this recommendation in different CPGs and expert consensus statements.[31-33] The scoring criteria is as following: 0% – 20%: radically different; 20% – 40%: numerous major differences; 40% – 60%: some major differences; 60% – 80%: only minor differences; 80% – 100%: essentially identical.[34 35]

Data analysis

To assess the degree of agreement between reviewers, the intraclass correlation coefficient (ICC) will be calculated using Statistical Package for Social Sciences (SPSS) 25.0. The scores will be defined as: poor 0.0-0.2, fair 0.21-0.4, moderate 0.41-0.6, good 0.61-0.8 and very good 0.81-1.00.[36]

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Textual descriptive synthesis and tables will be used to present the recommended rehabilitation assessments and therapies for different stages or different dysfunctions of COVID-19. We will list the reporting rate of each items and overall rate in tables to reflect the methodological quality and reporting quality of included CPGs and expert consensus statements.

Patient and public involvement

Patients and public are not involved in the design and conduction of this study.

Ethics and dissemination

No ethics approval is required for this systematic review because we will use information from published documents. Our findings will be published in a peer-reviewed journal according to the PRISMA guidelines.

Strengths and limitations of this study

This systematic review has several strengths. Firstly, to our knowledge, this will be the first systematic review to comprehensively assess the methodological quality and reporting quality of CPGs and expert consensus statements on rehabilitation for COVID-19. Secondly, the appraisers will be extensively trained to use the AGREE II instrument and RIGHT tool, and ICC will be calculated to test the consistency between two assessors. Thirdly, MSRA will be used to evaluate the heterogeneity of recommendations in the CPGs and expert consensus statements. Fourthly, we will summarize the recommendations of rehabilitation assessments and therapies for COVID-19 in CPGs and expert consensus statements according to the stages of disease or different dysfunctions.

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However, there are some limitations in this study: (1) We will search CPGs and expert consensus statements published in Chinese and English, language bias may exist. (2) The validity of the recommendations on rehabilitation for COVID-19 can not be evaluated.

The protocol amendments on PROSPERO will be updated if necessary and we intend to publish this study in peer-reviewed journal. It is hoped that our results could provide reasonable suggestions for guideline makers to develop higher quality CPGs and expert consensus statements or improve existing ones, and give quick references of rehabilitation therapy for clinicians and patients who are in the battle against COVID-19.

Declarations

Consent for publication

Not applicable.

Contributors

RJJ and JL designed the study. YZ, YXL and DLZ drafted the manuscript. YXL and YZ will search the literature. YZ, YYZ, YXL and DLZ will conduct the quality assessment. DLZ and XBL will analyze the data. YZ, YXL and DLZ contributed equally to this work and shared first authorship. All authors approved the manuscript.

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Competing interests

The authors declare that they have no competing interests.

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Supplementary file 1. Search Strategy

Search Strategy for PubMed

Number	Search terms
#1	Coronavirus[MeSH Terms]
#2	coronavirus infections[MeSH Terms]
#3	COVID-19[Title/Abstract] OR COVID-19 pneumonia[Title/Abstract] OR novel coronavirus[Title/Abstract] OR novel coronavirus pneumonia[Title/Abstract] OR coronaviru*[Title/Abstract] OR 2019-ncov [Title/Abstract] OR 2019-ncov pneumonia[Title/Abstract] OR novel cov[Title/Abstract] OR severe acute respiratory syndrome cov2[Title/Abstract] OR SARS-CoV-2[Title/Abstract] OR severe acute respiratory disease[Title/Abstract]
#4	#1 OR #2 OR #3
#5	rehabilitation [MeSH Terms]
#6	rehab*[Title/Abstract] OR respiratory rehabilitation [Title/Abstract] OR pulmonary rehabilitation [Title/Abstract] OR exercise therap* [Title/Abstract] OR physio[Title/Abstract] OR physiotherap*[Title/Abstract] OR physical therap*[Title/Abstract] OR PT[Title/Abstract] OR traditional Chinese medicine rehabilitation [Title/Abstract]
#7	#5 OR #6
#8	guideline[Title/Abstract] OR practice guideline[Title/Abstract] OR CPG[Title/Abstract] OR consensus development conference[Title/Abstract] OR consensus[Title/Abstract] OR consensus statement[Title/Abstract] OR expert consensus[Title/Abstract] OR standards[Title/Abstract] OR recommendation[Title/Abstract]
#9	#4 AND #7 AND #8

Search Strategy for Embase

Number	Search terms
#1	'coronavirus disease 2019'/exp
#2	'covid-19':ti,ab,kw OR 'covid-19 pneumonia':ti,ab,kw OR 'novel coronavirus':ti,ab,kw OR 'novel coronavirus pneumonia':ti,ab,kw OR coronaviru*:ti,ab,kw OR '2019 ncov':ti,ab,kw OR '2019-ncov pneumonia':ti,ab,kw OR 'novel cov':ti,ab,kw OR 'severe acute respiratory syndrome cov2':ti,ab,kw OR 'sars cov 2':ti,ab,kw OR 'severe acute respiratory disease':ti,ab,kw
#3	#1 OR #2
#4	'rehabilitation'/exp
#5	rehab*:ti,ab,kw OR 'respiratory rehabilitation':ti,ab,kw OR 'pulmonary rehabilitation':ti,ab,kw OR 'exercise therap*':ti,ab,kw OR physio:ti,ab,kw OR

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	physiotherap*:ti,ab,kw OR 'physical therap*':ti,ab,kw OR pt:ti,ab,kw OR 'traditional chinese medicine rehabilitation':ti,ab,kw
#6	#4 OR #5
#7	'guideline'/exp
#8	guideline:ti,ab,kw OR 'practice guideline':ti,ab,kw OR cpg:ti,ab,kw OR 'consensus development conference':ti,ab,kw OR consensus:ti,ab,kw OR 'consensus statement':ti,ab,kw OR 'expert consensus':ti,ab,kw OR standards:ti,ab,kw OR recommendation:ti,ab,kw
#9	#7 OR #8
#10	#3 AND #6 AND #9

Search Strategy for CBM

Number	Search terms
#1	COVID-19 OR SARS-CoV-2 OR 冠状病毒 OR 严重急性呼吸综合征 OR 非典型肺炎 OR 2019 新型冠状病毒 OR 肺炎 OR 呼吸衰竭[常用字段:智能]
#2	康复 OR 呼吸康复 OR 肺康复 OR 运动训练 OR 物理疗法 OR 中医康复 OR 太极拳 OR 八段锦 OR 六字诀 OR 传统功法 OR 冥想 OR 针刺 OR 艾灸 OR 针灸 OR 灸法 OR 穴位敷贴 OR 推拿 OR 按摩[常用字段:智能]
#3	指南 OR 专家共识 OR 专家意见 OR 指导意见 OR 建议 OR 方案 OR 标准 OR 规范 OR 推荐 OR 共识声明[常用字段:智能]
#4	#1 AND #2 AND #3

Search Strategy for VIP

Number	Search terms
#1	题名或关键词:COVID-19 OR SARS-CoV-2 OR 冠状病毒 OR 严重急性呼吸综合征 OR 非典型肺炎 OR 2019 新型冠状病毒 OR 肺炎 OR 呼吸衰竭
#2	题名或关键词:康复 OR 呼吸康复 OR 肺康复 OR 运动训练 OR 物理疗法 OR 中医康复 OR 太极拳 OR 八段锦 OR 六字诀 OR 传统功法 OR 冥想 OR 针刺 OR 艾灸 OR 针灸 OR 灸法 OR 穴位敷贴 OR 推拿 OR 按摩
#3	题名或关键词:指南 OR 专家共识 OR 专家意见 OR 指导意见 OR 建议 OR 方案 OR 标准 OR 规范 OR 推荐 OR 共识声明
#4	#1 AND #2 AND #3

Search Strategy for Wan Fang database

Number	Search terms
#1	题名或关键词:COVID-19 OR SARS-CoV-2 OR 冠状病毒 OR 严重急性呼吸综合征 OR 非典型肺炎 OR 019 新型冠状病毒 OR 肺炎 OR 呼吸衰竭
#2	题名或关键词:康复 OR 呼吸康复 OR 肺康复 OR 运动训练 OR 物理疗法 OR 太极拳 OR 中医康复 OR 八段锦 OR 六字诀 OR 传统功法 OR 冥想 OR 针刺

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	OR 艾灸 OR 针灸 OR 灸法 OR 穴位敷贴 OR 推拿 OR 按摩
#3	题名或关键词:指南 OR 专家共识 OR 专家意见 OR 指导意见 OR 建议 OR 方案 OR 标准 OR 规范 OR 推荐 OR 共识声明
#4	#1 AND #2 AND #3

Search Strategy for CNKI

Number	Search terms
#1	SU='COVID-19'+'SARS-CoV-2'+'冠状病毒'+'严重急性呼吸综合征'+'非典型肺炎'+'2019 新型冠状病毒'+'肺炎'+'呼吸衰竭'
#2	SU='康复'+'呼吸康复'+'肺康复'+'运动训练'+'物理疗法'+'中医康复'+'太极拳'+'八段锦'+'六字诀'+'传统功法'+'冥想'+'针刺'+'艾灸'+'灸法'+'穴位敷贴'+'推拿'+'按摩'
#3	SU='指南'+'专家共识'+'专家意见'+'指导意见'+'建议'+'方案'+'标准'+'规范'+'推荐'+'共识声明'
#4	#1 AND #2 AND #3

SU=主题

Search Strategy for NGC, GIN, SIGN, NICE and WHO

Number	Search terms
#1	COVID-19 OR COVID-19 pneumonia OR novel coronavirus OR novel coronavirus pneumonia OR coronaviru OR 2019-ncov OR 2019-ncov pneumonia OR novel cov OR severe acute respiratory syndrome cov2 OR SARS-CoV-2 OR severe acute respiratory disease
#2	rehabilitation OR respiratory rehabilitation OR pulmonary rehabilitation OR exercise therapy OR OR physiotherapy OR physical therapy OR traditional Chinese medicine rehabilitation
#3	#1 AND #2

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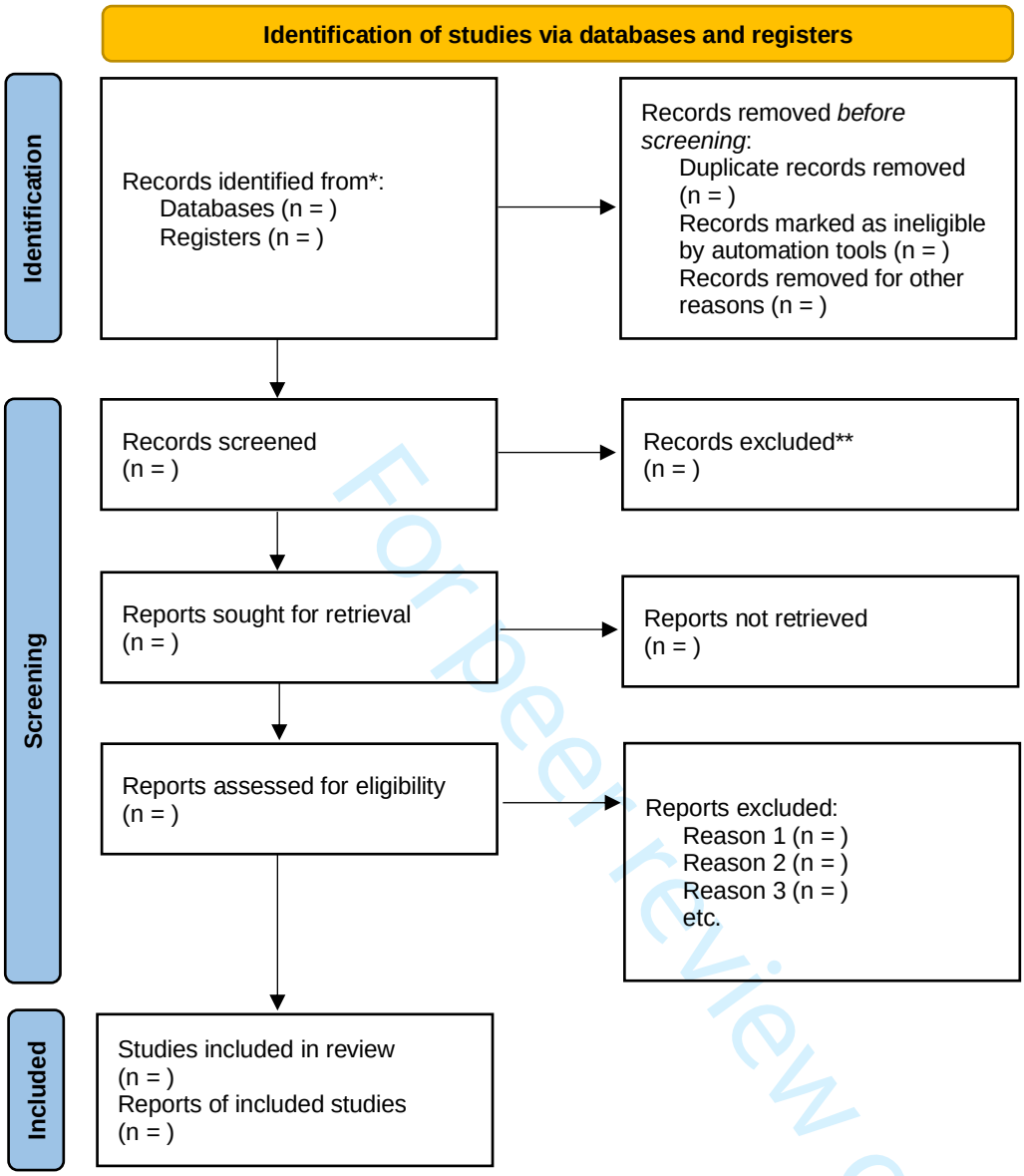
PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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Clinical practice guidelines and expert consensus statements on rehabilitation for patients with COVID-19: protocol for a systematic review

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Keywords: Methodological quality, reporting quality, AGREE II, RIGHT statement, systematic review.

Abstract

Introduction: Coronavirus disease 2019 (COVID-19) is a highly infectious disease, characterized by respiratory, physical and psychological dysfunctions. Rehabilitation could effectively alleviate the symptoms and promote recovery of the physical and mental health of patients with COVID-19. Recently, rehabilitation medical institutions have issued clinical practice guidelines (CPGs) and expert consensus statements

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involving recommendations for rehabilitation assessments and rehabilitation therapies for COVID-19. This systematic review aims to assess the methodological quality and reporting quality of the guidance documents, evaluate the heterogeneity of the recommendations, and summarize the recommendations with respect to rehabilitation assessments and rehabilitation therapies for COVID-19 to provide a give quick reference for front-line clinicians, therapists, and patients, as well as reasonable suggestions for future guidelines.

Methods and analysis: The electronic databases PubMed, Embase, Chinese Biomedical Literature Database (CBM), Chinese Science and Technology Periodical Database (VIP), Wanfang Database and China National Knowledge Infrastructure (CNKI), and websites of governments or organizations (e.g. National Guideline Clearinghouse, Guidelines International Network, National Institute for Health and Clinical Excellence, Scottish Intercollegiate Guidelines Network, and WHO) will be searched for eligible CPGs and expert consensus statements issued from inception to August 2022. CPGs and expert consensus statements published in Chinese or English and presenting recommendations for modern functional recovery techniques and/or of traditional Chinese medicine rehabilitation techniques for COVID-19 will be included. Reviews, interpretations, old versions of CPGs and expert consensus statements, and those for the management of other diseases during the pandemic will be excluded. Two reviewers will independently review each article, extract data, appraise the methodological quality following the Appraisal of Guidelines for Research & Evaluation (AGREE) II tool, and assess the reporting quality with the Reporting Items

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for Practice Guidelines in Healthcare (RIGHT) statement. The Measurement Scale of Rate of Agreement (MSRA) will be used to evaluate the heterogeneity of the recommendations in different CPGs and expert consensus statements. Agreement between reviewers will be calculated using the intraclass correlation coefficient. We will also summarize the recommendations for rehabilitation in patients with COVID-19. The results will be narratively described and presented as tables or figures.

Ethics and dissemination: Ethics approval is not needed for this systematic review because only information from published documents will be used. The findings will be submitted for publication in a peer-reviewed journal and reported in accordanc with PRISMA guidelines.

Systematic review registration number: PROSPERO, CRD42020190761.

Strengths and limitations of this study

- This systematic review will comprehensively evaluate the methodological and reporting quality of clinical practice guidelines (CPGs) and expert consensus statements, strictly following the Appraisal of Guidelines for Research & Evaluation (AGREE) II instrument and the Reporting Items for Practice Guidelines in Healthcare (RIGHT) statement.
- The Measurement Scale of Rate of Agreement will be used to compare the heterogeneity of recommendations in different CPGs and expert consensus statements.

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- The reviewers will be trained to use the AGREE II instrument and the RIGHT tool, and the intraclass correlation coefficient will be calculated to test the consistency between the two assessors.
- This study will include CPGs and expert consensus statements published in Chinese or English, so any guidance produced in other languages will be excluded.
- The validity of the recommendations on rehabilitation for coronavirus disease 2019 (COVID-19) patients cannot be evaluated.

Introduction

Coronavirus disease 2019 (COVID-19) was declared a pandemic by the World Health Organization (WHO) on 11 March 2020 and has affected more than 200 countries, with 551,226,298 confirmed cases and 6,345,595 deaths worldwide until July 8, 2022.[1-3] COVID-19 has posed a huge threat to global public health, the economy, and other aspects of people's daily life.[4] During hospitalization, COVID-19 patients may suffer from multisystem dysfunctions, including respiratory, cardiovascular, hematological, renal, digestive, neurological, psychiatric, and metabolic systems.[5-7] Of those patients with discharged COVID-19, 76% of them have at least one or more symptoms, the most common symptoms were fatigue or muscle weakness (63%) and sleep difficulties (26%), accompanied by anxiety or depression (23%).[8] Meanwhile, COVID-19 vaccination has been developed as a safe and effective strategy to reduce mortality and severe ICU admission (both in the general healthy population and clinically vulnerable population).[9] Recently, long COVID-19 syndrome has been used to describe persistent

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or developmental symptoms and signs after acute COVID-19.[10] Long COVID-19 syndrome is manifested as fatigue or muscle weakness, sleep difficulties, palpitations, joint/muscle pain, dizziness, chest pain and so on.[8 11] Long COVID-19 affects people's ability to resume normal life and work, increases the medical burden, and causes the loss of economy and productivity.[10] Therefore, COVID-19 infection and its long-term sequelae are worthy of attention because the function of these people may deteriorate and require social welfares/medical health care in the future.[12]

A systematic review of five randomized controlled trials confirmed that rehabilitation could improve dyspnea, muscle strength, walking capacity, sit-to-stand performance, anxiety and quality of life of COVID-19 patients.[13] Rehabilitation therapies should be carried out as early as possible to reduce the complications and disability rate and improve the patients' overall function at different stages of COVID-19.[5 14 15] So far, numerous clinical practice guidelines (CPGs) and expert consensus statements of rehabilitation for COVID-19 patients have been published,[16-19] and they have been developed to assist practitioners and patients in making decisions about appropriate healthcare for specific circumstances.[20] Notwithstanding, the different emphases of the guidelines, inconsistent or biased recommendations, low certainty of evidences in CPGs and expert consensus statements may decrease clinical application.[21 22] Moreover, low methodological quality may reduce the reliability of CPGs and expert consensus statements, attenuate compliance of CPGs and expert consensus statements in clinical practice, waste medical resources and lead to confusion among clinicians, therapists, and patients.[23 24] The reporting quality of CPGs and expert consensus

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statements are also important. Non-standard reporting could decrease the clarity and integrity of the content, and not provide clear guidance for guidelines users.[25] Therefore, CPGs and expert consensus statements with high methodological quality and reporting quality can save medical resources and costs, and improve patients care and safety.

The methodological quality and reporting quality of CPGs and expert consensus statements have not been evaluated. Thus, this systematic review aims to assess the methodological quality and reporting quality of CPGs and expert consensus statements with the Appraisal of Guidelines for Research & Evaluation (AGREE) II tool and the Reporting Items for Practice Guidelines in Healthcare (RIGHT) statement. Moreover, the heterogeneity of recommendations in different CPGs and expert consensus statements will be investigated using the Measurement Scale of Rate of Agreement (MSRA) and the current recommendations of rehabilitation for COVID-19 will be summarized to provide some valuable suggestions for guideline users and the formulation of related guidelines of rehabilitation for COVID-19 in the future.

Methods and analysis

Protocol registration

This protocol was registered on the International Prospective Register of Systematic Reviews (PROSPERO) (CRD42020190761).

Eligibility criteria

Inclusion criteria

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The inclusion criteria are: (1) CPGs and expert consensus statements of rehabilitation for COVID-19 issued by nationally or internationally recognized government authorities, medical/academic societies, or organizations; (2) CPGs and expert consensus statements focusing on COVID-19 patients. COVID-19 patients who are clinically diagnosed using any recognized diagnostic criteria (such as positive real-time quantitative polymerase chain reaction detection of new coronavirus nucleic acid, and highly homologous with known new coronavirus[26]). There are no restrictions on age, gender, race, or nationality; (3) CPGs and expert consensus statements that provide recommendations for modern functional recovery techniques (e.g. respiratory training, peripheral muscle training, psychosocial support and occupational therapies, etc.) and/or traditional Chinese medicine rehabilitation techniques (e.g. tuina, acupuncture, moxibustion, Tai Chi, etc.); (4) If there are multiple versions of the CPGs and expert consensus statements, only the latest version will be included.

Exclusion criteria

CPGs and expert consensus statements not published in Chinese and English, and reviews, interpretations, and guidance for the management of other diseases during the pandemic will be excluded.

Search strategy

The databases PubMed, Embase, Chinese Biomedical Literature Database (CBM), Chinese Science and Technology Periodical Database (VIP), Wanfang, and China National Knowledge Infrastructure (CNKI) will be searched from inception to August 2022. In addition, other international online repositories of guidelines, including the

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National Guideline Clearinghouse (NGC), Guidelines International Network (GIN), Scottish Intercollegiate Guidelines Network (SIGN), National Institute for Health and Clinical Excellence (NICE), and WHO will be searched using terms related to rehabilitation therapy, COVID-19, guidelines and expert consensus statements. The full search strategies of each database are displayed in supplementary file 1. The relevant websites of advising bodies or healthcare organizations (such as the European Society of Physical and Rehabilitation Medicine, American Congress of Rehabilitation Medicine, Canadian Association of Physical Medicine and Rehabilitation, etc.) will also be searched. Rehabilitation experts in this field will be consulted, and the reference lists of potentially eligible citations will be reviewed. PRISMA flow chart is demonstrated in supplementary file 2.

Study selection

All retrieved records will be imported into EndNote X9 reference management software. After removing the duplicates, two reviewers (YZ and YXL) will independently review the titles and abstracts to identify eligibile records and download the full texts for further screening. Any disagreements will be resolved in discussion with a third reviewer (JL).

Data extraction

Two reviewers (DLZ and XBL) will extract the data independently using a standardized data extraction form, including: (1) the characteristics of CPGs and expert consensus statements: title, country of origin and publication year; (2) stages of disease; (3) recommended rehabilitation assessment; (4) recommended rehabilitation treatment; (5)

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related contents of methodological quality and reporting quality. The extracted data will be cross-checked by two reviewers, and any disagreements will be resolved through team discussion.

Quality assessment

The methodological quality and reporting quality of the included CPGs and expert consensus statements will be evaluated using AGREE II tool and RIGHT statement, respectively. Two assessors (YZ and YYZ) will study the AGREE II User's Manual and appraise guidelines with My AGREE PLUS online appraisal platform (www.agreetrust.org) to practice the AGREE Ⅱ tool. Two assessors (YXL and DLZ) will study RIGHT checklist and detailed explanatory documents with examples (www.annals.org). Trained assessors will pre-assess and discuss the samples of eligible records, then independently assess the methodological quality and reporting quality of the included CPGs and expert consensus statements. Discrepancies will be discussed and resolved through consultation with a third reviewer (RJJ).

Methodological quality

The AGREE II instrument is developed to evaluate the development and methodological quality of guidelines with high construct validity.[27] The AGREE II consists of two overall assessment with 23 items covering six domains: (1) scope and purpose (items 1-3), (2) stakeholder involvement (items 4-6), (3) rigour of development (items 7-14), (4) clarity of presentation (items 15-17), (5) applicability (items 18-21) and (6) editorial independence (items 22-23). Each item is ranked on a seven-point scale (1: strongly disagree to 7: strongly agree) , and the standardized score is calculated

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using the AGREE II formula [(Obtained score from all raters − Minimum possible score from all raters) / (Maximum possible score for all raters − Minimum possible score for all raters)] × 100. According to the criteria of previous guideline appraisals, 5 or 6 domains scoring > 60% are usually considered as high quality, 3 or 4 domains scoring > 60% are usually considered as moderate quality, 2 or fewer domains scoring > 60% are usually considered as low quality.[28 29]

Reporting quality

The RIGHT statement is used to evaluate the reporting quality of the CPGs and expert consensus statements, which helps to report guidelines transparently and standardly.[25] It includes seven domains (22 items in total): (1) basic information (items 1-4), (2) background (items 5-9), (3) evidence (items 10-12), (4) recommendations (items 13-15), (5) review and quality assurance (items 16-17), (6) funding, declaration and management of interest (items 18-19), and (7) other information (items 20-22). Each item is judged as "Yes" (relevant information is sufficiently reported) or "No" (relevant information is lacking).[30]

Heterogeneity assessment in rehabilitation entries

If at least four CPGs and expert consensus statements recommend similar rehabilitation suggestions for COVID-19 patients, the Measurement Scale of Rate of Agreement (MSRA) will be used to compare the heterogeneity of this recommendation in different CPGs and expert consensus statements.[31-33] The scoring criteria are 0%-20%: radically different; 20%-40%: numerous major differences; 40%-60%: some major differences; 60%-80%: only minor differences; 80%-100%: essentially identical.[34 35]

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Data analysis

To assess the agreement between reviewers, the intraclass correlation coefficient (ICC) will be calculated using Statistical Package for Social Sciences (SPSS) 25.0. The scores will be defined as: poor 0.0-0.2, fair 0.21-0.4, moderate 0.41-0.6, good 0.61-0.8 and very good 0.81-1.00.[36]

The recommended rehabilitation assessments and therapies will be presented in textual descriptive synthesis and tables, with a clinical staging system (including early, development, critical, and recovery stage) used to stratify our findings if the clear clinical staging of COVD-19 is provided in the CPGs and expert consensus statements. Otherwise, our findings will be stratified according to the International Classification of Functioning, Disability and Health (ICF) framework (including body function and structure, activity, and participation). The reporting rate of each item and overall rate will be listed in tables to reflect the methodological quality and reporting quality of the included CPGs and expert consensus statements.

Patient and public involvement

None.

Ethics and dissemination

No ethics approval is required for this systematic review because only information from published documents will used. Our findings will be submitted for publication in a peer-reviewed journal and reported in accordance with PRISMA guidelines.

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Discussion

This systematic review has several strengths. First, to our knowledge, this will be the first systematic review to comprehensively assess the methodological quality and reporting quality of CPGs and expert consensus statements on rehabilitation for COVID-19. Second, the appraisers will be extensively trained to use the AGREE II instrument and the RIGHT tool, and ICC will be calculated to test the consistency between the assessors. Third, the MSRA will be used to evaluate the heterogeneity of recommendations in the CPGs and expert consensus statements. Fourth, we will summarize the recommendations of rehabilitation assessments and therapies for COVID-19 in CPGs and expert consensus statements according to the disease stages or different dysfunctions.

Nonetheless, this study has some limitations. First, there may be language bias as only CPGs and expert consensus statements published in Chinese or English will be included. Second, the validity of the recommendations on rehabilitation for COVID-19 cannot be evaluated.

It is anticipated that the review findings will lead to the development of reasonable suggestions to develop higher-quality CPGs and expert consensus statements or to improve existing guidelines, and quick references for COVID-19 rehabilitation therapies for clinicians and patients.

Declarations

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Consent for publication

Not applicable.

Contributors

JL designed the study. YZ, YXL and DLZ drafted the manuscript. YXL and YZ will search the literature. YZ, YYZ, YXL and DLZ will conduct the quality assessment. DLZ and XBL will analyze the data. RJJ and JL revised the manuscript. YZ, YXL and DLZ contributed equally to this work and shared first authorship. All authors approved the manuscript.

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Competing interests

The authors declare that they have no competing interests.

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Supplementary file 1. Search Strategy

Search Strategy for PubMed

Number	Search terms
#1	Coronavirus[MeSH Terms]
#2	coronavirus infections[MeSH Terms]
#3	COVID-19[Title/Abstract] OR COVID-19 pneumonia[Title/Abstract] OR novel coronavirus[Title/Abstract] OR novel coronavirus pneumonia[Title/Abstract] OR coronaviru*[Title/Abstract] OR 2019-ncov [Title/Abstract] OR 2019-ncov pneumonia[Title/Abstract] OR novel cov[Title/Abstract] OR severe acute respiratory syndrome cov2[Title/Abstract] OR SARS-CoV-2[Title/Abstract] OR severe acute respiratory disease[Title/Abstract]
#4	#1 OR #2 OR #3
#5	rehabilitation [MeSH Terms]
#6	rehab*[Title/Abstract] OR respiratory rehabilitation [Title/Abstract] OR pulmonary rehabilitation [Title/Abstract] OR exercise therap* [Title/Abstract] OR physio[Title/Abstract] OR physiotherap*[Title/Abstract] OR physical therap*[Title/Abstract] OR PT[Title/Abstract] OR traditional Chinese medicine rehabilitation [Title/Abstract]
#7	#5 OR #6
#8	guideline[Title/Abstract] OR practice guideline[Title/Abstract] OR CPG[Title/Abstract] OR consensus development conference[Title/Abstract] OR consensus[Title/Abstract] OR consensus statement[Title/Abstract] OR expert consensus[Title/Abstract] OR standards[Title/Abstract] OR recommendation[Title/Abstract]
#9	#4 AND #7 AND #8

Search Strategy for Embase

Number	Search terms
#1	'coronavirus disease 2019'/exp
#2	'covid-19':ti,ab,kw OR 'covid-19 pneumonia':ti,ab,kw OR 'novel coronavirus':ti,ab,kw OR 'novel coronavirus pneumonia':ti,ab,kw OR coronaviru*:ti,ab,kw OR '2019 ncov':ti,ab,kw OR '2019-ncov pneumonia':ti,ab,kw OR 'novel cov':ti,ab,kw OR 'severe acute respiratory syndrome cov2':ti,ab,kw OR 'sars cov 2':ti,ab,kw OR 'severe acute respiratory disease':ti,ab,kw
#3	#1 OR #2
#4	'rehabilitation'/exp
#5	rehab*:ti,ab,kw OR 'respiratory rehabilitation':ti,ab,kw OR 'pulmonary rehabilitation':ti,ab,kw OR 'exercise therap*':ti,ab,kw OR physio:ti,ab,kw OR

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	physiotherap*:ti,ab,kw OR 'physical therap*':ti,ab,kw OR pt:ti,ab,kw OR 'traditional chinese medicine rehabilitation':ti,ab,kw
#6	#4 OR #5
#7	'guideline'/exp
#8	guideline:ti,ab,kw OR 'practice guideline':ti,ab,kw OR cpg:ti,ab,kw OR 'consensus development conference':ti,ab,kw OR consensus:ti,ab,kw OR 'consensus statement':ti,ab,kw OR 'expert consensus':ti,ab,kw OR standards:ti,ab,kw OR recommendation:ti,ab,kw
#9	#7 OR #8
#10	#3 AND #6 AND #9

Search Strategy for CBM

Number	Search terms
#1	COVID-19 OR SARS-CoV-2 OR 冠状病毒 OR 严重急性呼吸综合征 OR 非典型肺炎 OR 2019 新型冠状病毒 OR 肺炎 OR 呼吸衰竭[常用字段:智能]
#2	康复 OR 呼吸康复 OR 肺康复 OR 运动训练 OR 物理疗法 OR 中医康复 OR 太极拳 OR 八段锦 OR 六字诀 OR 传统功法 OR 冥想 OR 针刺 OR 艾灸 OR 针灸 OR 灸法 OR 穴位敷贴 OR 推拿 OR 按摩[常用字段:智能]
#3	指南 OR 专家共识 OR 专家意见 OR 指导意见 OR 建议 OR 方案 OR 标准 OR 规范 OR 推荐 OR 共识声明[常用字段:智能]
#4	#1 AND #2 AND #3

Search Strategy for VIP

Number	Search terms
#1	题名或关键词:COVID-19 OR SARS-CoV-2 OR 冠状病毒 OR 严重急性呼吸综合征 OR 非典型肺炎 OR 2019 新型冠状病毒 OR 肺炎 OR 呼吸衰竭
#2	题名或关键词:康复 OR 呼吸康复 OR 肺康复 OR 运动训练 OR 物理疗法 OR 中医康复 OR 太极拳 OR 八段锦 OR 六字诀 OR 传统功法 OR 冥想 OR 针刺 OR 艾灸 OR 针灸 OR 灸法 OR 穴位敷贴 OR 推拿 OR 按摩
#3	题名或关键词:指南 OR 专家共识 OR 专家意见 OR 指导意见 OR 建议 OR 方案 OR 标准 OR 规范 OR 推荐 OR 共识声明
#4	#1 AND #2 AND #3

Search Strategy for Wan Fang database

Number	Search terms
#1	题名或关键词:COVID-19 OR SARS-CoV-2 OR 冠状病毒 OR 严重急性呼吸综合征 OR 非典型肺炎 OR 019 新型冠状病毒 OR 肺炎 OR 呼吸衰竭
#2	题名或关键词:康复 OR 呼吸康复 OR 肺康复 OR 运动训练 OR 物理疗法 OR 太极拳 OR 中医康复 OR 八段锦 OR 六字诀 OR 传统功法 OR 冥想 OR 针刺

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	OR 艾灸 OR 针灸 OR 灸法 OR 穴位敷贴 OR 推拿 OR 按摩
#3	题名或关键词:指南 OR 专家共识 OR 专家意见 OR 指导意见 OR 建议 OR 方案 OR 标准 OR 规范 OR 推荐 OR 共识声明
#4	#1 AND #2 AND #3

Search Strategy for CNKI

Number	Search terms
#1	SU='COVID-19'+'SARS-CoV-2'+'冠状病毒'+'严重急性呼吸综合征'+'非典型肺炎'+'2019 新型冠状病毒'+'肺炎'+'呼吸衰竭'
#2	SU='康复'+'呼吸康复'+'肺康复'+'运动训练'+'物理疗法'+'中医康复'+'太极拳'+'八段锦'+'六字诀'+'传统功法'+'冥想'+'针刺'+'艾灸'+'灸法'+'穴位敷贴'+'推拿'+'按摩'
#3	SU='指南'+'专家共识'+'专家意见'+'指导意见'+'建议'+'方案'+'标准'+'规范'+'推荐'+'共识声明'
#4	#1 AND #2 AND #3

SU=主题

Search Strategy for NGC, GIN, SIGN, NICE and WHO

Number	Search terms
#1	COVID-19 OR COVID-19 pneumonia OR novel coronavirus OR novel coronavirus pneumonia OR coronaviru OR 2019-ncov OR 2019-ncov pneumonia OR novel cov OR severe acute respiratory syndrome cov2 OR SARS-CoV-2 OR severe acute respiratory disease
#2	rehabilitation OR respiratory rehabilitation OR pulmonary rehabilitation OR exercise therapy OR OR physiotherapy OR physical therapy OR traditional Chinese medicine rehabilitation
#3	#1 AND #2

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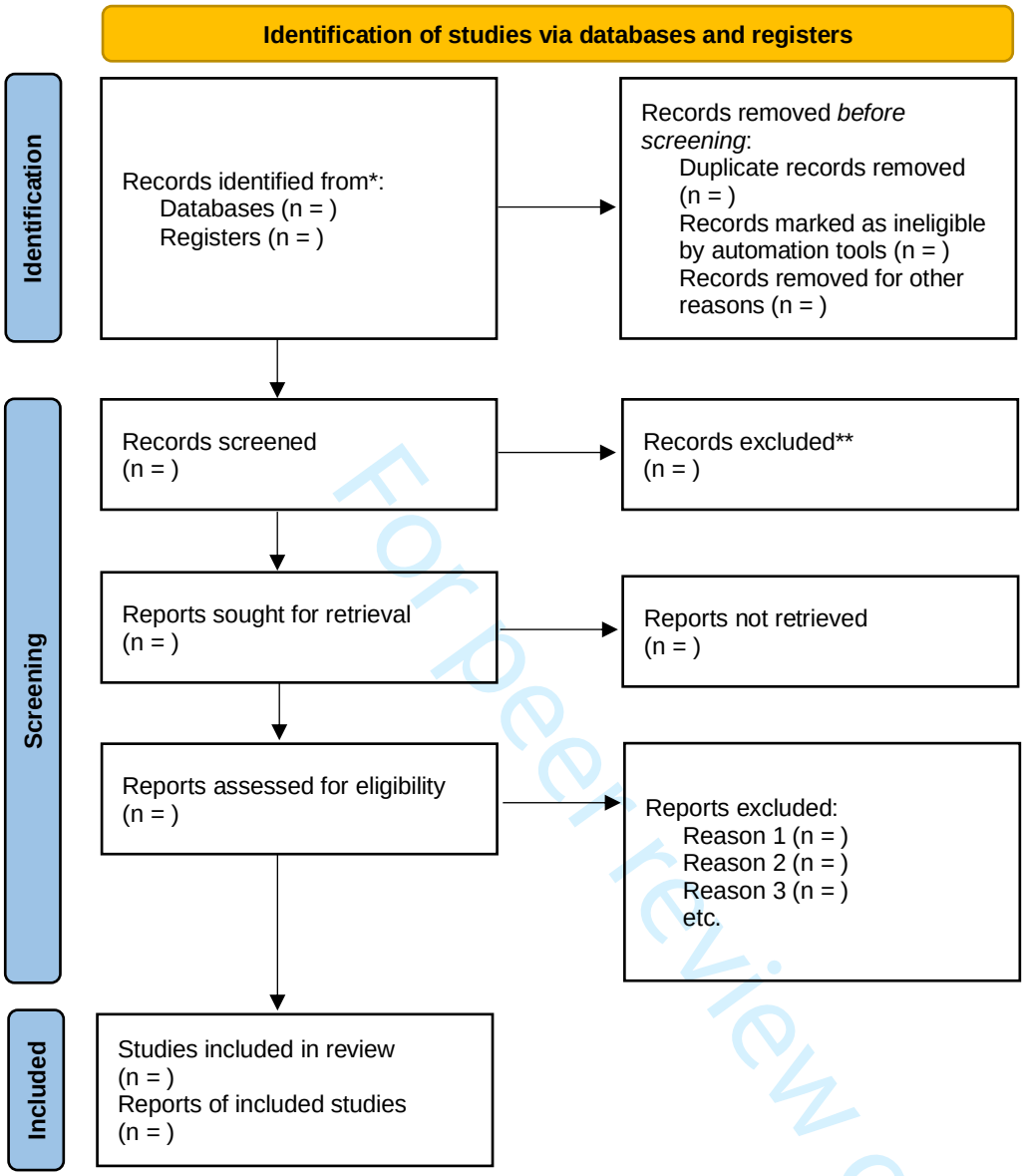
PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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