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PREVALENCE OF DEPRESSION AMONG HEALTH PROFESSIONALS DURING THE COVID-19 PANDEMIC: A SYSTEMATIC REVIEW AND META-ANALYSIS PROTOCOL

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COVER LETTER

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Dear Editor-in-Chief,

We would like to send for your evaluation the manuscript: **"PREVALENCE OF DEPRESSION AMONG HEALTH PROFESSIONALS DURING THE COVID-19 PANDEMIC: A SYSTEMATIC REVIEW AND META-ANALYSIS PROTOCOL"** to publish in JBI Evidence Synthesis.

This systematic review/meta-analysis study aims at assessing the prevalence of depression among healthcare professionals during the COVID-19 pandemic.

We certify that there is no conflict of interest with any organization regarding the material discussed in the manuscript.

The manuscript content represents the views of the authors and they approved the manuscript and submission.

The manuscript has not been published and is not under consideration at another journal.

We would appreciate publishing our paper in this important journal.

Yours sincerely,

Ana Katherine Gonçalves

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PREVALENCE OF DEPRESSION AMONG HEALTH PROFESSIONALS DURING THE COVID-19 PANDEMIC: A SYSTEMATIC REVIEW AND META-ANALYSIS PROTOCOL

RUNNING HEAD: COVID-19 AND PREVALENCE OF DEPRESSION IN HEALTH PROFESSIONALS

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Contributors: LMFP, WFS, LTAM, and KSM designed this systematic review and meta-analysis. LMFP, drafted the manuscript, and KSM revised it. LMFP and KSM developed the search strategies and LMFP, WFS, and LTAM will implement it. LMFP, WFS, KSM, and LTAM will track potential studies, extract data, and assess the quality. In case of disagreement between the authors, AKG will advise on the methodology and will be the referee. RNC will complete the data synthesis. All authors have approved the final version of this manuscript.

Conflict of interest

The authors declare no conflicts of interest.

ABSTRACT

Objective: This systematic review/meta-analysis study aims at assessing the prevalence of depression among healthcare professionals during the COVID-19 pandemic.

Introduction: Studies carried out during previous pandemics revealed an increase in the prevalence of depression among health professionals. A high prevalence of depression is also observed in some health categories, during the COVID-19 pandemic.

Inclusion criteria: Observational studies published from December 2019, without language restrictions in which the prevalence of depression among health professionals during the COVID-19 pandemic will be assessed.

Methods: PubMed, Web of Science, Embase, CINAHAL, PsycINFO, LILACS, SCOPUS, and The Cochrane Library will be searched for eligible studies. Two reviewers will independently screen and select studies, assess methodological quality, and extract data. A meta-analysis will be performed, if possible, and the Grading of Recommendations Assessment Development and Evaluation (GRADE) Summary of Findings will be presented.

Systematic review registration number: CRD42020212036.

Keywords: Health Professions; Depression; Syndrome Depressive; COVID-19; SARS-Cov-2.

Introduction

The coronavirus disease (COVID-19) emerged in mid-December 2019 in Wuhan province, China, and is characterized as a severe acute respiratory syndrome (SARS-CoV-2). It was characterized as “pandemic” in mid-March 2020 due to high transmissibility and the lack of knowledge about this new virus. This pathology has been affecting every country in the world drastically (1-4). According to the World Health Organization (WHO, 2020), more than 9,129,146 cases of COVID-19 were detected and around 916,919 deaths occurred worldwide, in mid-September, with the USA and Brazil being the most affected countries (5).

In view of the current context, high levels of anxiety, stress, and depression are already observed in the general population, including health professionals who care for patients with COVID-19, who are the most vulnerable to infection. Long work shifts, with few resources and poor infrastructure, fear of self-inoculation, and concern about the possibility of spreading the virus to their families, can result in different levels of psychological pressure. These conditions can trigger feelings of loneliness and helplessness, or a series of emotional states, such as stress, irritability, physical and mental fatigue, and despair. Work overload and symptoms related to stress make health professionals especially vulnerable to psychological suffering, which puts them at increased risk for developing psychiatric disorders (6, 7).

Health professionals directly involved in the diagnosis, treatment, and care of patients with COVID-19 are at high risk of developing psychological distress and other mental health symptoms. This is because they work under extreme pressure, are exposed to high levels of stress, work prolonged shifts, have excessive workload, sometimes work without training, and often do not receive appropriate personal protective equipment. Moreover, they face unprecedented situations, such as allocating scarce resources to equally needy patients, providing assistance with restricted or inadequate resources, and a lack of specific drugs (8, 9). Throughout history, it has been observed that during a health crisis, health teams tend to mobilize more actively, causing them to forget about the risk transmissibility of the infection. For example, during the severe acute respiratory syndrome (SARS) outbreak in 2003, 18% to 57% of health professionals presented serious emotional problems and psychiatric symptoms during and after the event (10). In 2015, during Middle East respiratory syndrome, depression and stress

were observed among health professionals. Frontline professionals were demonstrated to be at a higher risk of developing post-traumatic stress disorder (PTSD). There are also studies that show increased levels of stress, depression, anxiety, and PTSD among professionals even after some time had transpired since the end of the outbreak (11, 12).

Some studies performed in order to explore the psychiatric repercussions in health professionals during the COVID-19 pandemic presented significant results. Elbay et al. (2020) reports that according to data collected in China during the COVID-19 pandemic, health professionals had a high prevalence of depression, being reported by 50% of the professionals interviewed (13). Zhang et al. (2020) also demonstrate that health workers, including doctors, showed a higher prevalence of insomnia, anxiety, depression, somatization, and obsessive-compulsive symptoms (14). In another study conducted by Lai et al. (2020), a large number of participants presented symptoms of depression, anxiety, insomnia, and distress (15). Finally, Song et al. (2020), found prevalence rates of depressive symptoms of 25.2 % among 14,825 doctors and nurses in 31 provinces of mainland China (16).

However, we have not identified a systematic review exclusively on the prevalence of depression among health professionals during a pandemic. For this reason, this systematic review aims to uncover the real prevalence of depression among healthcare professionals during the COVID-19 pandemic.

Review questions

What is the prevalence of depression among health professionals during the COVID-19 pandemic?

Materials and methods

Protocol and registration

This protocol is registered with the International Prospective Register of Systematic Reviews (PROSPERO) under the CRD number CRD42020212036. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-P) (17) guidelines were used to design this systematic review protocol and will follow the JBI methodology for systematic reviews.

Inclusion criteria

This systematic review protocol will include the following studies:

Participants

- Studies on healthcare professionals and the development of depression during the COVID-19 pandemic;
- Studies published from December 2019 until December 2020.

Exposure

- Health professionals involved at the frontline of combating COVID-19.

Outcome

- The outcome of interest is the prevalence of depression among health professionals during the COVID-19 pandemic. The outcome must be measured after the exposure assessment, using the following scales: Patient Health Questionnaire-9 (PHQ-9) (18, 19); Depression Anxiety Stress Scales (DASS-21) (20, 21), Self Rating Depression Scale (SDS) (22, 23), and Beck Depression Inventory (BDI) (24, 25).

Types of studies

Only specific human observational study designs will be included such as: longitudinal cohort studies (prospective and retrospective), cross-sectional studies, and case-control studies. Case series and case reports will be excluded due to their low level of scientific evidence. Randomized controlled trials and quasi-experiments will also be excluded because this review does not examine the role of any intervention related to depression. There will be no language restrictions when selecting studies.

Exclusion criteria

1. Case reports, case studies, letters to the editor, fact sheets, conference abstracts and review articles.
2. Studies with children and adolescents <18 years.
3. Studies that include health professionals with other medical conditions.

Information sources

A search will be conducted in the following databases: PubMed, Web of Science, Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHAL), PsycINFO, Latin American and Caribbean Literature in Health Sciences (LILACS), SCOPUS, and The Cochrane Library, will be searched for articles dated between December 2019 and December 2020. The reference lists will be screened. The search strategy will be to use the medical subjective headings (MeSH) and terms that have been included in Table 1. The literature screening will be performed by four reviewers.

Search

The terms of the MeSH will be: (Health Professions OR Health Occupation OR Health Profession OR Nurses OR Nursing Personnel OR Physicians OR Doctor OR Physiotherapist OR Physical Therapists) AND (Depressive Disorder OR Syndrome Depressive OR Depression OR Depressive Neuroses) AND (COVID-19 OR SARS-Cov-2 OR severe acute respiratory syndrome coronavirus 2 OR Pandemics OR coronavirus disease 2019) AND (Epidemiology OR Prevalence OR Observational Study OR Longitudinal Studies OR Cross-sectional Studies OR Cohort Studies OR Case-control Studies)) (Table 1).

Table 1 Medline search strategy.

Table 1	**Medline search strategy**
Search items	
1	Health Professions
2	Health Occupation
3	Health Profession
4	Nurses OR Nursing Personnel
5	Physicians

6	Doctor
7	Physiotherapist
8	Physical Therapists
9	Depressive Disorder
10	Syndrome Depressive
11	Depression
12	Depressive Neuroses
13	COVID-19
14	SARS-Cov-2
15	Severe acute respiratory syndrome coronavirus 2
16	Pandemic
17	Coronavirus disease 2019
18	Epidemiology
19	Prevalence
20	Observational Study
21	Longitudinal Studies
22	Cross-sectional Studies
23	Cohort Studies
24	Case-control Studies

Study selection

Four authors, KSM, LMFP, WFS, and LTAM will select the articles independently, using titles and abstracts. Duplicate studies will be excluded. The

same authors will review the text to determine whether the studies meet the inclusion criteria. A fifth reviewer, AKG, will solve the discrepancies. The selection of the studies will be summarized in a PRISMA flow diagram (figure 1).

Figure 1 Flow diagram of the search for eligible studies on the prevalence of depression among health professionals during the COVID-19 pandemic: CENTRAL, Cochrane Central Register of Controlled Trials.

Data collection process

A standardized data extraction form will be developed and tested. Data from each included study will be extracted independently by two reviewers (ACS and APFC), and any subsequent discrepancies will be resolved through discussion with a third reviewer (AKG). The data extracted will include information on authors, year of publication, study location, type of study, main objectives, population, depression assessment, risk factors, protective factors, assessment tools, use of medications, biological variables, treatment, and patient outcomes. Furthermore, participant characteristics (e.g., mean age, gender), and results for the prevalence will be collected.

For data collection, the following scores for the scales will be standardized:

- For the PHQ-9 scale (18, 19), ≥ 10 is a common threshold for clinically significant depression.

- For the DASS-21(20, 21) scale, a score greater than or equal to 10 is to be considered for depression.

- The SDS (22, 23) shows that most people with depression scores between 50 and 69, while a score of 70 and above indicates severe depression, conforming to the WHO.

- As for the BDI (24, 25) instrument, the following characteristics are to be considered: “non-depressed” subgroup, BDI ≤15; “dysphoria” subgroup, 16 ≤ BDI ≤ 20; “depressed” subgroup, BDI >20.

The study authors will be contacted in case of missing data and/or to resolve any uncertainties. In addition, any additional information will be recorded. All data entries will be checked twice. If we find a set of articles with similar characteristics based on the information in the data extraction table, we will perform

a meta-analysis using a random-effects model. If there is data that are not clear in some articles, the corresponding author will be contacted for possible clarification.

Assessment of methodological quality

The methodological quality of each included study will be assessed by two reviewers (KSM and APFC) independently. They will do so using a widely-recognized standardized critical appraisal instrument from the Joanna Briggs Institute for the following study types: cohort studies (retrospective and prospective) and case-control studies (26). Study authors will be contacted in the event of insufficient details to confidently assess the methodological quality.

The risks of bias of observational studies will be assessed by two reviewers (KSM and ACS) independently using the Checklist for Prevalence Studies The Joanna Briggs Institute (27).

The tool evaluates biases from confounding factors, selection of participants into the studies, missing data, and measurement of outcomes. Any unresolved disagreements will be resolved through discussion and/or consensus with a third reviewer (RNC). Study authors will be contacted in the event of insufficient details to confidently assess the risk of bias.

Assessing certainty in the findings

The quality of evidence for all outcomes will be assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach (28). The quality of the evidence will be assessed based on the risk of bias, indirectness, inconsistency, imprecision, and publication bias.

Synthesis of results

Individual studies (≥2), where possible, will be pooled in a meta-analysis using Review Manager V.5.1. Some degree of heterogeneity is expected across the studies; therefore, a random-effects model for meta-analysis will be applied. Effect sizes will be expressed as risk ratios, odds ratios, or prevalence ratios (for dichotomous data) and weighted (or standardized) mean differences (for continuous data) and their 95% confidence intervals (CI) will be calculated. Cohort estimates will be presented as risk ratios or prevalence ratios with 95% CI, and

case-control estimates will be presented as odds ratios with 95% CI. The degree of statistical heterogeneity will be assessed using standard I^2 squared statistics. Where statistical pooling is not possible and/or there is substantial heterogeneity, we will provide a narrative synthesis of the study findings. Sensitivity analyses will be performed to explore the impact of the quality of the included studies. Publication bias will be assessed if more than 10 studies were included using a funnel plot. To assess funnel plot asymmetry, Egger's test (for continuous outcomes) will be performed.

Discussion

Health professionals who work at the frontline of combating COVID-19 are at risk for developing depression for various reasons on account of the psychological stress they suffer (29, 30). However, several factors can cause psychological distress for health professionals during this pandemic as the psychological needs of these professionals are neglected in such situations (31). According to Zhang et al. (2020), during the COVID-19 pandemic, some medical health workers developed psychosocial problems while others presented risk factors for developing them. The study showed that these professionals had a higher prevalence of insomnia, anxiety, depression, somatization, and obsessive-compulsive symptoms on account of being engaged in combating COVID-19. These health professionals deal with psychological distress and the risk of allostatic overload (14). Lai et al. (2020) also showed that a considerable proportion of participants related symptoms of depression, anxiety, insomnia, and distress between the contacted individuals in their study. Nurses, women, frontline health care workers, and those working in Wuhan, China, reported more severe degrees mental health distress 15). In addition, Song et al. (2020) found that medical and nursing staff workers in Hubei province were associated with a higher risk of depressive symptoms, while those working in the Hubei province but residing in another province had a lower risk of depressive symptoms and PTSD. All the studies pointed out the importance of implementing psychological interventions to promote mental health among these professionals (16).

One cross-sectional study was conducted in India among healthcare workers directly involved in triage, screening, diagnosing, and treating COVID-19 patients and suspects. The prevalence of health professionals with high-level stress was 3.7%, while the prevalence rates of professionals with depressive symptoms requiring treatment and anxiety symptoms requiring further evaluation were 11.4% and 17.7%, respectively. Women had approximately twice the increased odds of developing high-level moderator stress, depressive symptoms requiring treatment, and anxiety symptoms requiring further evaluation (32). In Brazil, a survey was conducted using social media and administrative emails to Brazilian active healthcare professionals during the COVID-19 outbreak. The results showed that new insomnia symptoms or previous insomnia worsening occurred in 41.4% of the professionals. Prevalent anxiety and burnout during the pandemic were observed in 44.2% and 21% of participants, respectively. Multivariate analyses showed that females, weight change, prevalent anxiety, new-onset burnout, and family income reduction >30% were independently associated with new-onset or worsening of previous insomnia (33).

The countries with the highest number of COVID-19 cases and deaths were the USA, Brazil, and India, where working conditions differ from those in China. Additionally, socio-cultural differences and socioeconomic disparities may be related to the development of depression among health professionals (34). Another factor to consider is geographic location, which was also a risk factor in Italy's study that compared stress and anxiety between healthcare workers and general population (35)

A study capable of identifying countries with a higher number of health professionals with depression will promote adoption of strategies to prevent and treat the disease, thereby allowing these professionals to not have to leave their work activities. The last systematic review (36) on the subject sought studies until April 2020, after which there was a peak in the pandemic in several other countries, which may have increased the prevalence of depression. Further, the latter did not focus solely on assessing the prevalence of depression and mainly included studies with professionals from China, with no data from other countries with a higher number of cases.

Thus, a systematic review that evaluates the real prevalence of depression among health professionals in the pandemic and identifies professional categories with increased risk for developing depression is critical. This is because preventive and therapeutic measures focused on specific groups based on the evidence generated by the study tend to be more effective.

Ethics and dissemination

Ethical approval is not required because this systematic review will use published data. The findings of this systematic review will be published in a peer-reviewed journal. Due revision to the conclusions of the systematic review will be made in light of any new evidence.

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Figure

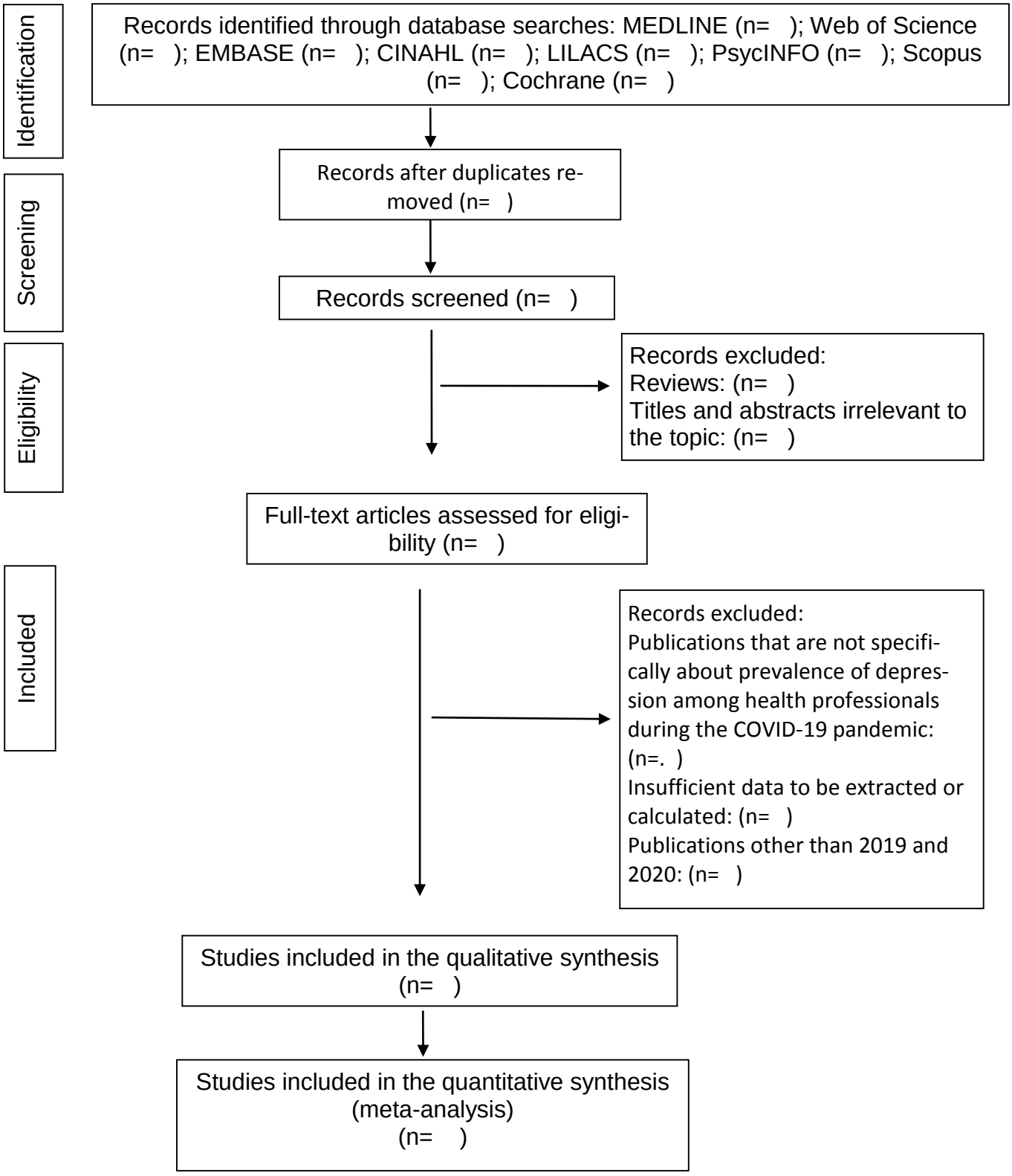

Figure 1 Flow diagram of the search for eligible studies on the prevalence of depression among health professionals during the COVID-19 pandemic: CENTRAL, Cochrane Central Register of Controlled Trials.

CERTIFICATE OF ENGLISH EDITING

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Title Of The Paper

PREVALENCE OF DEPRESSION AMONG HEALTH PROFESSIONALS DUR-ING THE COVID-19 PANDEMIC: A SYSTEMATIC REVIEW AND META-ANALYSIS PROTOCOL

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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
ADMINISTRATIVE INFORMATION		
Title:		
Identification	1a	Identify the report as a protocol of a systematic review
Update	1b	If the protocol is for an update of a previous systematic review, identify as such
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number
Authors:		
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review
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
Support:		
Sources	5a	Indicate sources of financial or other support for the review
Sponsor	5b	Provide name for the review funder and/or sponsor
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol
INTRODUCTION		
Rationale	6	Describe the rationale for the review in the context of what is already known
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)
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
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
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
Study records:		
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review

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)
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
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
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale
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
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised
	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)
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)

*** 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.**

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