Risk of Bias of a Systematic review with or without a meta-analysis
Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement

Reporting guideline provided for?
(i.e. exactly what the authors state in the paper)

Systematic reviews and meta-analyses

PRISMA checklist (Word)  PRISMA flow diagram (Word)

Full bibliographic reference


This guideline was published simultaneously in 6 journals. You can read the guideline in any of these journals using the links below.
Some clinical journals provide specific guidance to the authors regarding SR manuscripts but many don’t

- Reporting of a SR greatly affects its usefulness
- To maximize transparency and reproducibility, all data should be made available
  - SRDR https://srdr.ahrq.gov
  - Cochrane library
  - Full length evidence reports
  - Online supplementary materials (hosted by journals)
Tools for assessing ROB of a systematic review

- ROB of a systematic review (with or without meta-analysis)
  - Two tools: AMSTAR* (assessing mostly “reporting quality”) & ROBIS** (new tool and have questions addressing ROB in a systematic review)
  - Not ROB of a primary study nor a strength of evidence (SOE) rating
  - Not all SRs performed SOE assessment
  - It is important to perform ROB assessment of SRs when existing SRs are integrated into a new SR but many challenges remained

Ways to integrate existing SRs into a new SR

- Assuming that at least one relevant existing review has been identified that is considered of “acceptable quality,” there are several ways to integrate existing SR(s) into a new SR:
  - Use review without modifying or adding new studies
  - Use review and add new studies
  - Use review with new or modified analysis
  - Use selected elements of review

Figure 1 Methodological steps in using existing systematic reviews (SRs).

1. Locate existing SR(s)
2. Assess relevance
   - Questions
   - Methods
   - Search dates
3. Assess quality of existing SR(s)
4. Determine appropriate use and incorporate existing SR(s)
5. Report methods and results from using existing SR(s)

Stop. Proceed with SR of primary evidence
Use “almost” relevant SRs to frame and provide context (Contextual Use)
Scan References of “almost” relevant SRs to check new search results
Scan references, check new search results
Use complete review
Use existing data abstraction, study-level risk of bias assessments and/or synthesis
Use existing search
AMSTAR – a measurement tool to assess the methodological quality of systematic reviews.

1. Was an 'a priori' design provided?
The research question and inclusion criteria should be established before the conduct of the review.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: Need to refer to a protocol, ethics approval, or pre-determined/a priori published research objectives to score a "yes."

2. Was there duplicate study selection and data extraction?
There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: 2 people do study selection, 2 people do data extraction, consensus process or one person checks the other's work.

3. Was a comprehensive literature search performed?
At least two electronic sources should be searched. The report must include years and databases used (e.g., Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: If at least 2 sources + one supplementary strategy used, select "yes" (Cochrane register/Central counts as 2 sources; a grey literature search counts as supplementary).

4. Was the status of publication (i.e. grey literature) used as an inclusion criterion?
The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: If review indicates that there was a search for "grey literature" or "unpublished literature," indicate "yes." SIGLE database, dissertations, conference proceedings, and trial registries are all considered grey for this purpose. If searching a source that contains both grey and non-grey, must specify that they were searching for grey/unpublished lit.

5. Was a list of studies (included and excluded) provided?
A list of included and excluded studies should be provided.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: Acceptable if the excluded studies are referenced. If there is an electronic link to the list but the link is dead, select "no."

6. Were the characteristics of the included studies provided?
In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g., age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: Acceptable if not in table format as long as they are described as above.

7. Was the scientific quality of the included studies assessed and documented?
A priori methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: Can include use of a quality scoring tool or checklist, e.g., Jadad scale, risk of bias, sensitivity analysis, etc., or a description of quality items, with some kind of result for EACH study ("low" or "high" is fine, as long as it is clear which studies scored "low" and which scored "high"), a summary score/range for all studies is not acceptable.

8. Was the scientific quality of the included studies used appropriately in formulating conclusions?
The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: Might say something such as "the results should be interpreted with caution due to poor quality of included studies." Cannot score "yes" for this question if scored "no" for question 7.

9. Were the methods used to combine the findings of studies appropriate?
For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e., Chi-squared test for homogeneity, I²). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e., is it sensible to combine)?

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: Indicate "yes" if they mention or describe heterogeneity, i.e., if they explain that they cannot pool because of heterogeneity/variability between interventions.

10. Was the likelihood of publication bias assessed?
An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test, Hedges-Olken).

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: If no test values or funnel plot included, score "no". Score "yes" if mentions that publication bias could not be assessed because there were fewer than 10 included studies.

11. Was the conflict of interest included?
Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.

   □ Yes
   □ No
   □ Can't answer
   □ Not applicable

Note: To get a "yes," must indicate source of funding or support for the systematic review AND for each of the included studies.

| ROBIS | Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4687950/ |

<table>
<thead>
<tr>
<th>Signaling questions</th>
<th>1. Did the review adhere to predefined objectives and eligibility criteria?</th>
<th>2. Did the search include an appropriate range of databases/electronic sources for published and unpublished reports?</th>
<th>3. Were efforts made to minimize error in data collection?</th>
<th>4. Did the synthesis include all studies that it should?</th>
<th>A. Did the interpretation of findings address all of the concerns identified in domains 1 to 4?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 Were the eligibility criteria appropriate for the review question?</td>
<td>1.2 Were the eligibility criteria appropriate for the review question?</td>
<td>2.2 Were methods additional to database searching used to identify relevant reports?</td>
<td>3.2. Were sufficient study characteristics available for both review authors and readers to be able to interpret the results?</td>
<td>4.2. Were all predefined analyses reported or departures explained?</td>
<td>B. Was the relevance of identified studies to the review’s research question appropriately considered?</td>
</tr>
<tr>
<td>1.3 Were eligibility criteria unambiguous?</td>
<td>1.3 Were eligibility criteria unambiguous?</td>
<td>2.3 Were the terms and structure of the search strategy likely to retrieve as many eligible studies as possible?</td>
<td>3.3. Were all relevant study results collected for use in the synthesis?</td>
<td>4.3. Was the synthesis appropriate given the nature and similarity in the research questions, study designs, and outcomes across included studies?</td>
<td>C. Did the reviewers avoid emphasizing results on the basis of their statistical significance?</td>
</tr>
<tr>
<td>1.4 Were all restrictions in eligibility criteria based on study characteristics appropriate?</td>
<td>1.4 Were all restrictions in eligibility criteria based on study characteristics appropriate?</td>
<td>2.4 Were restrictions based on date, publication format, or language appropriate?</td>
<td>3.4. Was risk of bias (or methodologic quality) formally assessed using appropriate criteria?</td>
<td>4.4. Was between-study variation minimal or addressed in the synthesis?</td>
<td></td>
</tr>
<tr>
<td>1.5 Were any restrictions in eligibility criteria based on sources of information appropriate?</td>
<td>1.5 Were any restrictions in eligibility criteria based on sources of information appropriate?</td>
<td>2.5 Were efforts made to minimize error in selection of studies?</td>
<td>3.5. Were efforts made to minimize error in risk of bias assessment?</td>
<td>4.5. Were the findings robust, for example, as demonstrated through funnel plot or sensitivity analyses?</td>
<td></td>
</tr>
<tr>
<td>Judgment</td>
<td>Concerns regarding specification of study eligibility criteria</td>
<td>Concerns regarding methods used to identify and/or select studies</td>
<td>Concerns regarding methods used to collect data and appraise studies</td>
<td>Concerns regarding the synthesis</td>
<td>Risk of bias in the review</td>
</tr>
</tbody>
</table>
What’s new in ROBIS compared to AMSTAR?

- The tool is completed in 3 phases: (1) assess relevance (optional), (2) identify concerns with the review process and (3) judge risk of bias.
- Phase 2 covers four domains through which bias may be introduced into a systematic review: study eligibility criteria; identification and selection of studies; data collection and study appraisal; and synthesis and findings.
- Phase 3 assesses the overall risk of bias in the interpretation of review findings and whether this considered limitations identified in any of the Phase 2 domains.