Quality of published systematic reviews and meta-analyses in medicine and environmental health

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Outline

Methodological quality of systematic reviews

Reporting quality of systematic reviews

Possible explanations

Summary
Methodological versus Reporting Quality

- **Methodological quality**
  - How well a systematic review was *designed* and *conducted*
  - e.g. comprehensive literature search

- **Reporting quality:**
  - How well the methods and results were *described* in systematic review reports
  - e.g. clear presentation of meta-analyses

Pussegoda et al. Syst Rev 2017;6:131
Methodological quality of systematic reviews of health and medical research
Adherence to conduct standards (AMSTAR)

Pussegoda et al. Systematic Reviews (2017) 6:131
DOI 10.1186/s13643-017-0527-2

Systematic review adherence to methodological or reporting quality

Kusala Pussegoda¹, Lucy Turner¹, Chantelle Garrity¹,², Alain Mayhew¹,³, Becky Skidmore¹, Adrienne Stevens¹,², Isabelle Boutron⁴, Rafael Sarkis-Onofre⁵, Lise M. Bjerre³,⁶,⁷, Asbjørn Hróbjartsson⁸, Douglas G. Altman⁹ and David Moher¹⁰

23 studies evaluating 1,794 systematic reviews against AMSTAR
All systematic reviews published before 2017
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Percentage</th>
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<tr>
<td>'a priori' design used</td>
<td>100%</td>
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<tr>
<td>Publication status used as inclusion criterion</td>
<td>100%</td>
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<tr>
<td>Comprehensive search performed</td>
<td>100%</td>
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<tr>
<td>Duplicate study selection and data extraction</td>
<td>100%</td>
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<tr>
<td>List of studies provided</td>
<td>100%</td>
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<td>Characteristics of included studies provided</td>
<td>100%</td>
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<tr>
<td>Quality of included studies assessed</td>
<td>100%</td>
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<tr>
<td>Meta-analysis methods were appropriate</td>
<td>100%</td>
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<td>Likelihood of publication bias assessed</td>
<td>100%</td>
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<td>Quality of studies considered in conclusions</td>
<td>100%</td>
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<tr>
<td>Conflicts of interest stated</td>
<td>100%</td>
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Adherence to conduct standards (AMSTAR) in 1,974 SRs

- 'a priori' design used: 46%
- Publication status used as inclusion criterion: 57%
- Comprehensive search performed: 64%
- Duplicate study selection and data extraction: 30%
- List of studies provided: 30%
- Characteristics of included studies provided: 80%
- Quality of included studies assessed: 67%
- Meta-analysis methods were appropriate: 65%
- Likelihood of publication bias assessed: 56%
- Quality of studies considered in conclusions: 33%
- Conflicts of interest stated: 39%
Reporting quality of systematic reviews of health and medical research
OBJECTIVE
To investigate the prevalence and reporting characteristics (n=87) of systematic reviews indexed in MEDLINE® in February 2014
Results

682 systematic reviews published in a single month (Feb 2014)

= >8,000 per year
= 22 per day

11,749* systematic reviews indexed in PubMed in 2018

Improvements in reporting 2004 to 2014 (300 SRs per period)

- "Systematic review" or "meta-analysis" in title/abstract: 50% (2004), 85% (2014)
- Eligible language criteria stated: 55% (2004), 84% (2014)
- Number of studies identified, screened and included: 42% (2004), 78% (2014)
Areas for improvement in reporting 2004-2014 (300 SRs per period)

- Review protocol mentioned (in non-Cochrane reviews): 14%
- Full electronic search strategy reported: 42%
- Risk of bias/quality formally assessed: 67%
- Primary outcome stated: 51%
- Harms considered (in therapeutic reviews): 74%
- Funding source of review reported: 59%

Areas for improvement in reporting 2004-2014 (300 SRs per period)

- Full electronic search strategy reported: 42% (2004) vs 45% (2014)
- Primary outcome stated: 51% (2004) vs 47% (2014)
- Funding source of review reported: 59% (2004) vs 64% (2014)

Funding source of review reported

Harms considered (in therapeutic reviews)

Evaluations of the uptake and impact of the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) Statement and extensions: a scoping review

Matthew J. Page¹ and David Moher²,³
Systematic review of studies evaluating adherence to PRISMA

Searched MEDLINE® to July 2017

Included studies evaluating adherence to PRISMA in systematic reviews published 2010 onwards

Pooled number of systematic reviews adhering to each item across all studies

27 studies included

2,357 systematic reviews evaluated
Adherence to reporting standards (PRISMA) in 2,357 SRs
Adherence to reporting standards (PRISMA) in 2,357 SRs

13 items adhered to by <80% SRs
8 items adhered to by <67% SRs

Page and Moher. Syst Rev 2017;6:263
Adherence to reporting standards (PRISMA) in 2,357 SRs

- Limitations: 78%
- Structured summary: 77%
- Data collection process: 77%
- Data items: 75%
- RoB in individual studies (methods): 69%
- RoB within studies (results): 62%
- Additional analyses (methods): 59%
- Search: 58%
- Additional analysis (results): 57%
- Funding: 57%
- RoB across studies (methods): 54%
- RoB across studies (results): 52%
- Protocol and registration: 16%

13 items adhered to by <80% SRs
8 items adhered to by <67% SRs

Page and Moher. Syst Rev 2017;6:263
- 154 systematic reviews cited in National Comprehensive Cancer Network guidelines

- 35% presented insufficient info to reproduce all meta-analyses
Pre-publication quality at *Environment International*
Assessment of 52 SRs submitted April 2018-April 2019

- 65% show critical issues in defining research objectives
- 60% used search strategies likely to miss key evidence and/or don’t provide transparent methods
- 38% at high risk of failing to include all relevant evidence
- 83% used invalid study appraisal instruments, or often none at all
- 62% employ flawed methods for synthesising the findings of included studies

Whaley (personal communication)
Possible explanations
Why are there so many systematic reviews of poor quality?

- Lack of awareness of conduct/reporting standards
- Few strategies available to implement reporting guidelines
- Lack of involvement of librarians, methodologists and statisticians
- (Perceived) lack of suitable methods for all fields
- Lack of understanding of resources required
- “Publish or perish” culture
Summary
Summary

Systematic reviews should be able to provide credible evidence for decision making

Evidence that many systematic reviews:

– fail to adhere to existing conduct and reporting guidelines for systematic reviews

– fail to report methods and results in a way that allows users to reproduce them