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Methodological quality is underrated in systematic reviews and meta-analyses in health psychology

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Abstract

Objectives: In this paper, we compile and describe the main approaches proposed in the literature to include methodological quality (MQ) or risk of bias (RoB) into research synthesis. We also meta-review how the RoB of observational primary studies is being assessed and to what extent the results are incorporated in the conclusions of research synthesis.

Study Design and Setting: Electronic databases were searched for systematic reviews or meta-analyses related to health and clinical psychology. A random sample of 90 reviews published between January 2010 and May 2016 was examined.

Results: A total of 46 reviews (51%) performed a formal assessment of the RoB of primary studies. Only 17 reviews (19%) linked the outcomes of quality assessment with the results of the review.

Conclusion: According to the previous literature, our results corroborate the lack of guidance to incorporate the RoB assessment in the results of systematic reviews and meta-analyses. Our recommendation is to appraise MQ according to domains of RoB to rate the degree of credibility of the results of a research synthesis, as well as subgroup analysis or meta-regression as analytical methods to incorporate the quality assessment.

Keywords: Methodological quality; Risk of bias; Research synthesis; Systematic review; Meta-analysis; Meta-review

1. Introduction

Nowadays, there is broad consensus among the scientific community on the relevance of assessing the methodological quality (MQ) of the studies, especially when carrying out a research synthesis [1,2]. Assessing the MQ of the primary studies in the context of a systematic review or meta-analysis (MA) is often a challenging process [3,4], especially when the synthesis is based on observational studies [5].

However, the debate continues about how we should define, assess and, especially, incorporate MQ into research synthesis [6,7]. Regarding the latter, several studies have explored the role of MQ in systematic reviews and MA [8–11], but to date, guidelines on how to incorporate quality into the conclusions of a research synthesis remain scarce and vague [10].

On the other hand, previous research findings do not seem conclusive about the influence of the MQ of primary studies on the MA results [12–14]. Furthermore, certain methods proposed to incorporate the MQ, as for instance, weighting effect sizes (ESs) on the basis of MQ appraisal could be introducing bias in the results of MA [12,15].

Considering the large number of questions which remain unanswered about the inclusion of MQ in research synthesis, this review aims to identify the strengths and weaknesses of the different approaches proposed to date, as well as to find out if there is a consensus procedure to carry out the inclusion of MQ into an MA. This general objective is based on the following specific objectives:

- Review the approaches to the assessment of the MQ of primary studies.
- Review the main strategies to include MQ into systematic reviews and MA.

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What is new?

Key findings

- Only 11% of the reviews analyzed used a standard tool that assess the different domains of risk of bias (RoB) and stated the influence of the methodological quality (MQ) of primary studies on their results.
- Only two of the proposed analytical methods to include MQ into research synthesis can be recommended without reservation and only when there is enough statistical power: subgroup analysis and meta-regression.
- Our results pointed out the lack of specific guidance to incorporate the RoB assessment in the results of systematic reviews and meta-analysis (MA).

What this study adds to what was known?

- This article sets out the most common ways to manage MQ in a research synthesis as well as the implications of each of these alternatives.
- This paper provides a thorough meta-review that appraise in depth how MQ is being assessed and incorporated into research synthesis based on primary studies with cohort and case−control designs.

What is the implication and what should change now?

- It is necessary to work to generate solid, well-defined, and replicable procedures that guide the incorporation of the MQ of primary studies into systematic reviews and meta-analyses. This may substantially improve the decisions taken according to evidence-based practice.
- Our proposal is to use the assessment of MQ preferably in two ways: (1) to rate the degree of credibility of the results of a systematic review or a MA and (2) to improve the quality of research in a particular area and to reduce the heterogeneity attributable to the RoB.

- Meta-review how published systematic reviews and MA (1) assess the MQ of primary studies, (2) incorporate the MQ of primary studies, and (3) take into account the influence of the MQ of primary studies on the conclusions of the research syntheses.

2. Approaches to the assessment of the MQ of primary studies

Although there is no absolute consensus on what is and what should encompass the definition of MQ, in recent years, many authors and organizations (e.g., the Cochrane Collaboration [16] and GRADE guidelines [17]) have adopted the risk of bias (RoB) framework. According to the Cochrane Collaboration, RoB in a systematic review may be defined as the risk that the results overestimate or underestimate the true effect of the intervention [16]. Generalizing to other causal effects, Viswanathan and Berkman [18] consider that a central goal is the assessment of the believability of the findings, which entails evaluating the degree to which the effects reported by the study represent the true causal relationship between exposure and outcome. The RoB framework allows for a more accurate assessment of the main sources of bias that undermine the validity of a study [2]. Moreover, this perspective of MQ allows us to contextualize the importance of the different sources of bias depending on the study design and the field of the review [16]. In this paper, we refer to MQ within the RoB framework.

Moreover, and despite it not being the main purpose of this paper, it is essential to note that the assessment of MQ within the RoB framework presents some critical challenges, which clearly influence the use of MQ in research synthesis:

- The lack of validation of many of the assessment tools available make it difficult to appraise the MQ of the studies in a valid and reliable way [19−23]. This becomes more complex when the research synthesis includes observational research, which encompasses more diverse study designs than experimental research and in which authors often create their own ad hoc assessment tools [19,24].
- Although the use of global quality scores has been widely criticized [25−28], many quality assessment tools are still reducing the set of MQ domains to a single numerical value. This approach completely overlooks the fact that the relative importance of each of these domains can vary depending on the study design, the research field, or the research aim itself [13].
- Last but not least, it is the problem caused by poor reporting of primary studies [7,10,13] that, despite the existence of many standards about this issue (e.g., CONSORT [29] or STROBE [5]), results in incomplete information in many studies, thus making it impossible to obtain a proper assessment of MQ.

3. Strategies to incorporate MQ into research synthesis

To date, several strategies have been proposed to include the MQ component in a research synthesis [8,12,13,30]. Table 1 shows a classification of the methods available in four general approaches which do not exclude each other. Below are described the main features and criticisms of each method.

3.1. MQ as inclusion criteria in research synthesis

This approach uses a quality-based threshold to decide the inclusion of primary studies in the review or in primary