PRISMA 2020 – An updated checklist for systematic reviews and meta-analyses

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COMMENTARY

Scientific studies investigating the same question often report different results. The sources of the differences may be chance, the study of diverse populations, the use of different methodologies, or due to several biases, to cite some. Systematic reviews and meta-analyses aim to integrate these differences to provide a higher level of evidence. With a larger combined sample size, they can overcome the imprecision related to sampling error. Investigating the sources of between-study heterogeneity, they may provide hints about differences between populations or methodologies. Indeed, they may even suggest the presence of reporting or excess significance biases.

However, these noble aims may vanish if the review fails to adhere to a series of recommendations. For example, the inclusion of the original studies must follow a set of inclusion and exclusion criteria. Otherwise, the authors of the review may unconsciously "cherry-pick" the studies that confirm their hypothesis – while ignoring other papers that might contradict it. Similarly, data collection must be accurate enough to avoid typographical errors that may ultimately impact the results. And so on.

To help the readers of a review know if the authors followed these recommendations, Moher and collaborators provided in 2009 the PRISMA statement, which has been adopted widely by the systematic review community. They now offer a revised and improved PRISMA 2020 version [1], with increased clarity and updated to reflect recent advances in systematic review methodology and terminology. Interestingly, they also describe the process of updating the statement, which included a survey about potential modifications and member meetings [2].

It is worth mentioning that the PRISMA 2020 statement also includes a checklist for the paper's abstract and an expanded checklist. The latter may be necessary for specific domains. For example, one item of the (standard) list asks to report summary estimates with their precision, but the adequacy of such statistics for voxel-based meta-analyses may be debatable. Only some voxel-based meta-analysis methods return these statistics [3]. And for the ones that do, the authors can only sensibly report them for the "peaks" (of statistical significance), which might show inflated effects [4]. Fortunately, the PRISMA "expanded" checklist broadens the item to report additional statistics that may be more sensible in this context, such as the p-value, the number of studies, or the sample size.

Given the PRISMA 2020 statement is designed primarily for systematic reviews of the effects of interventions, I would personally suggest readers, reviewers, and editors weigh each item's relevance in the checklist when applied to other fields. Some items are of paramount importance. For example, failure to follow inclusion and exclusion criteria may lead to potentially severely biased reviews. Conversely, the non-fulfillment of other items may have milder consequences. For instance, there might be fewer data transcription errors in voxel-based neuroimaging meta-analyses if two (instead of one) researchers independently copy the peak coordinates reported in the manuscripts. But data collection errors only add noise; they should not bias the outcome. Indeed, in this context, the number of researchers collecting the data may be less critical than their experience, as inexperienced researchers might systematically include all small volume corrections peaks, potentially biasing the review. Conversely, I would advocate for some

tolerance in the new items' compliance, such as the protocol's pre-registration, until the statement becomes a standard.

On the other hand, in some cases, the readers may need additional tools to know whether the review or meta-analysis effectively fulfills some PRISMA 2020 items. For example, one item of the list asks to assess the studies' risk of bias. Authors of reviews and meta-analyses usually report significant differences in age or sex between patients and controls, as they are a well-known potential source of bias in most fields. Conversely, they may overlook substantial differences in other variables whose impact depends on the field, such as IQ or education, which may be relevant in cognitive studies while probably negligible in studies of the peripheral nervous system. Some reviews have carefully accounted for these differences [5] but most have not, likely because there are no field-specific tools to assess them. I encourage their creation.

All that said, a review meeting all PRISMA 2020 criteria is more likely to be unbiased than a review not meeting them. When adopted, this checklist will improve the quality of systematic reviews and meta-analyses, ultimately benefitting guideline developers, policymakers, health care providers, and, last but not least, patients.

DECLARATION OF COMPETING INTEREST

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