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Use, application, and interpretation of systematic reviews and meta-analyses

Hyun Kang

Department of Anesthesiology and Pain Medicine, Chung-Ang University College of Medicine, Seoul, Korea

Editorial

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Corresponding author:
Hyun Kang, M.D., Ph.D., M.P.H.
Department of Anesthesiology and Pain Medicine, Chung-Ang University College of Medicine, 84 Heukseok-ro, Dongjak-gu, Seoul 06911, Korea
Tel: +82-2-6299-2586
Fax: +82-2-6299-2585
Email: roman00@cau.ac.kr
ORCID: https://orcid.org/0000-0003-2844-5880

Systematic reviews (SRs) and meta-analyses (MAs), which attempt to gather all available empirical evidence, have several strengths, namely, that they focus on a narrow research question; involve a search of the evidence that is comprehensive and systematic; select and evaluate all relevant articles; synthesize data in a clear, explicit, systematic, and rigorous way; investigate and explore sources of heterogeneity; and use the results from multiple studies, thereby providing more precise effect estimates with increased statistical power [1,2]. Furthermore, if SRs and MAs are conducted appropriately, they can provide sufficient statistical power that could only be achieved by large-scale randomized clinical trials. In addition to a summary of the literature relevant to a specific question, SRs and MAs can provide clear answers to questions related to "Who", "Why", "How", "What", and "When" of the studies.

SRs and MAs are located at the top of the hierarchy of evidence since they provide balanced and transparent evidence, which increases their influence on clinical practice, healthcare, and policy development [1–4]. Currently, SRs and MAs are used to evaluate uncertain and unanswered questions in areas that require further research, making them an inevitable starting point for the research process. They have also become an integral part of clinical practice guidelines.

However, not all SRs and MAs are conducted and reported appropriately and rigorously. Many SRs and MAs are still conducted and reported in nonsystematic and untransparent ways; thus, they are often biased, conflicted, and misleading [5]. Although the pre-registration of SR and MA protocols is encouraged to improve transparency, only a small portion are registered in open registries, such as PROSPERO, before being conducted [6]. Additionally, some SRs and MAs are carried out by companies that are contracted by sponsors from the pharmaceutical and medical device industries. Therefore, if the results are not favorable for the sponsors, they may not wish to publish them, leading to publication bias.

Many of the topics that have been evaluated by SRs and MAs are overlapping and redundant, which leads to a waste of resources. Other SRs and MAs, even if well-conducted, may conclude that the evidence is weak or insufficient and thus not be informative for clinical practice, healthcare, and policy development.

To overcome these criticisms, reporting guidelines for SRs and MAs [7,8] or their protocols [9], appraisal tools [10], and tools for evaluating the quality of primary studies [11] have become standards for planning, conducting, and reporting of SRs and MAs. Furthermore, various methodologies for synthesizing data from primary studies [12,13] and automation tools for searching, screening, and extracting data [14] have been developed and introduced. Currently, the use of these methodologies and tools has even expanded to the synthesis of data from qualitative, observational, and animal studies.

These advances and changes are expected to improve the quality, accountability, and transparency of SRs and MAs. However, many clinicians, researchers, and policymakers

are still insufficiently aware of them. In addition, there are plenty of data in the field of anesthesiology that have never been comprehensively and systematically evaluated by SRs and MAs.

The current issue of the *Korean Journal of Anesthesiology* includes various studies that apply several types of SRs and MAs, including network MAs. I expect this issue to help us anesthesiologists, as researchers and readers, to broaden our understanding and knowledge of SRs and MAs, thereby increasing their use and applicability.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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