SWAR 17: Do meta-meta-analyses lead to biased results: meta-research into overviews of systematic reviews?

Objective of this SWAR
1) To determine the impact of overlapping studies on the estimated effect in meta-meta-analyses in overviews of systematic reviews of the effects of interventions; 2) To compare different strategies for meta-meta-analyses.

Study area: Statistical Analysis
Sample type: Studies
Estimated funding level needed: Unfunded

Background
Overviews of systematic reviews of the effects of interventions are done for a variety of reasons, including 1) to describe the effects of an intervention in different populations, 2) to describe the effects of different interventions for the same population, 3) to map the existing evidence on a specific health topic, and 4) to determine reasons for discrepancies in the results of systematic reviews of the same research question. Some authors of overviews use meta-meta-analyses, which use meta-analyses to pool the effects estimated by the included systematic reviews, to estimate the effects of the same intervention in different populations or of different interventions in the same population. However, this statistical method could generate biased results if there is overlap in the studies included in the systematic reviews.

Interventions and comparators
Intervention 1: Meta-meta-analysis without considering the overlap of included studies.
Intervention 2: Meta-meta-analyses adjusted for overlap of included studies.
Intervention 3: Conventional meta-analyses, using outcome data extracted from the studies included in the systematic reviews.
Intervention 4: Any other meta-meta-analysis strategy reported in the overviews of systematic reviews.

Index Type: Full Review

Method for allocating to intervention or comparator
All analysis strategies will be applied to each overview of systematic reviews.

Outcome measures
Primary: Direction and magnitude of the estimated effect, by assessing the impact of the different strategies for meta-meta-analyses on the direction of the effect estimate (in favour of the intervention or comparison) and the variability of their magnitude (in percentage).
Secondary: Accuracy of the estimated effect, by assessing the impact of different meta-meta-analysis strategies on the 95% confidence interval and statistical significance for the estimated effect.

Analysis plans
1) Outcome data obtained through the meta-meta-analyses done in each overview of systematic reviews will be extracted.
2) Subsequently, meta-meta-analyses adjusted for overlapping included studies will be performed. The systematic review with the largest number of studies included in its meta-analysis will be considered the primary systematic review and its effect estimate will remain unchanged. For the other systematic reviews included in the meta-meta-analysis, a new effect estimate will be estimated by excluding the studies included in the more comprehensive systematic reviews.
3) Finally, conventional meta-analyses will be performed by extracting the outcome data from each study in the systematic reviews.

Possible problems in implementing this SWAR
Overviews of systematic reviews often do not confirm whether the included studies comply with the eligibility criteria for the individual reviews, which might cause selection bias.

References

Publications or presentations of this SWAR design
Gutierrez-Arias R, Pieper D, Torres-Castro R, Aguilera-Eguía R, Zaror C, Seron P. On "Effects of Neural Mobilization on Pain Intensity, Disability, and Mechanosensitivity: An Umbrella Review With Meta–Meta-Analysis." Cuenca-Martínez F, La Touche R, Varangot-Reille C, et al. Physical Therapy. 2022;102:pzac040. Physical Therapy 2022;pzac161.

Examples of the implementation of this SWAR

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