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Development of a Critical Appraisal Tool for Analytic Approaches in Pairwise Meta-analysis of Interventions

An International Consensus Study

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Background

- Pairwise meta-analysis most common quantitative approach for comparing intervention effects in SRs.
- Analytical choices (model choice, heterogeneity estimation, effect measures, pooling methods) influence pooled estimates, confidence intervals, and heterogeneity.
- Existing appraisal tools focus mainly on overall review conduct, with limited assessment of analytical methods.
- No dedicated, comprehensive tool for appraising analytical conduct of pairwise meta-analyses.

Aims

To develop an evidence-informed, internationally consensus-based, user-friendly critical appraisal tool for evaluating analytical approaches in pairwise meta-analyses of intervention studies.

Methods

Three-step, evidence-informed consensus process

1. Evidence generation and item consolidation

- Systematic survey of existing appraisal tools and items (Completed)
- Systematic survey of empirical evidence (meta-epi studies) on analytical approaches (In Progress)
- Consolidation of candidate items (Planned)

2. Consensus and draft tool development (Planned)

- International two-round Delphi survey to prioritize concepts
- Development of draft appraisal tool using expert consensus

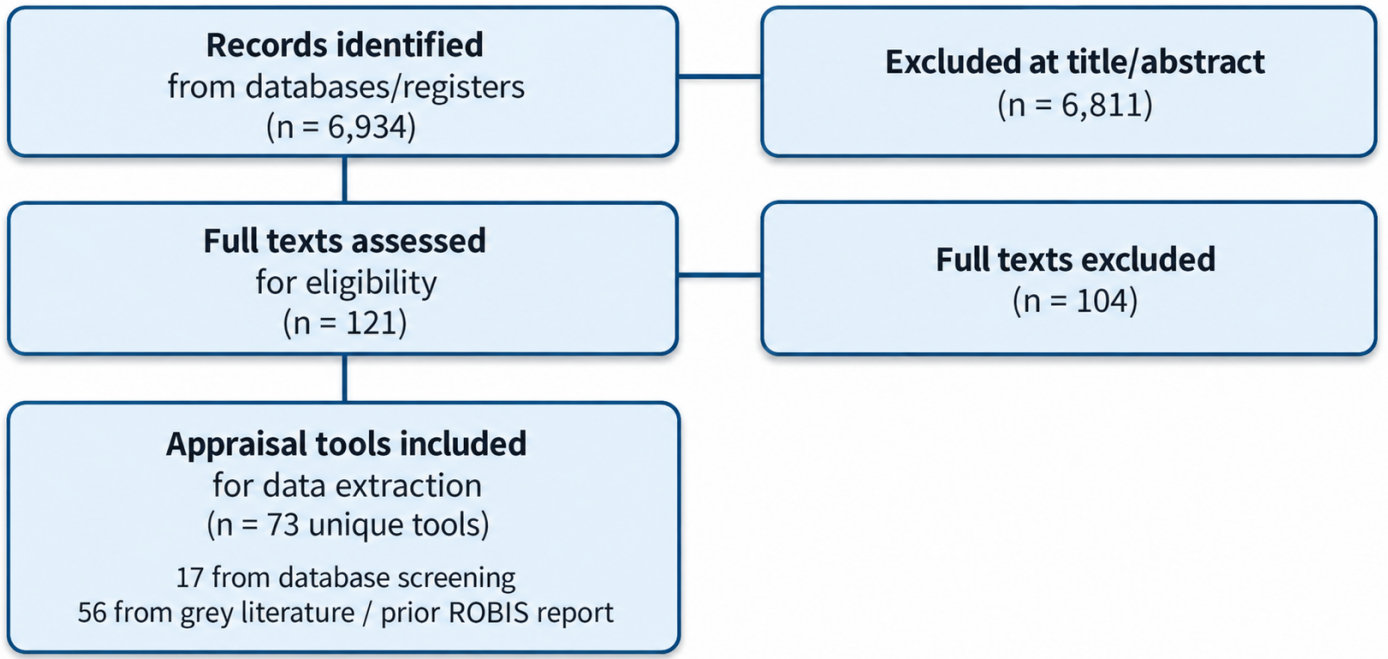
3. User testing and finalization (Planned)

- Think-aloud testing with junior and expert users
- Assessment of clarity, usability, interpretability, and feasibility

Results

First Systematic Survey of Existing Appraisal Tools:

- Instruments published between **1984 and 2025**



Results

Characteristics of Included Tools

Characteristic	Findings (n = 73)
Publication source	• Journal Publication: 48 (65.8%); • Other(checklists, manuals, books, reports): 22 (30.1%);
Development basis	• Referred to Existing tools/guidance/literature: 54 (74.0%) • Reported expert or group consensus process: 11 (15.1%)
Item organization	• Domains/sections: 37 (50.7%); • No grouping: 20 (27.4%); • Unclear: 16 (21.9%)
Response options	• Primarily Yes/No, with some tools offering additional response categories (e.g., Unclear, Partially met, or Not applicable).

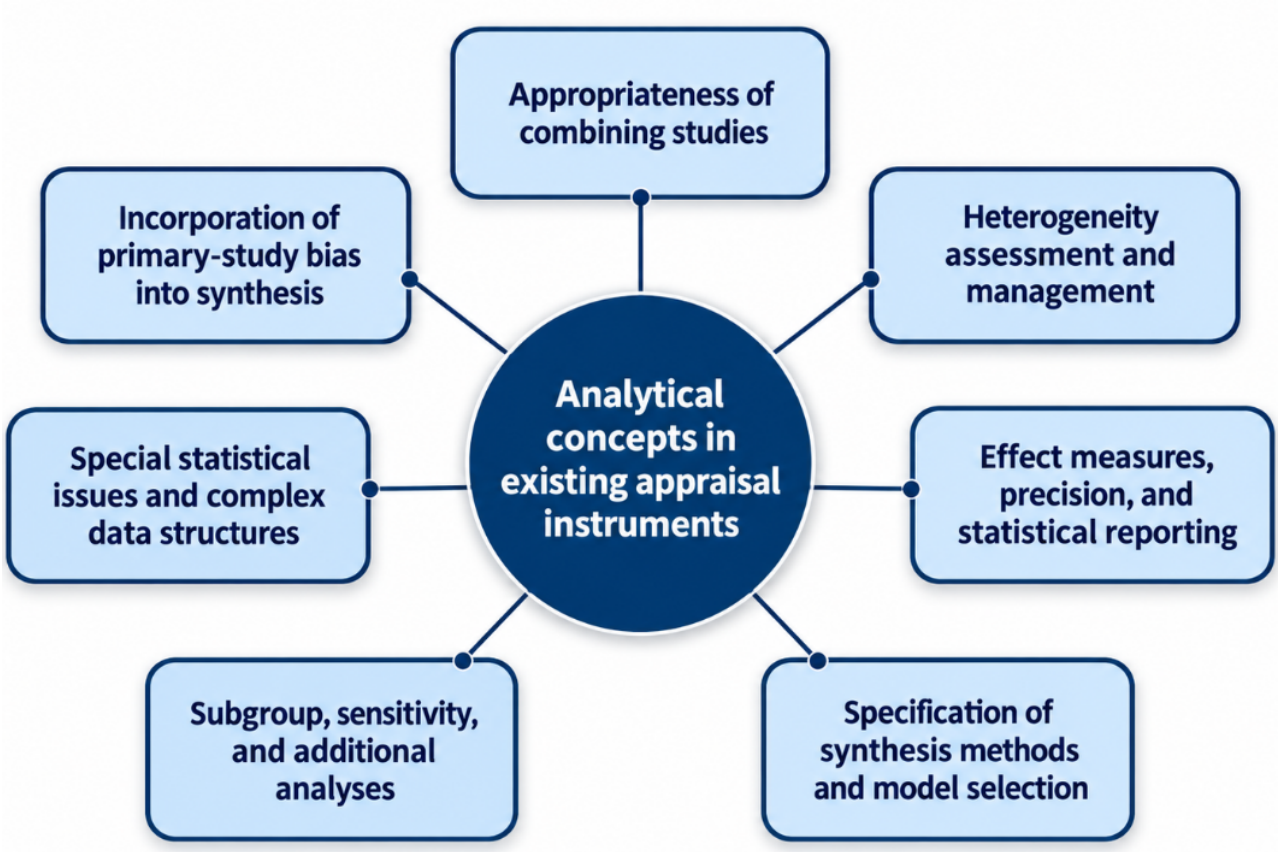
Results

More Characteristics of Included Tools

- 0–23 analytical items per instrument
- Median: 3 items (IQR 2–5)
- 9 instruments contained only one relevant analytical item; 5 had none identified

Results

Analytical Content of Existing Instruments



Limits

Incomplete reporting: Instruments provide limited information on tool development, item guidance, and decision rules.

Subjective classification: Identifying and grouping analytical items required reviewer judgment.

Conclusions

- This systematic survey Identified 73 appraisal instruments with variable coverage of analytical methods and limited assessment guidance.

- Next steps: Complete second systematic survey, consolidate items, reach expert consensus, develop draft tool, and conduct user testing.