Assessing the Reliability of Data from Non-Randomized Studies: Where are we now?

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INTRODUCTION

Risk of bias (RoB) tools aim to identify systematic error or deviation from the truth in primary studies. While RoB assessment of randomised controlled trials (RCTs) is well established, assessment of other trial designs is less standardised. It can be difficult for review authors to decide how to classify studies, and which tool is most appropriate for correctly assessing their risk of bias.

We investigated which tools are currently used for RoB assessment in systematic reviews (SRs) of non-randomised studies. To consider how RoB assessment has changed over the past 20 years, we compared our findings with those of Deeks et al (2003)[1], who conducted an evaluation of the RoB assessment tools used by the authors of 511 SRs, the eligibility criteria for which included non-randomised interventional studies.

METHODS

A pragmatic search of Medline identified 66 SRs published in 2023 that included a total of 940 non-randomised primary studies.

Due to the lack of consistency in review authors' own descriptions of included primary studies, we conducted our own assessment, classifying them as non-randomised controlled trials (21), single arm trials (183), cohort studies (198), or case series (538).

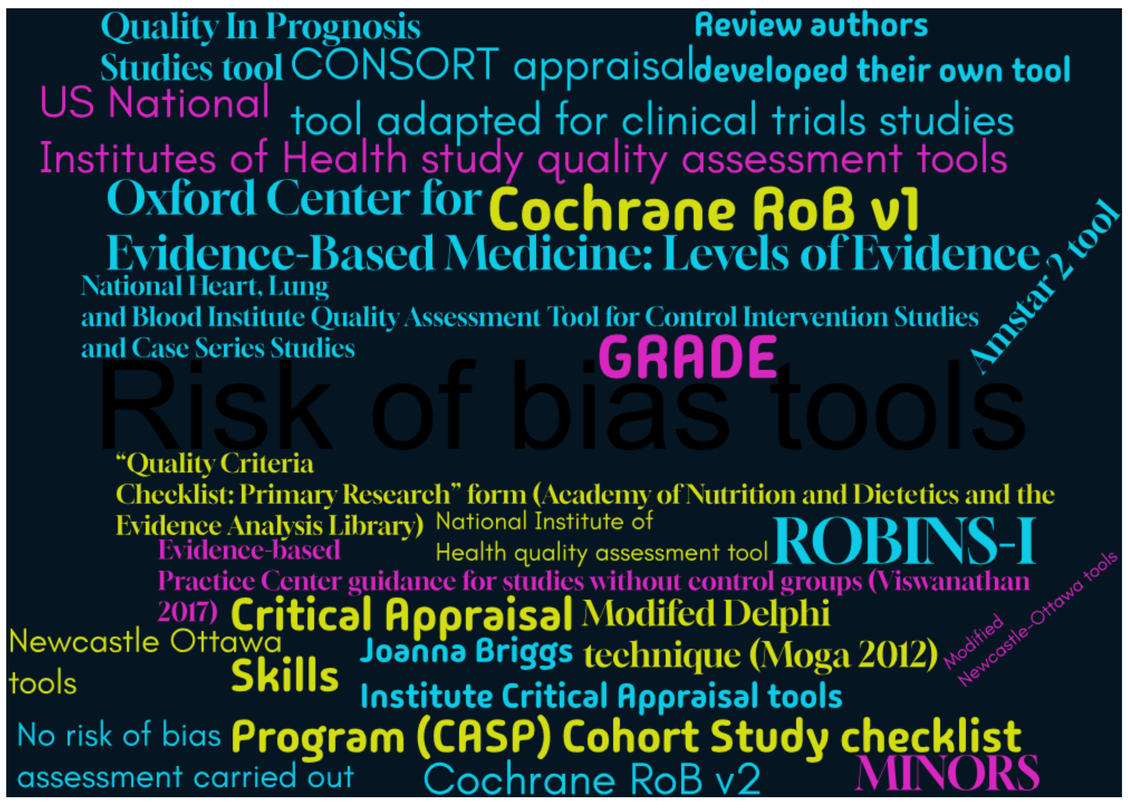
Common reasons for the re-classification of studies included:

- Review authors categorized studies as "prospective" or "retrospective" rather than by the study design used.
- Review authors described studies by phase, i.e., "a phase 2 study", rather than by the study design used.
- Numerical cutoffs applied to decide whether a study was a "case series" or not; these cutoffs were inconsistent across the 66 reviews assessed.
- Review authors grouped studies, e.g. all included studies referred to as "observational studies", or all studies referred to as "single arm studies" regardless of design.
- A lack of clarity currently exists over the differentiation between case series and cohort studies. This was reflected in the sample of 66 reviews assessed.

RESULTS

Within the sample of 66 SRs assessed, 19 different tools, or groups of tools (Figure 1), were used to conduct RoB assessment. This included modified versions of existing validated tools. In addition, some authors developed their own RoB tools.

Figure 1: Tools used for RoB assessment: 2023



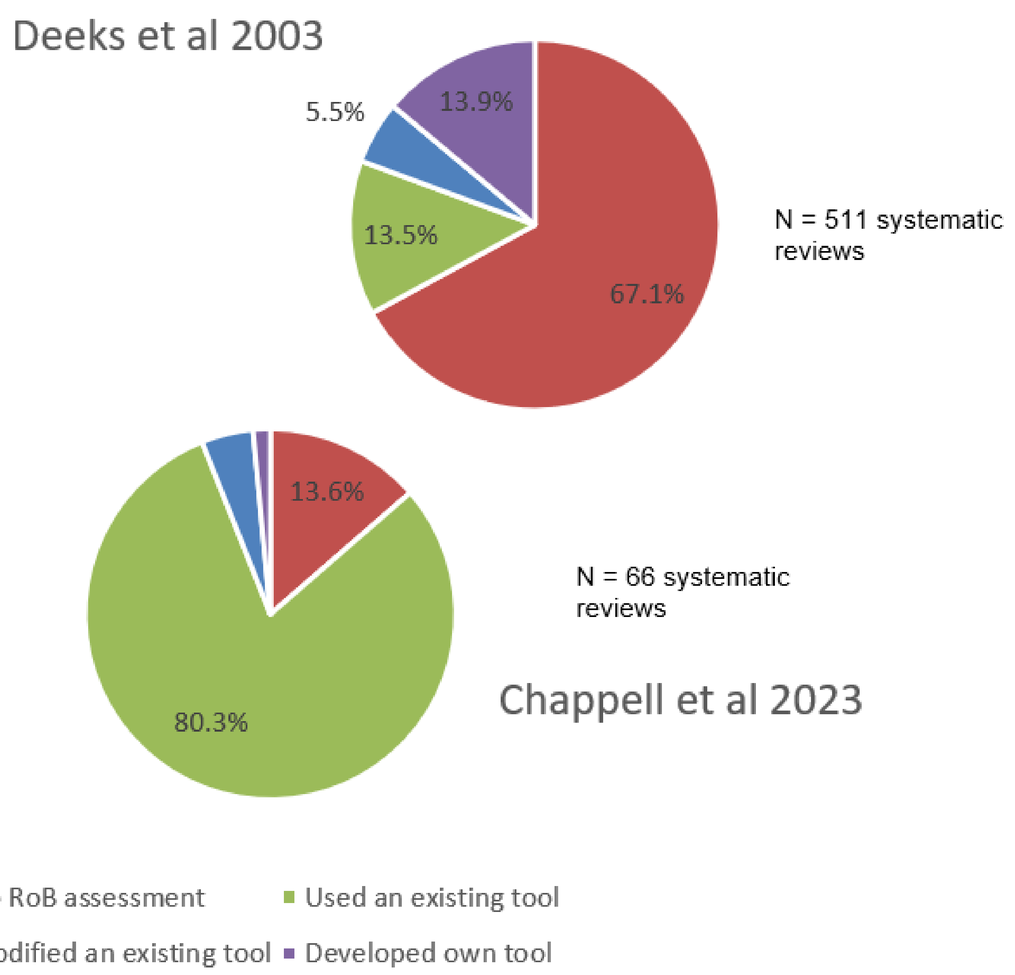
Across 39 SRs including non-randomized comparative studies (cohort studies or non-randomized controlled trials) ten different RoB tools were used, with six SRs (15%) conducting no RoB assessment of the included studies.

Across 65 SRs including non-comparative studies (case series or single arm trials) 14 RoB tools were used, with 15 SRs (23%) conducting no RoB assessment of the included single group studies.

For both comparative and non-comparative studies, most SRs used a Newcastle–Ottawa[2], Joanna Briggs Institute (JBI)[3], or MINORS[4] tool to assess RoB.

Figure 2 demonstrates that compared with 2003, more authors are conducting RoB assessment (86% of SRs in 2023, compared with 33% in 2003) and more authors are using an existing standardised tool (80% of SRs, compared with 14% in 2003). However, for up to 55% of the 2023 SRs evaluating non-randomized studies, the choice of RoB tool may not have been appropriate.

Figure 2: Comparison of 2003 and 2023



CONCLUSIONS

The specific tools used for RoB assessment of non-randomised studies have changed over the past two decades, with a positive trend towards a greater awareness of the importance of RoB assessment, and more consistency in the tools used. However, matching each study design to the most appropriate tool remains challenging.

REFERENCES

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