

Implications of different methods for literature searching and assessment in systematic reviews and meta-analyses: a case study

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Background and aims

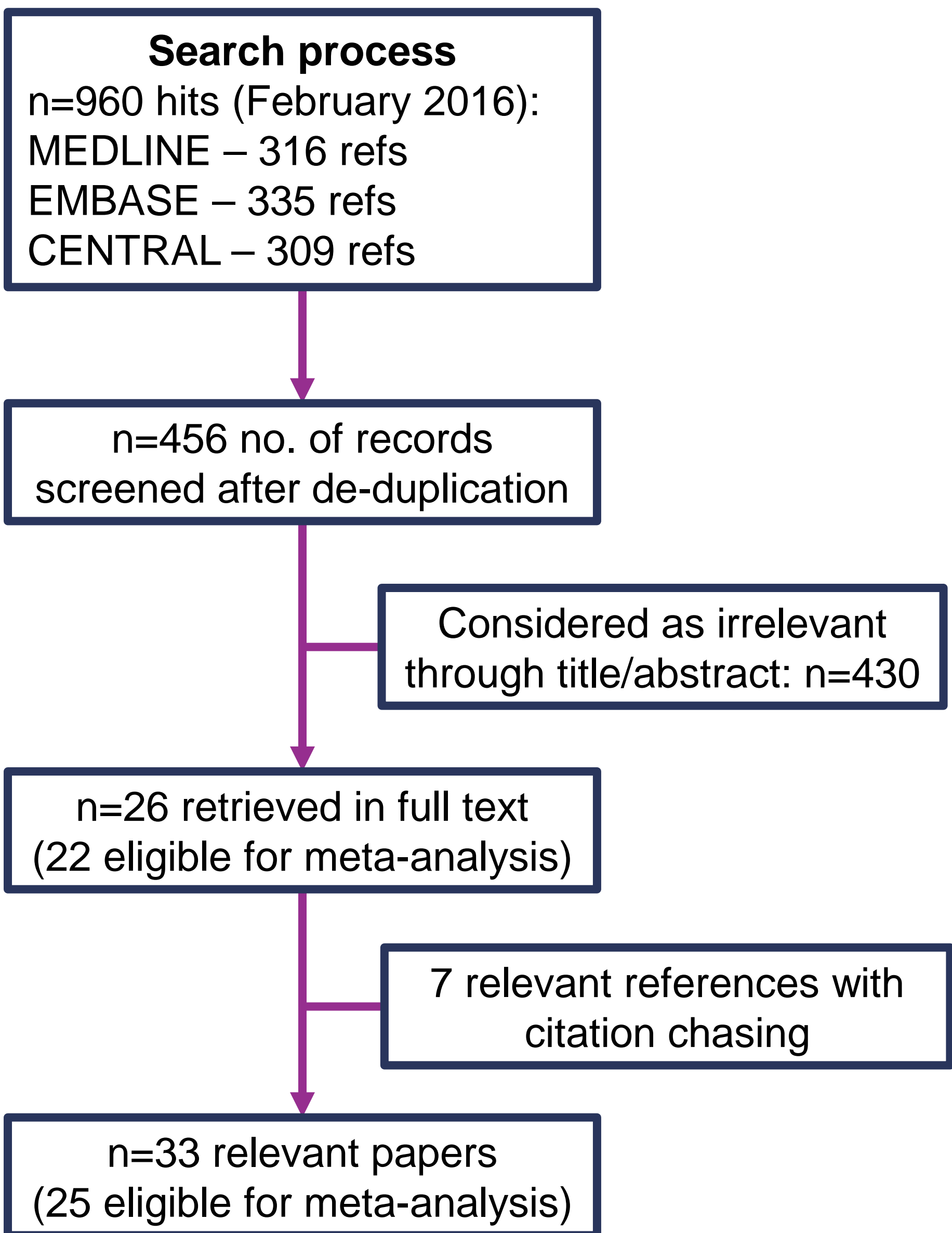
The development of an adequate literature search strategy when performing a systematic review and meta-analysis of epidemiologic studies may represent a key methodological issue.

We explored how adding citation chasing to a standard literature search may modify summary estimates computed in a systematic review and meta-analysis.

Methods

We searched the literature through online databases about the effect of supplemental potassium intake on blood pressure in hypertensive individuals, from the early available date till February 2016.

Figure 1. Flow chart of search process



Results

We retrieved 316 records in MEDLINE, 335 in Embase and 309 in CENTRAL. After de-duplication and title/abstract screening, 26 eligible studies were identified and 22 could be included in the meta-analysis.

A further extended search based on backward and forward citations of relevant articles and other resources, and particularly on citation chasing, allowed us to identify 7 additional studies, 3 of which eventually eligible for the meta-analysis.

Using the conventional search, overall potassium supplementation was found to decrease systolic blood pressure (SBP) of 3.64 mmHg (95% confidence interval (CI) 2.12 to 5.15) and diastolic blood pressure (DBP) of 2.13 mmHg (95% CI 0.48 to 3.79). Using the extended search, SBP decreased by 4.48 mmHg (95% CI 3.07 to 5.90) and DBP by 2.96 mmHg (95% CI 1.10 to 4.82).

Little difference between the studies retrieved by the two methodologies emerged by assessing the quality of evidence using the GRADE approach and the risk of bias with the RoB 2.0 tool.

Figure 2. Forest plot of meta-analysis of studies according to search methods for SBP and DBP

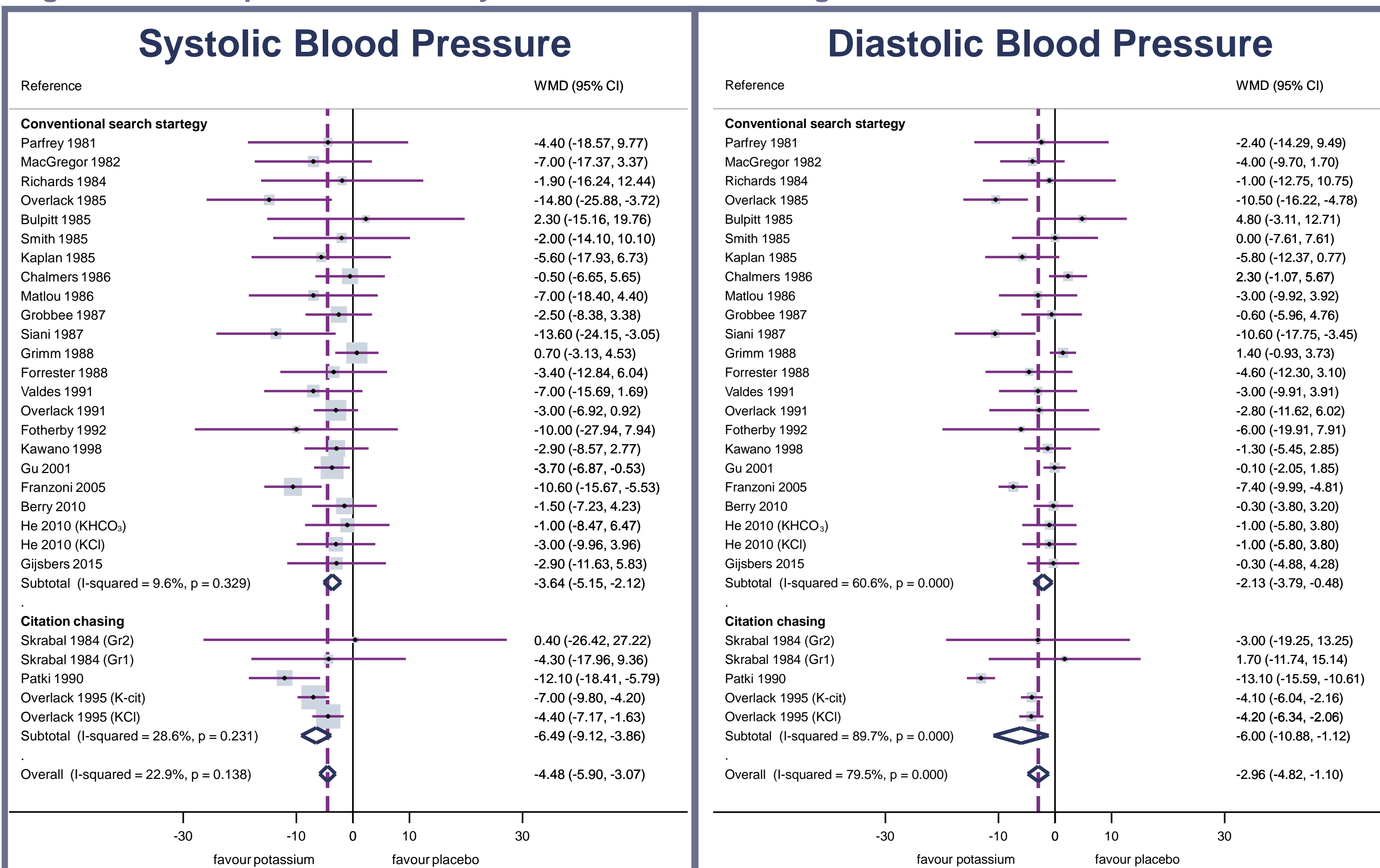


Figure 3. Evaluation of RoB according to search strategy

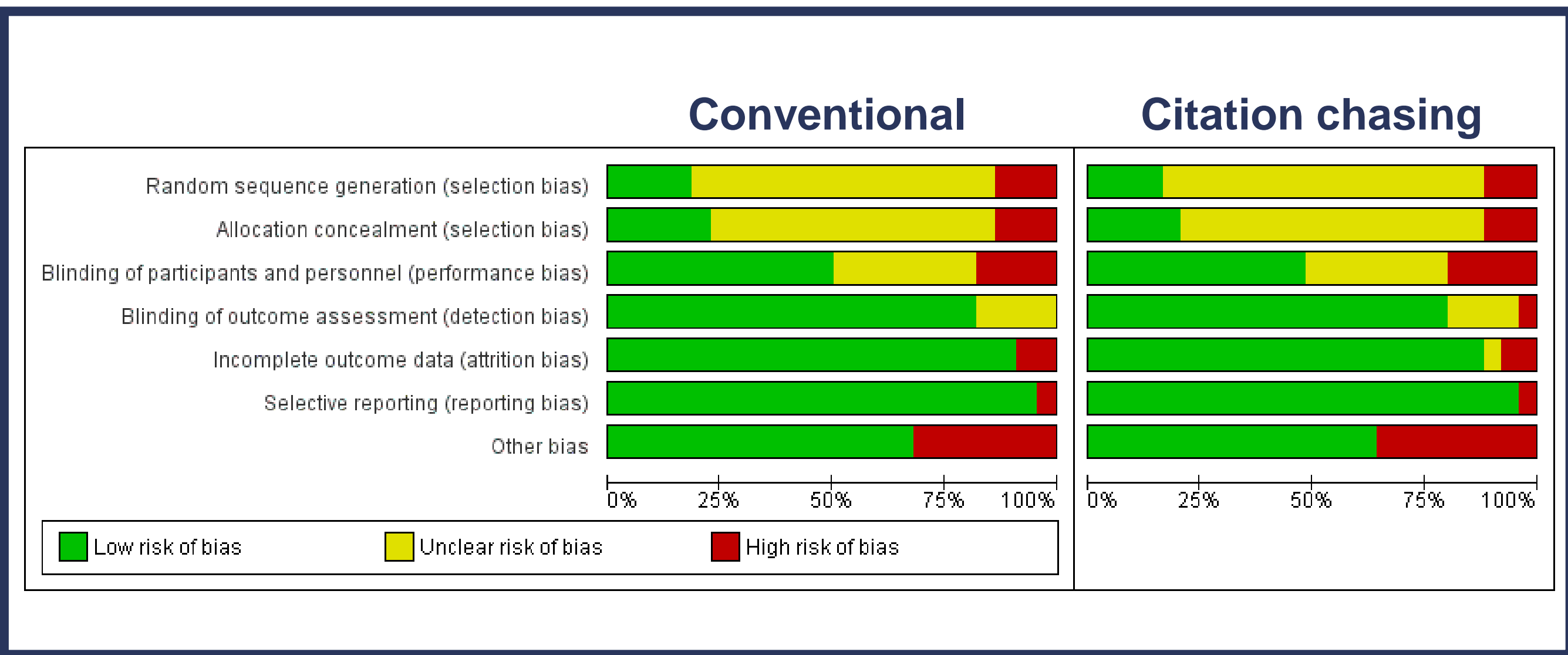


Figure 4. Publication bias

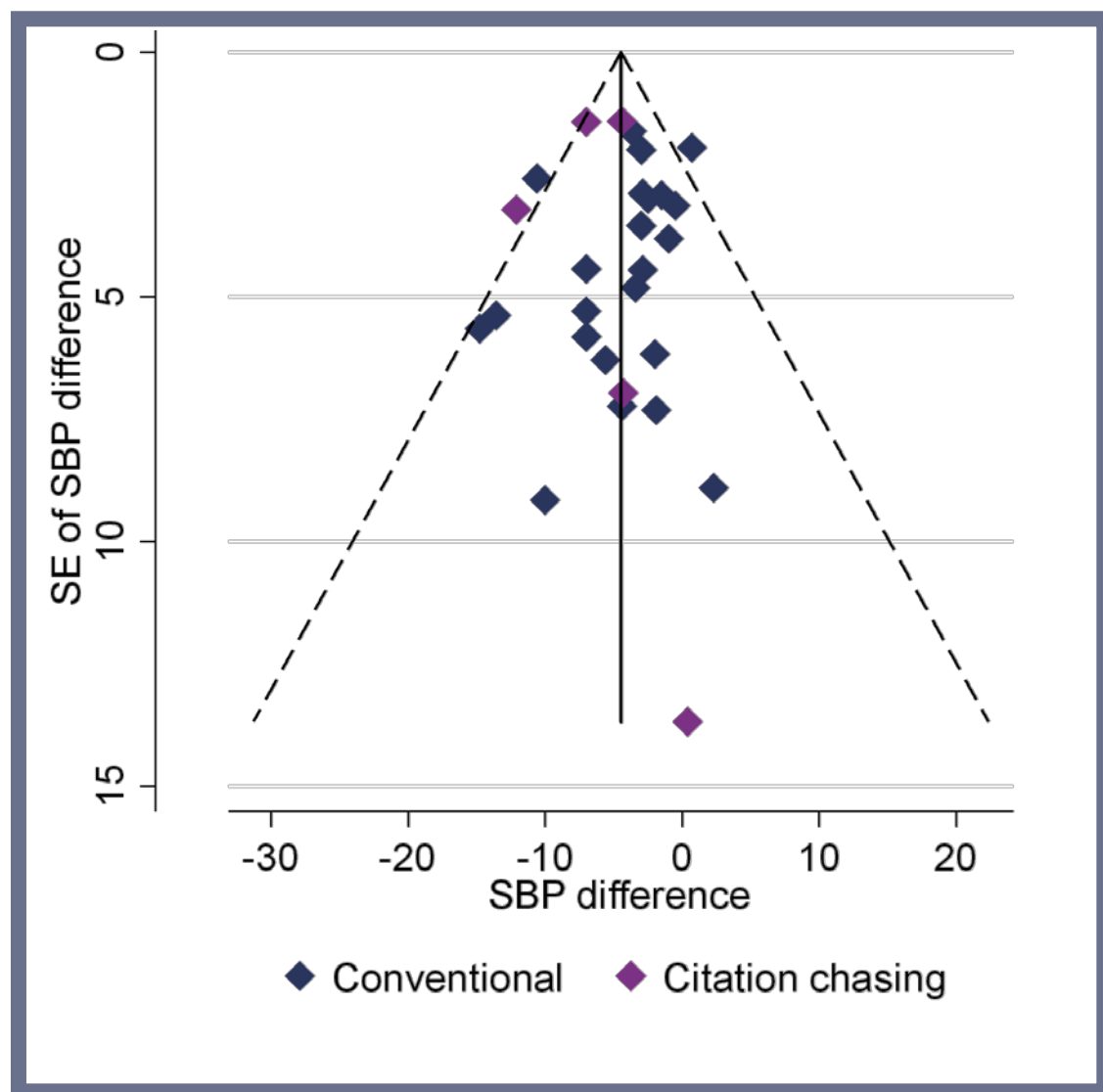


Figure 5. Magnitude of BP reduction

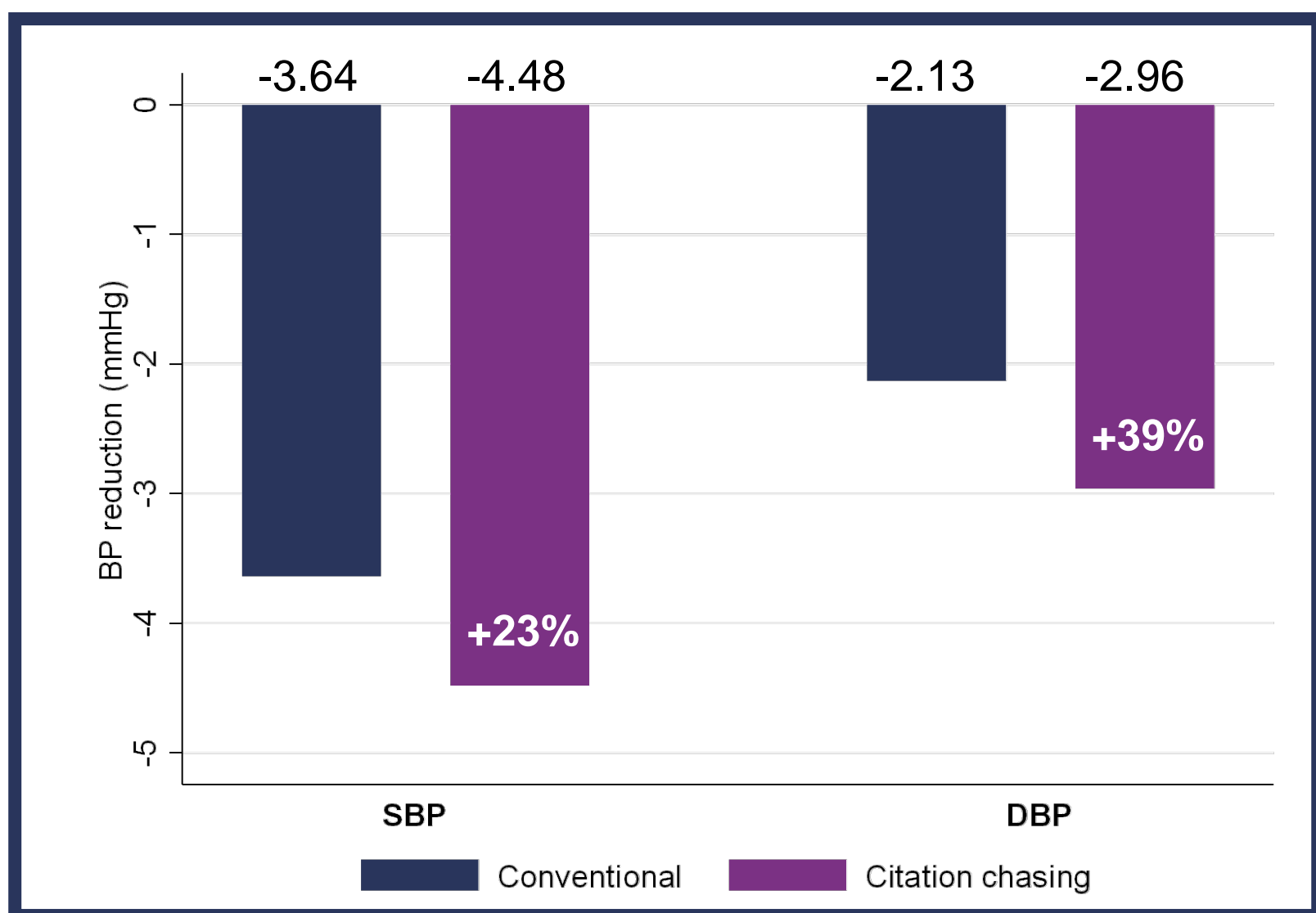


Table 1. GRADE assessment of potassium supplementation for SBP and DBP reduction according to search strategy

№ of studies	Quality assessment						№ of patients		Effect	Quality	Importance
	Study design	RoB	Inconsistency	Indirectness	Imprecision	Other considerations	K suppl.	Placebo/ Control	Absolute (95% CI)		
Conventional											
SBP n=22	RCTs	not serious	not serious	not serious	not serious	strong association	820	826	mean 3.64 mmHg lower (5.15 lower to 2.12 lower)	⊕⊕⊕⊕ HIGH	CRITICAL
DBP N=22	RCTs	not serious	serious ^a	not serious	not serious	None ^b	820	826	mean 2.13 mmHg lower (3.79 lower to 0.48 lower)	⊕⊕⊕○ MODERATE	CRITICAL
Citation chasing											
SBP N=25	RCTs	not serious	not serious	not serious	not serious	strong association	928	934	mean 4.48 mmHg lower (5.9 lower to 3.07 lower)	⊕⊕⊕⊕ HIGH	CRITICAL
DBP n=25	RCTs	not serious	serious ^a	not serious	not serious	strong association	928	934	mean 2.96 mmHg lower (4.82 lower to 1.1 lower)	⊕⊕⊕⊕ HIGH	CRITICAL

Explanations

a. High heterogeneity (>60%); b. Lower 95% bound <1 mmHg.



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Conclusions

Traditional literature search strategies generally retrieve most of the relevant studies for systematic reviews and meta-analyses. However, they may fail to identify all relevant studies potentially eligible for the analysis, thus affecting to some extent the validity of the summary estimates. In this case study, adding in the meta-analysis studies retrieved through citation chasing substantially modified the overall effect estimates, and these changes were of considerable relevance under a clinical and public health perspective. In fact, changes even as little as ~1 mmHg of systolic and diastolic pressure may have large health effects at the population level. Unconventional strategies using backward and forward reference searching may substantially improve the completeness of the literature.