Background & Purpose
Mobilizations and manipulations are commonly used treatments in the management of back pain. The effectiveness of these skilled interventions is dependent on the expertise of the treating clinician, creating potential for bias. Quantifying differences in pain outcomes and internal validity based on the number of treating clinicians and the number of interventions they each perform will give better understanding to this potential bias. This systematic review aims to examine bias and internal validity within randomized controlled trials (RCTs) utilizing mobilization and manipulation of the spine.

Hypothesis: Single clinician studies will show inflated effect sizes for pain outcomes and greater risk to internal validity.

Methods
RCTs from PubMed and Cochrane databases identified and included or excluded based on review criteria. Each study categorized by option choice. Data extraction performed and cross checked by all authors. PEDro scores pulled when available, or scored by CS.

Analysis
- Standard mean differences (SMDs), 95% confidence intervals (CIs) calculated from extracted data with R Project for Statistical Computing (stratified by region of spine and follow up time frame)
- Analysis of PEDro scores performed using one-way ANOVA
- Chi squared tests to compare experimental interventions within option choices
- Examination of publication trends over time

Results
- Option 2 studies consistently produced larger SMDs than Option 1; Option 3 not present in each stratification for analysis.
- PEDro scores for Option 3 (7.2 ± 1.1) significantly higher than Option 1 (6.4 ± 1.4, p = .005) and Option 2 (6.2 ± 1.4, p = .003)
- Single- versus multiple interventions (e.g. mobilization/manipulation) more likely to be performed in Option 1 studies (p = .01)
- Publication trends show an increase of Option 1 and 2 studies and a decrease in Option 3 studies

Conclusions & Clinical Relevance
- Single therapist bias does not appear to drive pain outcomes
- Differences between option choices are present and significant regarding internal validity, type of intervention, and publication rate; differences not in favor of any particular option choice
- Extreme heterogeneity makes any extrapolation challenging
- Additional research needed to better understand this potential bias within physical therapy studies

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