

Electrolyte Therapy as a Non-Invasive Treatment for Temporomandibular Disorder Myalgia: A Systematic Review and Meta-Analysis

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Background

Temporomandibular disorders (TMDs) are a major cause of chronic orofacial pain, with myalgia of the masticatory muscles being central to symptom burden. Electrolyte modulation, particularly magnesium, may influence neuromuscular excitability and nociceptor sensitization, but no systematic review has synthesized the evidence for muscle pain syndromes or its relevance to TMD.

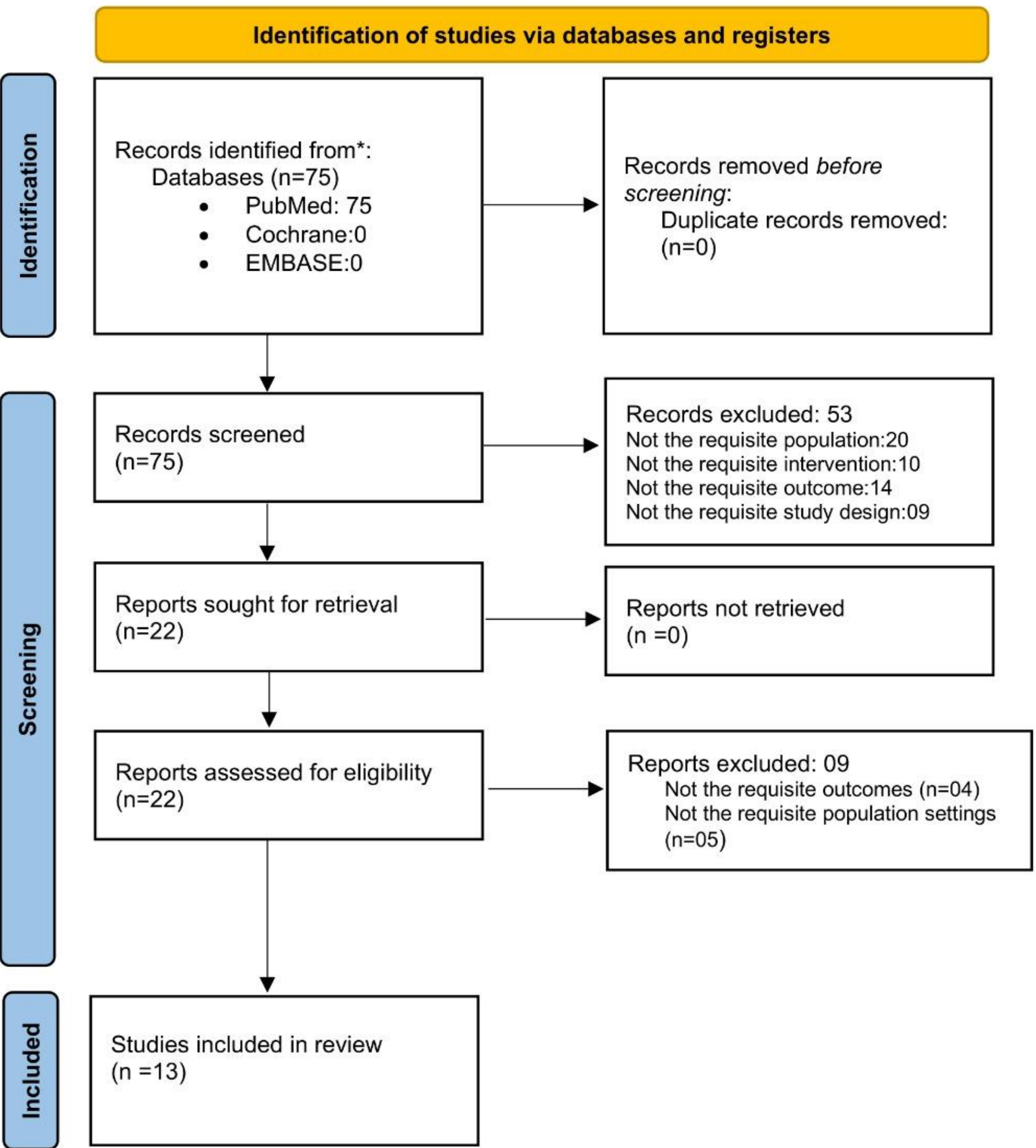


Figure 1. PRISMA flow diagram of identification of studies via databases and registers

Methodology

This systematic review followed PRISMA guidelines and was prospectively registered in PROSPERO (CRD420251120631).

PubMed/MEDLINE, Embase, and Cochrane CENTRAL were searched from January 1995 to August 2025. Randomized or quasi-randomized trials of electrolyte supplementation for cramps or myalgia were eligible. Data extraction and risk-of-bias assessment (RoB 2 tool) were performed independently by two reviewers. Meta-analyses used random-effects models in R (v4.4.3) and Python (v3.11).

Results

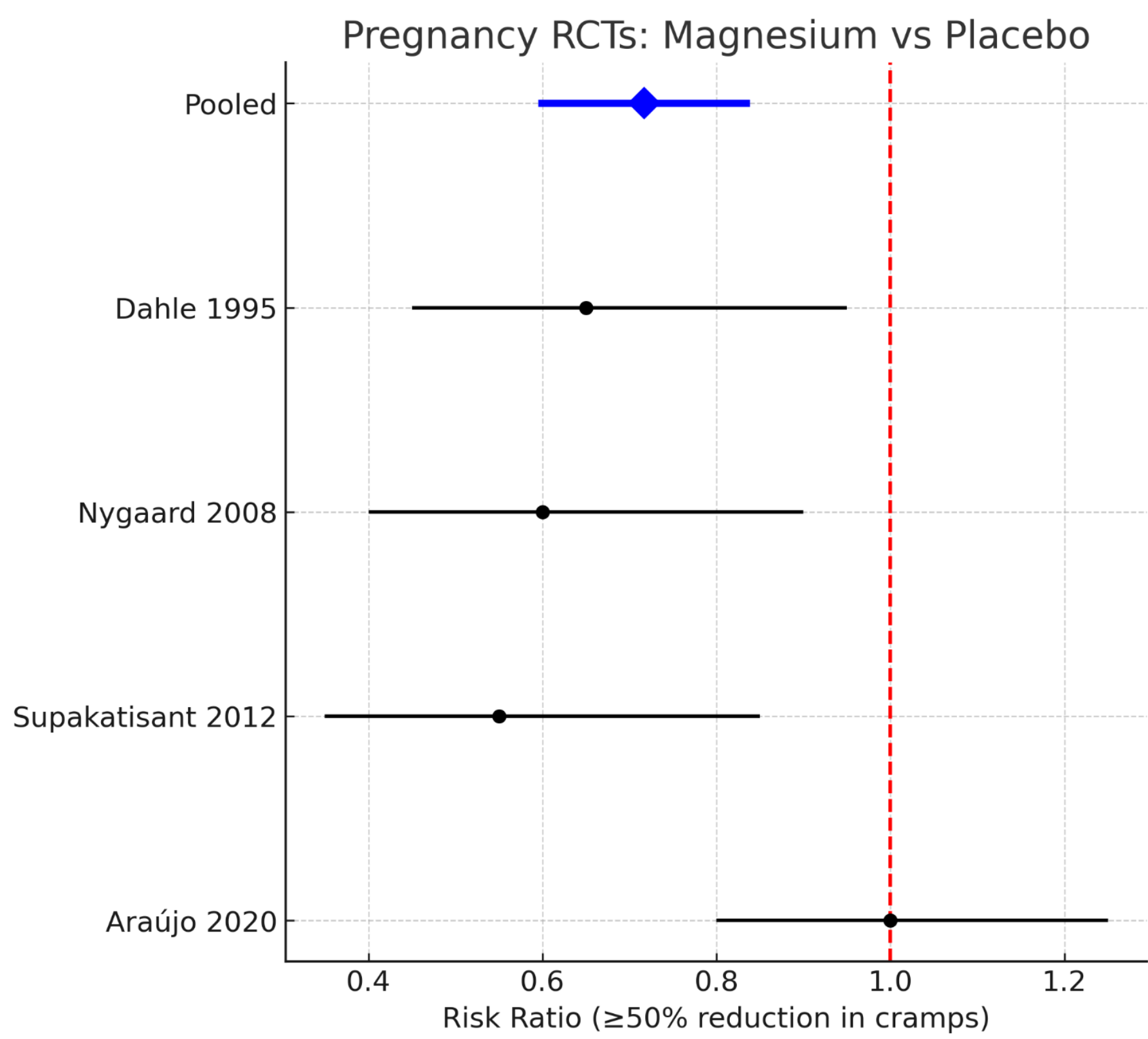


Figure 2. Forest plot of magnesium supplementation for pregnancy-associated leg cramps
The effect measure is expressed as risk ratios (RR) with 95% confidence intervals (CIs) for achieving ≥50% reduction in cramp frequency. The vertical red line represents the line of no effect (RR = 1). The pooled effect estimate is depicted as a blue diamond.

Conclusion

Magnesium supplementation benefits pregnancy-related cramps but shows inconsistent effects in other populations. Sodium-based interventions are context-specific, and calcium and potassium remain unsupported. Magnesium is the most plausible candidate for translation to TMD myalgia, warranting targeted clinical trials.

Key Points

Magnesium supplementation significantly reduces pregnancy-related cramps but shows inconsistent effects in other populations. Sodium-based interventions demonstrate context-specific benefits, while calcium and potassium lack supportive evidence. Among electrolytes, magnesium shows the strongest biological plausibility for translation to TMD myalgia, highlighting the need for targeted clinical trials.

References

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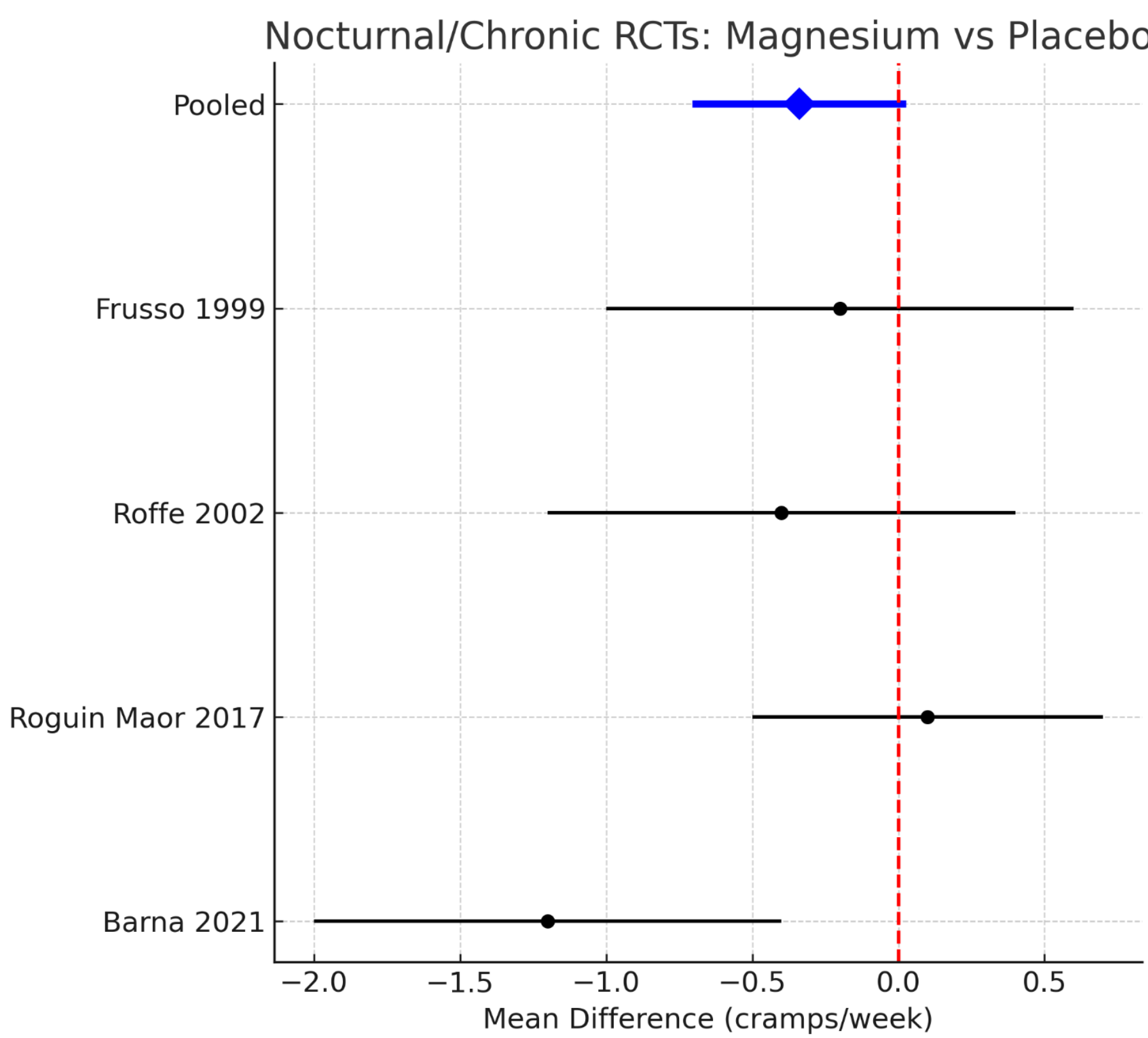


Figure 3. Forest plot of magnesium supplementation for nocturnal or persistent leg cramps in adults
The effect measure is expressed as mean differences (MD) in number of cramps per week with 95% confidence intervals (CIs). The vertical red line represents the line of no effect (MD = 0). The pooled effect estimate is shown as a blue diamond.

Thirteen trials were included. Magnesium was most frequently studied (10 RCTs). In pregnancy-associated cramps (four trials, N≈364), magnesium significantly reduced cramp frequency compared with placebo (pooled RR 1.35, 95% CI 1.05–1.74, p=0.02). In nocturnal or persistent leg cramps in adults (four trials, N≈396), no significant effect was found (MD -0.42 cramps/week, 95% CI -1.15 to 0.31, p=0.26). Intravenous magnesium showed no benefit in older adults, but a perioperative trial demonstrated reduced fasciculations and postoperative myalgia. Sodium-based solutions reduced cramp susceptibility in exercise and cirrhosis, while calcium and potassium lacked supportive evidence. Risk of bias was generally low to moderate.