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Vitamin D Supplementation and Symptom Severity in Irritable Bowel Syndrome: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

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ADMINISTRATIVE INFORMATION

Support - N/A.

Review stage at the time of initial registration - Completed but not published.

Conflicts of interest - The authors declare that they have no known financial or non-financial competing interests that could have appeared to influence the work reported in this manuscript.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 22 November 2026 and was last updated on 22 November 2026.

INTRODUCTION

Review question / Objective To determine whether vitamin D supplementation, compared with placebo, reduces symptom severity in patients with irritable bowel syndrome (IBS). P: patients with IBS (Rome III/IV); I: vitamin D3 supplementation, alone or combined with another agent; C: placebo; O: IBS Severity Scoring System (IBS-SSS) at the end of intervention; S: randomized controlled trials. Secondary aim: to explore whether the effect differs by daily dose, formulation and dosing frequency.

Condition being studied Irritable bowel syndrome: recurrent abdominal pain associated with altered bowel habits, diagnosed by Rome III or IV criteria. Symptom severity is commonly measured with the IBS-SSS (range 0–500), in which a reduction of 50 points is regarded as clinically meaningful.

METHODS

Participant or population Adolescents and adults with IBS diagnosed by Rome III or Rome IV criteria, of any subtype. No restriction on baseline vitamin D status or sex.

Intervention Oral or sublingual vitamin D3 (cholecalciferol) at any dose and schedule (daily, weekly or fortnightly), alone or combined with another agent such as a probiotic.

Comparator Placebo (inactive supplement of similar appearance).

Study designs to be included Parallel-group randomized controlled trials (including arms of factorial or multi-arm trials). Multiple reports of one trial were treated as one study.

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Eligibility criteria Included: randomized placebo-controlled trials in patients with IBS reporting IBS-SSS at the end of intervention, or data from which a standardized effect size could be derived. Excluded: non-randomized or single-arm studies, reviews, case reports, studies without extractable symptom data, and duplicate or overlapping reports.

Information sources Two independent reviewers systematically searched major electronic databases, including PubMed, Embase, Cochrane CENTRAL, ClinicalKey, ProQuest, ScienceDirect, and Web of Science for studies.

Main outcome(s) IBS symptom severity measured by the IBS-SSS at the end of the intervention. Effect measure: standardized mean difference between vitamin D and placebo, with 95% confidence interval; negative values favour vitamin D.

Quality assessment / Risk of bias analysis Cochrane Risk of Bias 2 (RoB 2) tool for the effect of assignment to intervention, applied to the IBS-SSS result in each trial (five domains plus overall judgement: low risk, some concerns, high risk).

Strategy of data synthesis Random-effects meta-analysis (method of moments) of standardized mean differences, using Comprehensive Meta-Analysis software.

Subgroup analysis Exploratory subgroup analyses by dose, formulation and dosing frequency.

Sensitivity analysis Leave-one-out analysis omitting one trial at a time; the monotherapy-only analysis; and assessment of small-study effects with funnel plot and Egger's test.

Language restriction None.

Country(ies) involved Taiwan.

Keywords vitamin D; irritable bowel syndrome; IBS-SSS; randomized controlled trial; meta-analysis.

Contributions of each author

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