INPLASY PROTOCOL

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None declared.

Association Between Vitamin D Supplementation and Fall prevention: A Systematic Review and Meta-analysis

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Review question / Objective: **Is vitamin D supplementation associated with a lower fall incidence in adults older than 50 years?**
Condition being studied: **Elderly falls occur frequently, leading to a large number of morbidity and mortality. But previous studies had inconsistent results regarding the association between vitamin D supplementation and falls.**
Information sources: **The electronic databases of the Pubmed, Embase and the Cochrane library.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 10 July 2020 and was last updated on 10 July 2020 (registration number INPLASY202070030).

INTRODUCTION

Review question / Objective: **Is vitamin D supplementation associated with a lower fall incidence in adults older than 50 years?**

Condition being studied: **Elderly falls occur frequently, leading to a large number of morbidity and mortality. But previous studies had inconsistent results regarding the association between vitamin D supplementation and falls.**

METHODS

Search strategy: **We searched the PubMed, Cochrane library, and EMBASE databases systematically from the inception dates to**

June 10, 2020, using the keywords vitamin D, randomized controlled trial (RCT) and fall to identify systematic reviews or meta-analyses. The RCTs were identified from systematic reviews or meta-analyses. And we performed an additional search to identify recently published RCTs (from the inception dates to February 15, 2020). Initial searches were updated in May 10, 2020.

Participant or population: Adults equal or exceed 50 years.

Intervention: Vitamin D, or combined calcium.

Comparator: Placebo or no treatment.

Study designs to be included: Randomized controlled trial.

Eligibility criteria: Inclusion criteria: (1) RCTs comparing vitamin D or combined calcium supplements with a placebo or no treatment; (2) Trials enrolling adults equal or exceed 50 years; (3) Trials providing fall data. Exclusion criteria were (1) Trials randomized trials without a placebo or no treatment group; (2) Observational or animal studies; (3) Trials that focused on patients with Parkinson's disease, organ transplant recipients, or patients with stroke; (4) trials that assessed intramuscular injection of vitamin D.

Information sources: The electronic databases of the Pubmed, Embase and the Cochrane library

Main outcome(s): Our primary outcome was the relative risk of a person who had at least one fall with vitamin D supplements compared placebo or simply calcium supplements alone.

Quality assessment / Risk of bias analysis: The methodological quality of the included RCTs was independently evaluated by two authors (F.-L.Z., C.-P.Z.). Disagreements were resolved through consensus. According to Cochrane's bias risk criteria, each quality item was classified into low risk, high risk, and undefined risk. The randomization sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other bias were used to evaluate bias in each trial. Trials with dissimilar baseline characteristics between different intervention groups were defined as other bias.

Strategy of data synthesis: The association of supplemental vitamin D and active forms of vitamin D supplements with fall incidence was assessed. And the effect of supplemental vitamin D and active forms of vitamin D were separately analyzed. Meta-analysis was performed to calculate risk ratios (RRs), absolute risk differences (ARDs) and 95% CIs using the Mantel-Haenszel statistical method. When there was inconsistency between RR and ARD, we interpreted the results based on RR because the RR model is more consistent than ARD, especially for interventions designed to prevent adverse events. We pooled the data by a random-effects model,18 and statistical heterogeneity between summary data was evaluated using the I2 statistic. Revman version 5.3 (Cochrane Collaboration) was used to performed all meta-analyses. 2-tailed $P<0.05$ was considered statistically significant.

Subgroup analysis: To assess whether the relationship between vitamin D or combined calcium supplements and falls was modified according to clinical characteristics, we specified subgroups based on dose and frequency of vitamin D supplementation (≥700 IU/d; <700 IU/d; sex (women-only trials or trials that include both men and women); dwelling (ambulatory or institutionalized); dietary calcium intake; baseline serum 25-hydroxyvitamin D concentration (≥50 or <50 nmol/L); form vitamin D (D3 only or D2 only); and intermittent high-dose given as once every year, once every 3 or 4months and other frequencies; daily doses including twice a day and daily. Subgroup analysis was to assess whether the differences between subgroups were statistically significant.

Sensibility analysis: We identified additional trials that did not meet the primary analysis criteria to be included in sensitivity analysis.

Language: No restriction.

Country(ies) involved: China.

Keywords: Vitamin D; Falls.

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