

Effects of vitamin D supplementation on Patients with chronic heart failure: a meta-analysis

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ADMINISTRATIVE INFORMATION**Support** - Nanchong Science and Technology Project: 22SXQT0162.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202440032**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 07 April 2024 and was last updated on 07 April 2024.**INTRODUCTION**

Review question / Objective Effects of vitamin D supplementation on Patients with chronic heart failure.

Condition being studied Chronic heart failure (CHF) is a disorder of cardiac structure and function caused by multiple causes, and ventricular ejection capacity is impaired, resulting in cardiac systolic and diastolic dysfunction, resulting in insufficient cardiac output. The main manifestations of the disease dyspnea, weakness, pulmonary stasis and limb edema. Once the disease deteriorates, it is the final stage and one of the most important causes of death. Therefore, early diagnosis, prevention, and treatment can significantly reduce the global burden of cardiovascular disease. Chronic heart failure is characterized by high morbidity, high disability rate, high readmission rate, poor quality of life, and high mortality. [2] With the improvement of living

standards and the aggravation of population aging, the incidence of diabetes, hypertension, coronary heart disease and other common causes has increased, and the incidence of heart failure has also been increasing. A large number of studies have consistently confirmed that vitamin D deficiency is associated with an increased risk of cardiovascular events (i.e., myocardial infarction, heart failure and stroke) and cardiovascular death. [3] But is vitamin D supplementation beneficial for chronic heart failure? There have been several articles on the clinical efficacy of vitamin D supplementation in chronic heart failure, but this issue is still controversial. There are a few meta-analyses on the efficacy of vitamin D supplementation and chronic heart failure, but the included articles are few, the sample size is small, the outcome indicators are different, and the results of the analysis are inconsistent. Therefore, the aim of this study is to add data to previous studies and further verify the effect of vitamin D

supplementation on cardiac function inpatients with chronic heart failure by Meta-analysis.

METHODS

Participant or population Inclusion criteria: all patients with chronic heart failure; Type of study: Randomized controlled trials (RCT); Intervention measures: The experimental group was supplemented with vitamin D on the basis of maintaining normal heart failure treatment, and the control group was given placebo or blank; Outcome: Brain natriuretic peptide (BNP) or N-terminal pro-brain natriuretic peptide (NT-proBNP), 6 Minute Walk Distance (6MWD), Left ventricular ejection fraction (LVEF), Left ventricular end-diastolic dimension (LVEDD), Left ventricular end-diastolic volume (LVEDV). Exclusion criteria: Repeated publication of literature; Animal experiments and reviews; Non-RCT studies.

Intervention Vitamin D supplementation.

Comparator No vitamin D supplementation.

Study designs to be included Randomized controlled trials (RCT) RCT studies.

Eligibility criteria Repeated publication of literature; Animal experiments and reviews; Non-RCT studies.

Information sources Pubmed, EMBASE, Web of Science, the Cochrane Library, Google Scholar, China National Knowledge Internet database along with references of all included and related studies to achieve the best results. We also scanned systematic reviews in order to discover potential additional studies.

Main outcome(s) Compared with the control group, vitamin D supplementation could improve left ventricular ejection fraction and 6-minute walking distance, decreased left ventricular end-diastolic diameter, left ventricular end-diastolic volume, N-terminal forebrain natriuretic peptide.

Quality assessment / Risk of bias analysis The Cochrane Risk of Bias tool was used to evaluate the quality of the literature, including random sequence generation, allocation concealment, blinding of subjects and researchers, blinding of outcome assessors, incomplete outcome data, and selective reporting of results.

Strategy of data synthesis and Subgroup analysis In order to calculate the effect size of each outcome, the mean or mean change and

standard deviation (SD) of the two groups after intervention were extracted from each study. RevMan5.3 and stata15.0 software were used for Meta-analysis. All outcome measures were continuous variables and were analyzed using the weighted mean difference (WMD) with 95% CI as the effect size. After the analysis of clinical heterogeneity of the included studies, the statistical heterogeneity was evaluated using the Cochran Q statistic based on χ^2 and I². For the Q statistic, $p \geq 0.1$ indicated that there was homogeneity among multiple similar studies and a fixed effect model was used for meta-analysis, while $p < 0.1$ indicated that heterogeneity was statistically significant and a random effect model was used for analysis. Funnel plots were used for qualitative assessment of publication bias. Begg and Egger plots were used for quantitative assessment, and two-tailed p-values < 0.1 for Begg's and Egger's tests were considered statistically significant. Sensitivity analyses were performed using the "remove one study" method.

Sensitivity analysis Funnel plots were used for qualitative assessment of publication bias. Begg and Egger plots were used for quantitative assessment, and two-tailed p-values < 0.1 for Begg's and Egger's tests were considered statistically significant. Sensitivity analyses were performed using the "remove one study" method.

Country(ies) involved China.

Keywords Heart failure, Vitamin D, Cardiac function, Meta-analysis, Randomized controlled trial.

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