

# Reducing length of stay with vitamin D: a systematic review

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## Introduction

Vitamin D has long been associated with calcium and bone metabolism. Recent studies have also identified its role in the defense against infections. Association of vitamin D deficiency and sepsis is also well documented in the literature. Low vitamin D level is associated with poor clinical outcomes.

However little evidence has been published to investigate the effect of therapeutic vitamin D in patients with infection or sepsis. This systematic review evaluates the effectiveness and validity of using vitamin D as treatment for sepsis or infection.

## Methods

Our study reviewed all randomized controlled trials with patients of all ages with suspected or confirmed infection, sepsis or septic shock up until 2018. PRISMA guidelines were followed. Cochrane Central of Controlled trials, EMBASE, and OVID MEDLINE® are searched with the OVID interface. WHO International Clinical Trial Registry Platform, Web of Science, ClinicalTrials.gov were also searched:

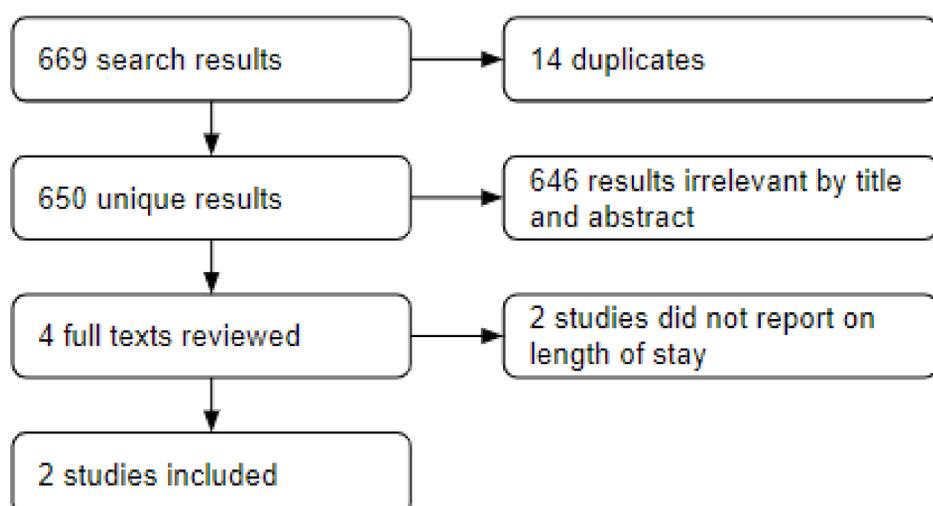
Vitamin D: (1 alpha, 25 dihydroxy\*, 1,25 dihydroxy\*, Vitamin D\*, Ergocalciferol, Calciferol, Alfacalcidol, Calcitriol, Cholecalciferol, Dihydroxycholesterol, Paricalcitol, Calcifediol, Calcidiol), AND

Infection: (Infection, Sepsis, Septic shock), AND

Prognosis: (Prognosis, Length of stay, Hospital stay, Mortality, Death)

Papers with supplement or status included in the title was excluded.

## Flow chart



## Acknowledgement

Special thanks to Justin Tenney, Daniel Pilsgaard Henriksen, and Lars Folkestad for their advices and expert opinion on the topic.

## Results

Literature search performed in July 2018 reviewed 669 studies. After duplicated studies were excluded, 650 titles and abstract were screened, 646 studies were excluded and 4 full-text were assessed. Only two studies had data on hospital length of stay (LOS), our primary outcome. We attempted to obtain additional data from authors of studies with no hospital LOS study with no avail. We considered these two studies to be high quality and low overall risk of bias.

Quraishi et al's study was a randomized placebo-controlled trial that recruited 30 adult patients with severe sepsis or septic shock in an ICU in the US with 3 groups: placebo, low dose (200,000 units) and high dose (400,000 units) vitamin D. The drug was given orally or enterally. They have found that the low-dose group had a shorter hospital LOS when compared to the placebo or the high dose group. The overall 30-day mortality was 27% (high dose vs low dose vs placebo groups: 20% vs 30% vs 30%).

Somnath et al recruited 154 Indian children (aged 2 months to 5 years) with acute lower respiratory infection in a randomised, open label, placebo-controlled trial. Two groups in their study are vitamin D (100,000 units) and placebo group. The drug was given orally. Hospital LOS were found to be no different between the two groups. No deaths were reported. No differences were found in other outcomes such as paediatric intensive care unit (PICU) admission rate, PICU LOS, time taken for settling of body temperature, complications rate and recurrence of respiratory tract infection within 90 days.

Study	Intervention group median LOS (IQR)	Placebo group median LOS (IQR)	P value
Quraishi <i>et al</i> 2015	Lower dose: 13 (12-16) Higher dose: 14 (8-21)	21 (18-31)	<i>p</i> =0.03
Somnath <i>et al</i> 2017	7 (5-9)	7 (5-10)	<i>p</i> =0.44

LOS = Length of Stay; IQR = Interquartile Range

## Discussion

We find it interesting that the group receiving higher dose of vitamin D has a much wider interquartile range than the group receiving the lower dose. With only 10 patients per group in their study, this finding might be due to type 2 error.

Although the quality of the studies reviewed were good, the small number of the studies, small number of patients (a total of 184 patients) included and difference in patient cohort (age group, ethnicity, mortality rate, disease severity) made it impossible to draw any conclusions. This study highlights the need of a larger interventional study.