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Vitamin D supplementation versus placebo for treatment of pulmonary tuberculosis: a meta-analysis

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Background: The benefit of Vitamin D supplementation as an adjunct to standard therapy for pulmonary tuberculosis (PTB) gained from a number of clinical trials remains unclear. Vitamin D has been shown by *in vitro studies* to modulate the immune system by inducing the destruction of mycobacteria. We investigated the effect of vitamin D supplementation on outcomes of PTB treatment of adult patients with active TB. We determined the effect of vitamin D supplementation on the rate of sputum smear conversion at weeks 4 and 8. We also investigated the following secondary outcomes: (1) median time to culture conversion, (2) development of severe adverse events, and (3) hypercalcemia.

Material/methods: We searched electronic databases up to August 2016 to identify studies with vitamin D supplementation and its effect on PTB treatment outcomes. We performed a systematic literature search across MEDLINE, EMBASE, the Cochrane Central Register of Controlled Trials, Springer, EBSCO, ProQuest, HighWire Press, and Web of Science, published as of August 2016. We estimated pooled risk ratios (RR) and 95% confidence intervals (CI) using random-effect models. Selection criteria were as follows: all randomized controlled trials using vitamin D supplementation for PTB treatment that reported at least one of the desired outcomes (rate of sputum smear conversion, time to culture conversion, and adverse events) among patients ≥ 16 years old. We included all randomized controlled trials comparing vitamin D plus standard PTB regimen *versus* standard PTB regimen with or without placebo.

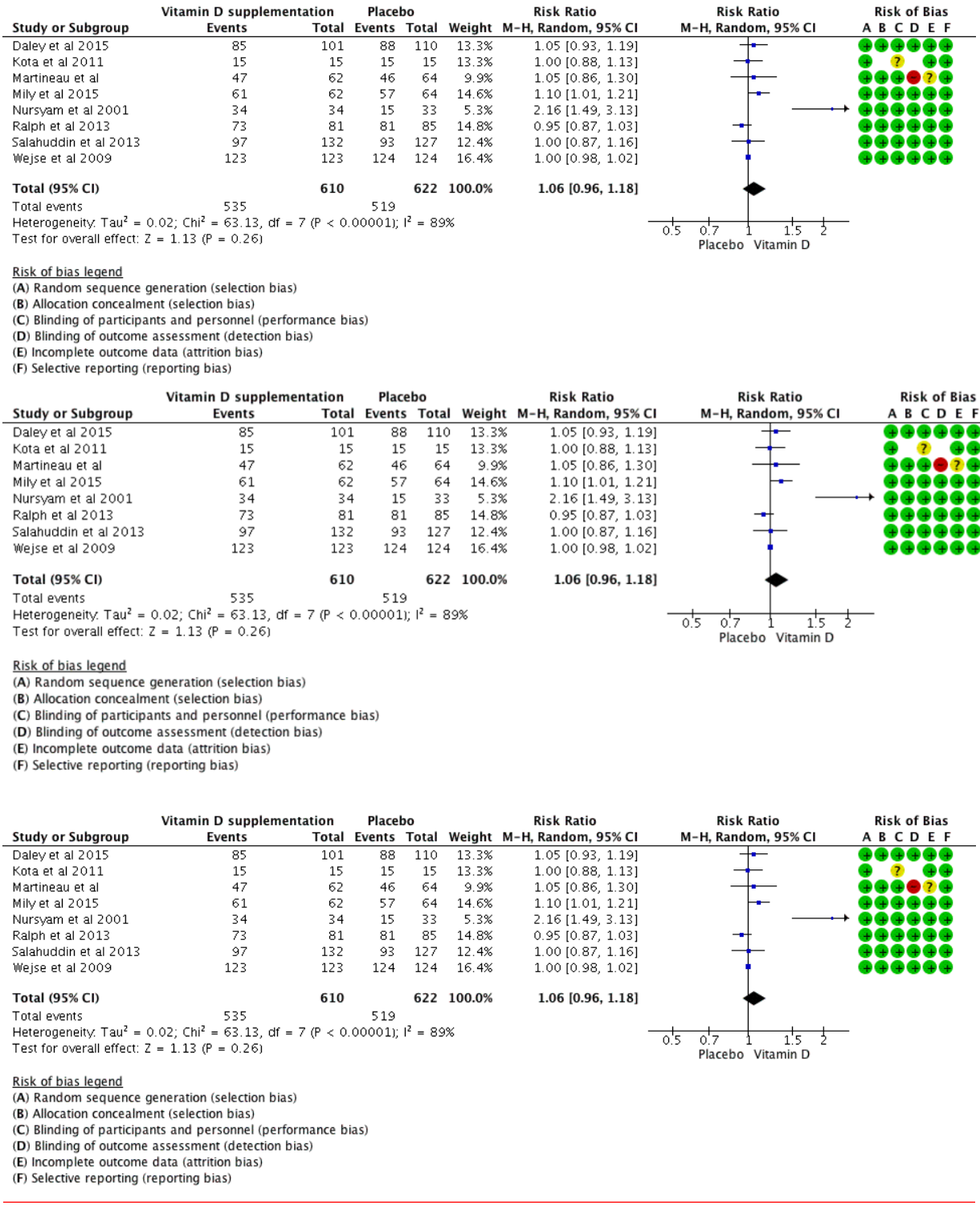
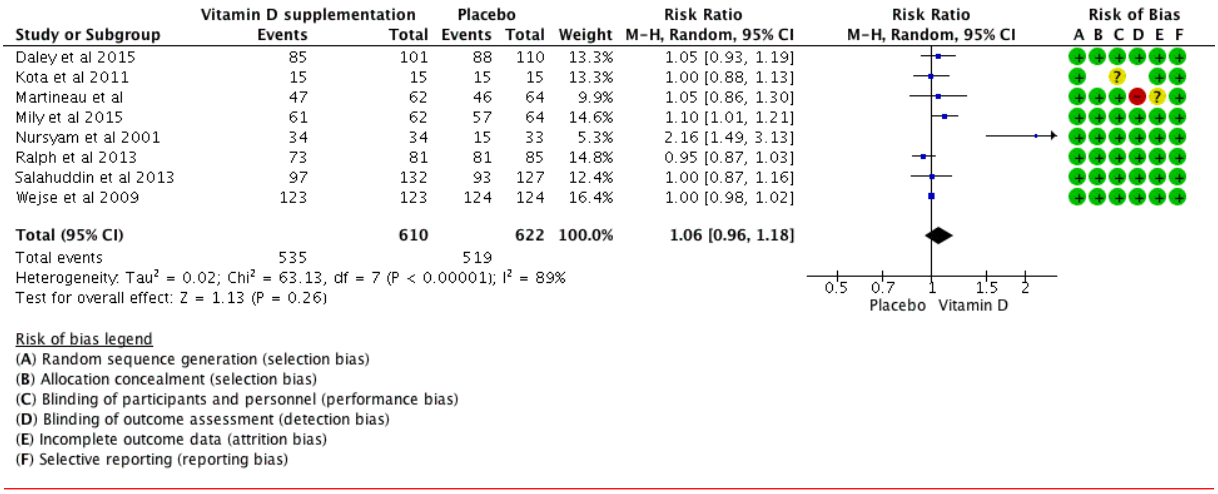


Figure 1. Effect of vitamin D supplementation on rate of sputum smear conversion at 8 weeks.

Results: A total of nine studies were analysed in our meta-analysis covering 1,601 newly-diagnosed PTB cases, observed over 8 to 32 weeks. The studies were of high quality with low risk of bias. There seemed to be a trend towards benefit in the vitamin D arm, with vitamin D supplementation increasing the rate of conversion by 11% at week 4 and 6% by week 8—although these trends were not statistically (at week 4: RR 1.11, 95% CI 0.86 to 1.43, P=0.42; at week 8: 1.06, 95% CI 0.96 to 1.18, P=0.26). There was no statistically significant trend towards benefit favoring vitamin D supplementation in terms of shortening median time to culture conversion. With vitamin D supplementation, there was no increased risk for adverse events or development of hypercalcemia.



Conclusions: The results indicate that vitamin D supplementation did not significantly increase sputum smear conversion rates at weeks 4 and 8, nor did it significantly shorten sputum smear conversion. Further studies are needed to explore whether vitamin D supplementation at varying doses could shorten treatment and if baseline vitamin D levels have any effect on time of treatment.