

Effects of Zinc and Vitamin A Supplementation on Prognostic Markers and Treatment Outcomes of Adults with Pulmonary Tuberculosis: A Systematic Review and Meta-Analysis

Authors : Fasil Wagnew, Kefyalew Addis Alene, Setegn Eshetie, Tom Wingfield, Matthew Kelly, Darren Gray

Abstract : Introduction: Undernutrition is a major and under-appreciated risk factor for TB, which is estimated to be responsible for 1.9 million TB cases per year globally. The effectiveness of micronutrient supplementation on TB treatment outcomes and its prognostic markers such as sputum conversion and serum zinc, retinol, and hemoglobin levels has been poorly understood. This systematic review and meta-analysis aimed to determine the association between zinc and vitamin A supplementation and TB treatment outcomes and its prognostic markers. Methods: A systematic literature search for randomized controlled trials (RCTs) was performed in PubMed, Embase, and Scopus databases. Meta-analysis with a random effect model was performed to estimate risk ratio (RR) and mean difference (MD), with a 95% confidence interval (CI), for dichotomous and continuous outcomes, respectively. Results: Our search identified 2,195 records. Of these, nine RCTs consisting of 1,375 participants were included in the final analyses. Among adults with pulmonary TB, zinc (RR: 0.94, 95%CI: 0.86, 1.03), vitamin A (RR: 0.90, 95%CI: 0.80, 1.01), and combined zinc and vitamin A (RR: 0.98, 95%CI: 0.89, 1.08) supplementation were not significantly associated with TB treatment success. Combined zinc and vitamin A supplementation was significantly associated with increased sputum smear conversion at 2 months (RR: 1.16, 95%CI: 1.03, 1.32), serum zinc levels at 2 months (MD of 0.86umol/l, 95% CI: 0.14, 1.57), serum retinol levels at 2 months (MD: 0.06umol/l, 95 % CI: 0.04, 0.08) and 6 months (MD: 0.12umol/l, 95 % CI: 0.10, 0.14), and serum hemoglobin level at 6 months (MD: 0.29 ug/dl, 95% CI: 0.08 to 0.51), among adults with TB. Conclusions: Providing zinc and vitamin A supplementation to adults with pulmonary TB during treatment may increase early sputum smear conversion, serum zinc, retinol, and hemoglobin levels. However, the use of zinc, vitamin A, or both were not associated with TB treatment success.

Keywords : zinc and vitamin A supplementation, tuberculosis, treatment outcomes, meta-analysis, RCT

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