

# Vitamin D deficiency and tuberculosis: what about body mass index?

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## Dear editor

Huang et al conducted a meta-analysis of published studies on various aspects of association between vitamin D and tuberculosis (TB).<sup>1</sup> The study concluded that vitamin D deficiency (VDD) was associated with higher risk of TB. However, low body mass index (BMI), a well-recognized and a stronger risk factor of TB than VDD, was not mentioned in this review nor was it accounted for in the multivariable analysis in the majority of case-control studies included in the meta-analysis exploring the association between TB and VDD. Vitamin D levels are likely to be positively correlated with weight/BMI. Infected people who are underweight by  $\geq 15\%$ , 10%–14% and 5%–9% are at increased risk of progression to TB disease with 2.6, 2.0 and 2.2 cases per 1,000 person-year, respectively.<sup>2</sup> Contradictory results were found in the few studies of this meta-analysis<sup>1</sup> that considered weight/BMI in the multivariable analysis. One study showed a weak association between VDD and TB (odds ratio: 1.07, 95% confidence interval 1.01–8.52) but only in men.<sup>3</sup> Another study found no such association.<sup>4</sup>

Protein-calorie malnutrition is recognized as a well-established risk factor of TB disease, if not the strongest.<sup>5</sup> Some studies in the meta-analysis<sup>1</sup> consistently showed that TB patients have lower weight/BMI as compared to controls and therefore this should always be considered in the multivariable analysis assessing nutritional risk factors of TB. Besides low levels of vitamin D, underweight TB patients likely have low levels of other vitamins, calcium, albumin, ferritin or cholesterol (to mention a few) as shown by some studies included in Huang et al meta-analysis.<sup>1</sup>

Future studies focusing on nutritional deficiency risk factors for TB should consider all of these factors together and/or independently as playing a role.

## Disclosure

The author reports no conflicts of interest in this communication.

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