

# IMPACT OF VITAMIN D STATUS ON THE CLINICAL COURSE OF PULMONARY TUBERCULOSIS

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## Introduction

In 2023, a PUBMED (MeSH) search registered more than 65,000 cases on the assessment of the role of vitamin D. The number of these scientific works has increased over the last two decades.

Some researchers argue that vitamin D metabolites play an important role in the coordinated functioning of the body's immune system by inducing phagocyte migration, modulating Th1-Th2 cell balance and differentiation of T-regulatory cells.

Certain studies have shown that vitamin D can also be useful in the treatment of tuberculosis, multiple sclerosis, and the prevention of cancer [1, 4]. In particular, apoptosis-promoting 1,25(OH)<sub>2</sub>D has been shown to play an important role in controlling intracellular pathogens such as M. tuberculosis (MTB).

Inflammatory synthesis of 1,25(OH)<sub>2</sub>D by macrophages and dendritic cells also plays a key role in mediating T cell responses to vitamin D, leading to inhibition of inflammatory T helper (Th)1 subtype cells and concomitant induction of regulatory T cells, which can inhibit

## Purpose

Determination of vitamin D levels in patients with pulmonary tuberculosis but not only the humoral but also the cellular component of the immune system [2, 3].

## Methods

This study was carried out including 45 patients with newly diagnosed pulmonary tuberculosis (NDTB) with sensitivity to drugs and 30 healthy individuals (HI). Patients' ages ranged from 23 to 65 years. The majority of the examined patients were males – 68.2% (females – 31.8%).

Serum vitamin D levels were investigated using the VD (Vitamin D) ELISA Kit (Optics Valley Biomedical Industrial Park, Wuhan, China (430075)), for the quantitative detection of vitamin D in serum, number: EU2541, range: 1.563-100 ng/ml.

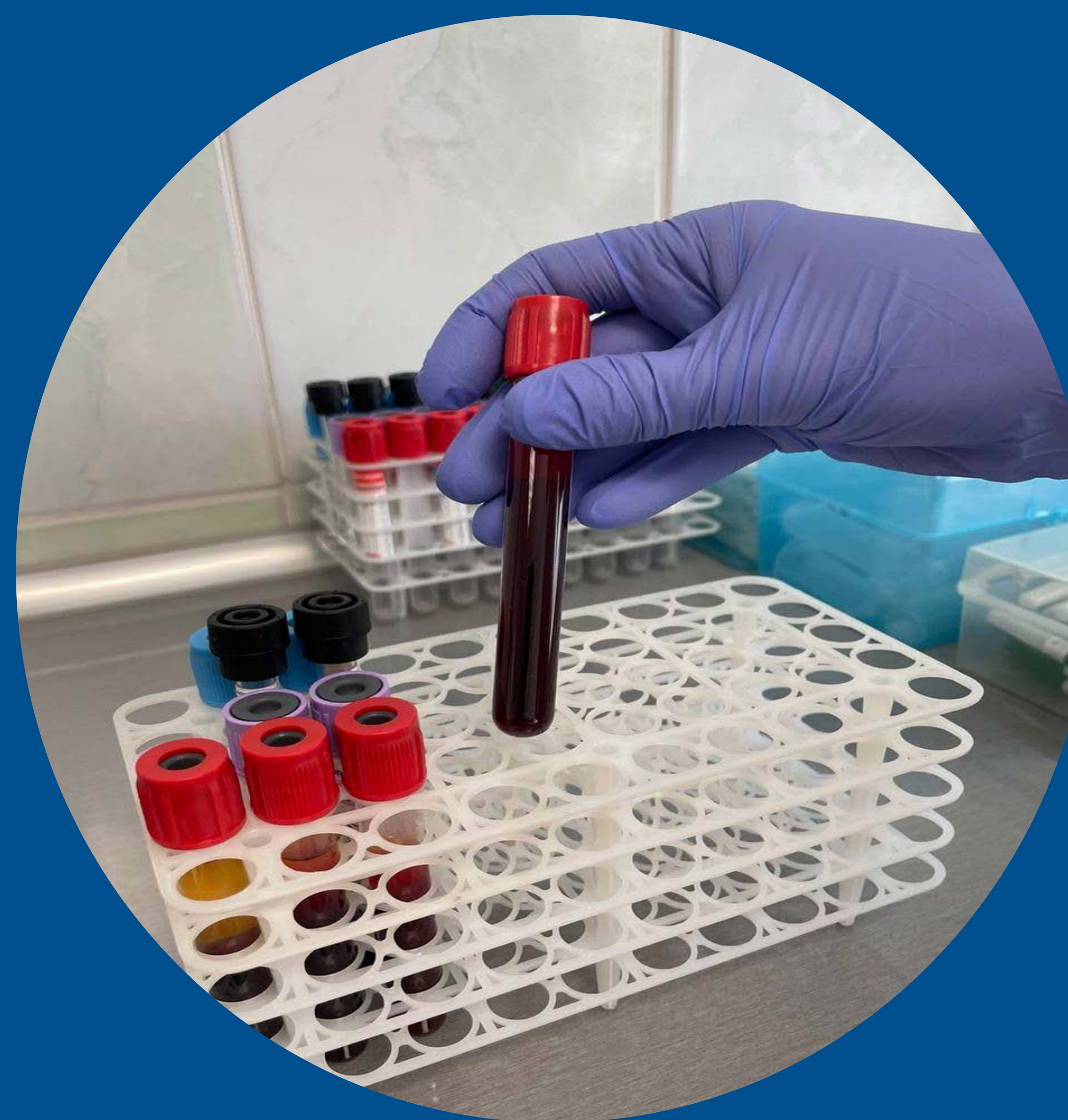
Blood for enzyme immunoassay in an amount of 5 ml was collected in the morning, on an empty stomach, in the first days of confirmation; the blood plasma was simultaneously subjected to passive thawing at t=20°C for 30 minutes.



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# Main Finding

The value of this study is that a variety of factors may influence serum vitamin D levels as well as various metabolic parameters

## Conclusions

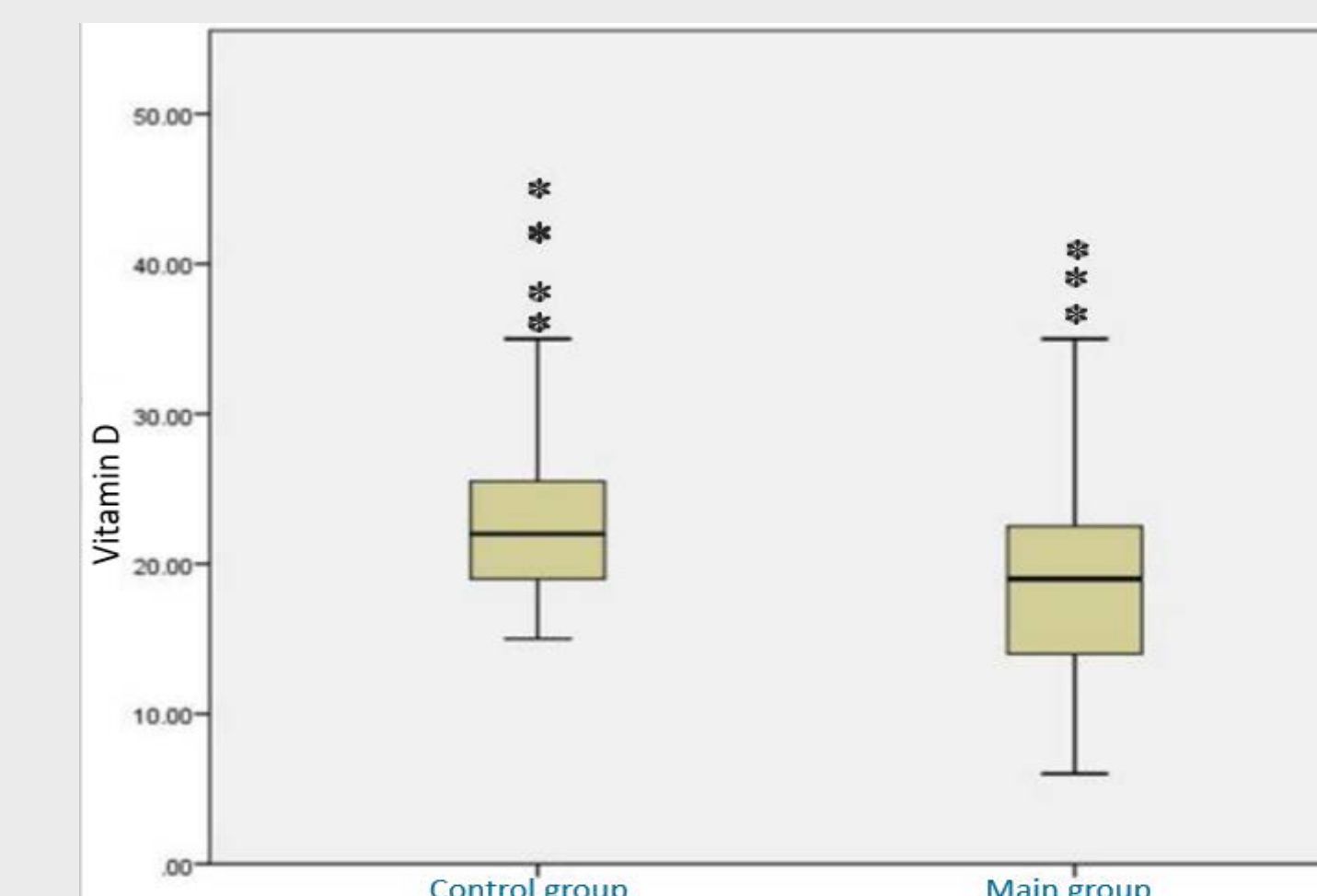
In patients with sensitive pulmonary tuberculosis, the serum level of 25(OH)D is significantly lower than in the control group. Vitamin D deficiency was reported in 61.5% of cases

## Results

Assessment of the average vitamin D content in the blood serum of patients with sensitive tuberculosis in the control group

	Main group	Control group	t -тест	P
25OH Vitamin D (ng/dL)	18,46±4,23	28,834±5,79	0,432	<0,001

The average serum concentration was found to be 18.46±4.23 ng/ml of 25(OH) D in NDTB. In the control group it was 28.834±5.79 ng/ml and was statistically significant (p = 0.001).



Vitamin D deficiency (<20 ng/ml) was found to occur in 61.5% of patients in the main group versus 38.5% of patients in the control group (P<0.001, OR 3.680, 95% CI 1.761–6.923).

The results of the study showed that vitamin D failure (<30 ng/ml) was observed in 74.6% of patients with NDTB and 43.4% of the control group.

Multivariate studies with binary logistic regression showed a strong direct relationship between the presence of a specific TB process and vitamin D deficiency (<20 ng/ml) (OR 2.817, 95%, CI 1.287-4.894, p<0.005)

Category	Adjusted odds ratio (DI 95%)	P-value
Smoking history	1,133 [0,501–2,984]	0,580
Associated diseases in the anamnesis	0,031 [0,401–2,108]	0,721
Body mass index	1,875 [1,064–4,412]	0,034
Blood pressure	4,675 [1,127–23,554]	0,021
Fasting blood sugar level	2,848 [0,752–8,347]	0,080
Serum vitamin D level 25OH	2,817 [1,287–4,894]	0,004

## Discussion

In multivariate linear regression analysis, neither gender, smoking history, nor alcohol consumption was observed as relevant predictors of hypovitaminosis D. However, we found a negative correlation between 25(OH)D and body mass index, an association between vitamin D deficiency and arterial, pressure and blood sugar levels.

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