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**EVOLIUCINĖ MEDICINA:
ŽMOGAUS RAIDOS PERSPEKTYVOS IR SVEIKATA
BESIKEIČIANČIOJE APLINKOJE**

**EVOLUTIONARY MEDICINE:
PERSPECTIVES ON HUMAN DEVELOPMENT AND HEALTH
CONSEQUENCES IN A CHANGING ENVIRONMENT**

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DIFFERENCES IN VITAMIN AND FATTY ACID STATUS BETWEEN TUBERCULOSIS PATIENTS AND HEALTHY CONTROL SUBJECTS

**Ruta MERESKEVICIENE^{1,2}, Gabriele TARUTYTE³, Sigita GUSTAITE¹,
Edvardas DANILA^{1,2}**

¹Institute of Clinical Medicine, Clinic of Chest Diseases, Immunology and Allergology, Vilnius University Faculty of Medicine, Vilnius, Lithuania

²Center of Pulmonology and Allergology, Vilnius University Hospital Santaros Klinikos, Vilnius, Lithuania

³Department of Research and Innovation, Vilnius University Faculty of Medicine, Vilnius, Lithuania

Contact e-mail: ruta.mereskeviciene@santa.lt

Background and Aim: Tuberculosis incidence rates in Lithuania remain one of the highest in Europe. This study aimed to investigate potential nutritional indicators associated with increased disease risk and to identify deficiencies that should be corrected and monitored to reduce the probability of adverse drug reactions.

Materials and Methods: In a cross-sectional study, we enrolled 30 adult tuberculosis patients at Vilnius University Hospital Santaros Clinics and 16 healthy control subjects. Blood samples were drawn in the first week of tuberculosis treatment for patients. The control group consisted of readily available individuals. Analysis of the samples was performed in two accredited laboratories: HILA (Vilnius, Lithuania), MVZ Gemeinschaftslabor Cottbus GmbH (Cottbus, Germany).

Results: Vitamin C deficiency in the tuberculosis group was found in 76,67% of cases vs. 18,8% in healthy controls (False Discovery Rate (FDR)-adjusted $p=0.04$); vitamin K2 (MK-7) deficiency – in 33,33% tuberculosis patients vs. 0% healthy controls (FDR-adjusted $p=0.009$); folic acid deficiency – 53,33% in tuberculosis patients vs. 0% healthy controls (FDR-adjusted $p=0.04$). These differences were statistically significant and may be due to increased oxidative stress and metabolic demand during chronic inflammation, as well as to poor nutrition in tuberculosis patients. Lower-than-normal concentrations of vitamin A were found in 26,67% of tuberculosis patients vs. 0% in healthy controls (FDR-adjusted $p=0.062$), low vitamin K2 (MK-4) levels - in 63,3% of tuberculosis patients vs. 25,0% healthy controls (FDR-adjusted $p=0.062$). Increased omega-3 fatty acid concentrations were more common in healthy controls – 68,8% vs. 30,0% for alpha-linolenic acid (FDR-adjusted $p=0.062$) and 37,5% vs. 6,7% for eicosapentaenoic acid. These differences were only marginally significant after correction for multiple comparisons.

Conclusions: Nutrient deficiencies are common in tuberculosis patients. Lower concentrations of some vitamins and fatty acids may be part of the disease itself, or they may serve as predictors of disease development.

Keywords: fatty acids, nutrition, tuberculosis, vitamins