



Tuberculosis and malnutrition



ESPEN



THE EUROPEAN SOCIETY
FOR CLINICAL
NUTRITION
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METABOLISM

A note on terminology: malnutrition and undernutrition



Malnutrition is broadly defined by WHO as deficiencies or excesses in nutrient intake, an imbalance of essential nutrients or impaired nutrient utilization (1).

This definition covers a spectrum of nutrition-related states from undernutrition to overweight and obesity. Malnutrition is often used as a synonym for undernutrition in both academic literature and clinical discourse. Consequently, the term **malnutrition** is used in this factsheet to describe a state of undernutrition.

Key facts



Malnutrition is the leading attributable risk factor for tuberculosis (TB) infection (2).



The risk of acquiring TB increases by 13.8% for each unit decrease in body mass index (BMI), although this relationship is not maintained at the extremes of the BMI range (3).



Malnutrition is also a risk factor for conversion from latent TB (pre-existing but dormant) to active disease.



Malnourished TB patients experience poorer treatment outcomes; this is particularly pronounced in those with rifampicin- and/or multidrug-resistant TB (RR/MDR-TB) (4).



Malnourished patients are twice as likely to die from TB compared with non-malnourished patients (5).



An optimized nutritional treatment has shown beneficial effects on patient prognosis and the response to drug therapy, although the evidence is limited and heterogeneous.



The provision of nutritional supplementation alongside treatment is associated with increased treatment compliance.

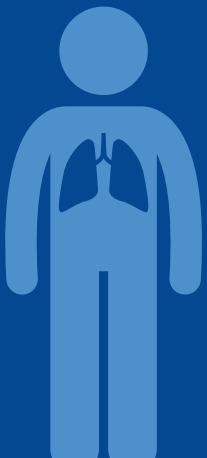


All patients with TB should be assessed for malnutrition at diagnosis and routinely (every 4 weeks) during treatment.



Overview

TB remains an important cause of mortality and morbidity in the WHO European Region and worldwide. Rates of drug-resistant TB are increasing globally. Malnutrition has significant interactions with the TB disease process and may be an important therapeutic target. There is a bidirectional relationship between TB and malnutrition: malnourished individuals are at greater risk of contracting TB, and TB is a catabolic disease that can cause or exacerbate malnutrition. TB patients who are malnourished experience poorer outcomes, which are more pronounced in those with RR/MDR-TB. Malnutrition impairs immune system function in multiple ways, and this may underpin some of the observed relationships. Furthermore, malnutrition can influence how drugs are absorbed and processed, causing treatment failure and downstream effects on treatment toxicity rates in TB patients.



Malnutrition: nutritional assessment, risk screening and diagnosis

In itself, malnutrition is an important disease entity that predisposes people to a variety of diseases and poor health outcomes, including TB. The two broad categories are hunger-based and disease-based malnutrition. Nutritional assessment and malnutrition screening are advised at TB diagnosis and every 4 weeks during treatment.

Nutritional assessment

Nutritional assessment should include:



taking a nutrition-oriented history and examination



an anthropometric assessment such as BMI



dietary and relevant laboratory assessments (if appropriate).

Malnutrition risk screening

Several validated malnutrition screening tools have been developed. The European Society for Parenteral and Enteral Nutrition (ESPEN) recommends the use of the following setting-specific and population-specific malnutrition screening tools (6,7).



Community level

Malnutrition Universal Screening Tool for adults



Hospital settings

Nutrition Risk Screening 2002



Elderly people

Mini Nutritional Assessment

Malnutrition diagnosis

If the risk screening result is positive, a further diagnostic investigation should be undertaken. To diagnose malnutrition in patients with TB, the framework published by the Global Leadership on Malnutrition (GLIM) is suggested. The diagnosis of malnutrition has been complicated by the lack of widespread adoption of consistent diagnostic criteria and over-reliance on BMI, which can lead to significant underdetection of malnutrition. GLIM have developed a comprehensive definition of malnutrition that considers phenotypic and etiological criteria to ensure the timely identification of malnutrition in patients with normal or elevated BMI (8).

Nutritional interventions and their TB-related outcomes

The literature on assessing malnutrition, nutritional optimization and TB-related outcomes remains incomplete. Optimizing nutrition has demonstrated beneficial effects on prognosis and the response to drug therapy for patients with TB, although the evidence is limited and heterogeneous.



Increased calorie and protein intake positively correlate with the TB recovery rate in two out of three European studies (9).



Micronutrient supplementation studies are inconclusive and often present contradictory results. These studies were limited by their heterogeneity and low quality, and lacked data from developed countries.



Perioperative nutritional support has demonstrated improvements in some outcomes, such as reducing wound drainage.



Nutritional support for TB patients was shown to increase treatment compliance.

Take-home messages



Policy-makers and health system decision-makers should systematically include nutritional status assessment and care when developing guidelines and programmes for the prevention and treatment of TB and RR/MDR-TB.



Systematic nutritional assessment and malnutrition screening should be conducted at diagnosis and regularly (every 4 weeks) throughout TB treatment.



Individualized malnutrition management plans and diet optimization, with a particular focus on protein and calorie intake, should be components of TB treatment.



The specific energy requirements of TB patients have not been elucidated (10); however, ESPEN has published guidelines for nutritional intake in other chronic catabolic diseases (11,12):

- ✓ **energy intake – 30 kcal/kg body weight per day**
- ✓ **protein intake – 1 g protein/kg body weight per day.**



Micronutrient supplementation should be limited to patients with demonstrable deficiencies or those who do not receive the daily requirement through their regular diet (9).



The provision of nutritional support throughout the entire duration of TB treatment is encouraged to promote treatment adherence and prevent the development of other malnutrition-related diseases.

Future directions

Further study is required of the relationship between nutritional supplementation and treatment-related outcomes in patients with TB. In particular, supplementation of micronutrients, many of which play an important role in immune function, requires further investigation.

WHO response and further information

WHO has published a guideline outlining nutritional care and support for patients with TB (10).



<https://iris.who.int/handle/10665/94836>



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