





WHO Policy Updates: Nutritional Interventions and Food Assistance for people with TB and their household contacts

Kerri Viney WHO Global Programme on Tuberculosis and Lung Health

Joint European regional workshop to plan the accelerated adoption and uptake of new WHO TB policies. 28-30 April 2025, Almaty, Kazakhstan

WHO consolidated guidelines on tuberculosis WHO operational handbook on tuberculosis

Module 6: Tuberculosis and comorbidities Module 6: Tuberculosis and comorbidities

> (World Health Organization





Hunger numbers remain high as global crises deepen



24 July 2024 News Release

"Hunger numbers stubbornly high for three consecutive years as global crises deepen: 2024 joint UN report 1 in 11 people worldwide faced hunger in 2023, 1 in 5 in Africa

Around 733 million people faced hunger in 2023, equivalent to one in eleven people globally and one in five in Africa, according to the latest State of Food Security and Nutrition in the World (SOFI) report published today by five United Nations specialized agencies.

..... The report shows that the world has been set back 15 years, with levels of undernourishment comparable to those in 2008-2009."





Background

Global tuberculosis report







Tuberculosis and undernutrition

Undernutrition more than **doubles the risk of TB** (HR 2.23, 95% CI: 1.83–2.72)



Cochrane Database of Systematic Reviews

Undernutrition as a risk factor for tuberculosis disease (Review)

Franco JVA, Bongaerts B, Metzendorf MI, Risso A, Guo Y, Peña Silva L, Boeckmann M, Schlesinger S, Damen JAAG, Richter B, Baddeley A, Bastard M, Carlqvist A, Garcia-Casal MN, Hemmingsen B, Mavhunga F, Manne-Goehler J, Viney K

Study	-	with 95%	CI	Country	ROB1	ROB2	ROB3	ROB4	ROB5	ROB6
A: < 10 years										
Hanrahan 2010 -	-	1.20 [0.81,	1.78]	South Africa	•	۲	۲	۲	•	٠
Chen 2022		1.26 [0.52,	3.06]	China	٠	۲	۲	-	0	٠
Li 2013	-	1.30 [0.92,	1.84]	Tanzania	•	0	۲	•	۲	٠
Kim 2018		1.36 [1.15,	1.60]	South Korea	٠	•	۲	•	0	٠
Albana 2016	-	1.42 [0.74,	2.73]	Peru	•	•	۲	•	۲	٠
Baker 2012	-	1.60 [0.55,	4.68]	Taiwan, China	٠	۲	•	•	•	•
Choun 2013		1.60 [1.13,	2.26]	Cambodia	•	۲	۲	•	•	•
Alemu 2020	-	1.91 [1.44,	2.53]	Ethiopia	•	•	۲	•	•	٠
Leung 2007	-	2.06 [1.46,	2.91]	China	•	٠	۲	٠	0	٠
Park 2022		2.21 [1.98,	2.46]	South Korea	٠	۲	۲	•	0	٠
Batista 2013		2.25 [1.38,	3.67]	Brazil	•	•	٠	•	•	•
Ganesan 2023		2.28 [1.27,	4.10]	Subsaharan Africa	•	٠	۲	٠	•	•
Yoo 2021		2.36 [2.17,	2.57]	Taiwan, China	٠	٠	•	•	•	٠
Getu 2022		2.42 [1.30,	4.51]	Ethiopia	•	٠	۲	•	•	•
Ahmed 2018		2.53 [1.27,	5.04]	Ethiopia	۰	0	0	0	0	0
Moore 2007		2.80 [1.59,	4.93]	Uganda	•	۲	۲	•	0	0
Gedlew 2020		2.94 [1.23,	7.03]	Ethiopia	•	0	٠	•	•	•
Tiruneh 2019		3.13 [1.77,	5.53]	Ethiopia	•	۰.	٠	۰.	۰.	۰.
Maro 2010		3.72 [1.16,	11.96]	Tanzania	•	٠	۲	٠	•	•
Beshir 2019	_	5.19 [1.89,	14.23]	Ethiopia	•	0	۲	•	۲	٠
Worodria 2011		5.85 [1.24,	27.53]	Uganda	•	0	۲	•	0	0
Gatechompol 2022		8.21 [2.43,	27.73]	Thailand	•	۲	۲	•	0	٠
Heterogeneity: $\tau^2 = 0.06$, $l^2 = 71.55\%$, $H^2 = 3.52$		2.02 [1.74,	2.34]							
Test of $\theta_i = \theta_i$: Q(21) = 70.50, p = 0.00										
Test of $\theta = 0$: z = 9.30, p = 0.00										
B: 10 or more years										
Cegielski 2012		12.43 [5.74.	26.911	USA	•	•	•	•	•	•
Heterogeneity: T ² = 0.00, 1 ² = .%, H ² = .	-	12.43 [5.74.	26.911			×.		- T		
Test of 0 = 0: Q(0) = -0.00, p = .	-									
Test of $\theta = 0$: z = 6.39, p = 0.00										
Overali		2 23 [1 83	2 791							
Heteromeneity: x ² = 0.14, l ² = 86, 16%, H ² = 7.22	1		A							
Tort of 0 = 0: 0(22) = 00.02 p = 0.00										
Test of $\theta = 0$; $z = 7.91$, $p = 0.00$ reduced risk	increased risk									
Test of group differences: Q _s (1) = 20.51, p = 0.00										
	1 2 4 8 16									
Random-effects REML model Sorted by: _meta_es 95% prediction intervals										

48% (95% CI: 40.9–55.2%) prevalence of undernutrition among people with TB.

Prevalence and risk factors of malnutrition in patients with pulmonary tuberculosis: a

systematic review and meta-analysis

Ai Li', Su-yun Yuan', Quan-guo Li, Jin-xing Li, Xiang-yu Yin and Na-na Liu*

Department of Respiratory Critical Care Medicine, The Second People's Hospital of Weifang, Weif





Impact of the dual burden – a bidirectional relationship

Adjusted incidence rate ratios for unfavourable treatment outcomes and death					
	Unfavourable aIRR (95% CI)	Loss to Follow-Up aIRR (95% CI)	Death aIRR (95% CI)		
BMI at treatment initiation (kg/m ²) <16 c/w 18.5-22.9	2.05 (1.42-2.98)	1.81 (1.46-2.25)	4.17 (1.97-9.53)		
Unchanged or decreased BMI	1.81 (1.27-2.61)	6.24 (3.78-10.87)	5.16 (1.51-17.65)		



Sinha et al, Clin Infect Dis. 2022 Nov 25;76(8):1483–1491. doi: <u>10.1093/cid/ciac915</u>

Barghava et al, Lancet Glob Health 2023; 11: 1402–11 https://doi.org/10.1016/ S2214-109X(23)00324-8

- Undernutrition is associated with more severe disease, delayed sputum conversion, and worse TB treatment outcomes including death
- Tuberculosis can lead to/worsen undernutrition
- Patient cost surveys have found high proportion of catastrophic costs due food and nutritional supplementation





TB comorbidities in the End TB Strategy











Implementing the End TB Strategy: the essentials is available at: https://www.who.int/publications/i/item/9789240065093

Background

- WHO guideline *Nutritional care and support for patients with tuberculosis* published in 2013
- New evidence on nutritional interventions and micronutrient supplementation for people with TB, and on the impact of food assistance on TB prevention in household contacts
- WHO commissioned systematic reviews on three PICO questions
 - 1. Nutritional interventions for people with TB
 - 2. Micronutrient supplementation for people with TB
 - 3. Food assistance to household contacts of people with TB
- WHO also commissioned surveys among MoH participants and people who have had TB and their household contacts.
- Guideline development group (GDG) meeting convened June–July 2024 to review evidence and formulate recommendations





PICO 1 – Nutritional interventions for people with TB

- The systematic review identified 18 randomized controlled trials
- Which measured the impact of the following interventions on one or more critical outcomes

Intervention	Certainty of evidence	Balance between benefits and harms
Arginine	Moderate	Probably favours intervention
High Energy-protein	Low-moderate	
Financial support and psychosocial counselling	Moderate	
Food vouchers	Moderate	
Green tea extract	Low	Uncertain
Fish oil/vitamin D/zinc	Very low	
Channa striata	Low	
Dietary nursing	Low-moderate	





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The balance of effects for the studies on green tea extract, fish oil/vitamin D/zinc, channa striata and dietary nursing was uncertain. The GDG therefore judged that the evidence did not support the provision of these interventions for people with TB. No trials measured the impact of nutritional assessment and counselling.



PICO 1 – Nutritional interventions for people with TB

Intervention/outcome	Study	Effect size	Certainty of evidence
Arginine-rich food			
TB cure – 6 month, PLHIV	Schön T et al, Tuberculosis (Edinb); 2011	RR 1.58 (1.11; 2.25)	
Underweight at 1 month	Farazi A et al. Tuberc Res Treat; 2015	RR 0.35 (0.13; 0.99)	Moderate ⊕⊕⊕⊖
High energy-protein supplementary food			
TB treatment completion	Jahnavi G et al, Singapore Med J; 2010	RR 1.20 (1.04; 1.37)	$Low \oplus \oplus \bigcirc \bigcirc$
% weight gain (2 months)	Martins N, Bmj; 2016	MD 1.7% (0.19; 3.21)	$High \oplus \oplus \oplus \oplus$
% weight gain (8 months)	Martins N, Bmj; 2016	MD 2.6% (0.51; 4.69)	$High \oplus \oplus \oplus \oplus$
Adherence (2 months)	Martins N, Bmj; 2016	MD -4.7 (-8.58; -0.82)	Moderate ⊕⊕⊕⊖
Change in lean body mass (6 weeks)	Paton N et al, Am J Clin Nutr: 2004	MD 1.13 kg (0.40; 1.86)	Moderate ⊕⊕⊕⊖
Grip strength (3 months)	Jahnavi G et al, Singapore Med J; 2010 and Paton N et al, Am J Clin Nutr: 2004	MD 1.51 (1.10; 1.92)	Moderate ⊕⊕⊕⊖
Financial support and psycho-social of	counselling		
Cure (MDR-TB)	Baral et al; BMC Public Health; Jan 17 2014	RR 1.21 (1.00; 1.46)	Moderate $\oplus \oplus \oplus \bigcirc$
Food vouchers			
Cure	Reis-Santos et al; Am J Trop Med Hyg; 2022	RR 1.08 (1.03; 1.13)	Moderate ⊕⊕⊕⊖

PICO 2 – Micronutrients for people with TB

- The systematic review identified 33 RCTs on single micronutrients (Vit A, Vit D, selenium and zinc)
- 17 RCTs on multiple micronutrients (single administration of 2 or more single micronutrients)

Intervention	Certainty of evidence overall	Balance between benefits and harms overall
Vitamin D	Low	Probably favours intervention
Vitamin A	Low	Favour neither the intervention nor
Selenium	Low	comparison
Zinc	Low	
Multiple micronutrients	Moderate	





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Multiple micronutrients	Moderate	

None of the studies investigating Vit A, selenium, Zinc, and multiple micronutrients demonstrated a balance between benefits and harms in favour of the interventions for any critical clinical outcomes other than for an increase in serum levels. The GDG therefore judged that a recommendation would not be appropriate.





PICO 2 – Micronutrients for people with TB

Intervention/outcome	Study	Effect size	Certainty of evidence
Vitamin D			
TB cure	Hasanain A, et al, Indian J Tuberc; 2019 and Wen Y et al, BMC Infect Dis; 2022	RR 1.25 (1.09; 1.43)	
Any adverse events	Daley P et al, Lancet Infect Dis; 2015, Wejse C et al, Am J Respir Crit Care Med; 2009, Hasanain A et al, Indian J Tuberc; 2019, Farazi A et al, Egyptian Journal of chest diseases and tuberculosis; 2017	RR 0.70 (0.50; 0.99)	Very low ⊕○○○
Change in serum vitamin D 2-3 months ^{1,16,17,18}	Ganmaa D et al, Am J Respir Crit Care Med,; 2017, Zhang L et al, Neuropsychiatr Dis Treat; 2018, Kota S et al, Diabetes Metab Syndr; 2011, Afzal A et al, Pakistan journal of medical sciences; 2018	SMD 4.10 (2.64; 5.56)	Very low ⊕○○○

The two trials investigating the impact of Vitamin D on TB cure differed in Vit D dosage and Vit D status in the trial participants.





PICO 3 – Food assistance for household contacts

- The systematic review identified 1 randomized controlled trial (Bhargava et al, Lancet, 2023)
- Measured one critical outcome (TB incidence)

Intervention/outcome	Certainty of evidence	Effect size	Balance between benefits and harms			
Food basket with multiple micronutrients						
TB incidence	Moderate	RR 0.61 (0.43 to 0.85)	Favours the intervention			
No trials assessed the impact of assessment and counselling on TB incidence among household contacts of people with TB.						





Recommendations on nutritional assessment & care

- **Reworded from 2013:** At diagnosis and throughout treatment all individuals with TB should be offered nutritional assessment and appropriate counselling based on their nutritional status. *(strong rec, no direct evidence available)*
- **New:** Household contacts of people with TB should be offered nutritional assessment and counselling as part of contact tracing. If undernutrition is identified it should be managed according to WHO guidance. (strong rec, low certainty of evidence)
- **New:** Nutritional interventions should be offered to individuals with TB who have severe, moderate or mild undernutrition as part of a comprehensive package of TB care. (strong rec, low-moderate certainty of evidence)
- **New:** In settings with food insecurity, food baskets in combination with multiple micronutrient supplements should be offered to all households of people with TB. (strong rec, moderate certainty of evidence)
- **New:** Vitamin D supplementation may be provided to people with TB in the context of rigorous research. (conditional rec, low certainty of evidence)



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Consolidated recommendations

- TB screening in people with a risk factor for TB who are either seeking health care or in health care in settings where the TB prevalence in the general population is 100/100 000 population or higher.
- TB screening among subpopulations with structural risk factors for TB.
- Treatment adherence interventions, regardless of nutritional status, including material support (e.g. meals, food baskets, food supplements, food vouchers)

WHO consolidated guidelines on tuberculosis

Module 2: Screening Systematic screening for tuberculosis disease

> World Health Organizatio

WHO consolidated guidelines on tuberculosis

Module 4: Treatment Tuberculosis care and support

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Key considerations

- Multi-sectoral engagement is critical for planning, budgeting, implementation, and monitoring and evaluation.
- Assessment of undernutrition & food insecurity and counselling
 - Mapping of food insecurity
 - Equipment (measures of mid-upper arm circumference, scales, stadiometers)
 - Models of delivery (facility and community-based)
 - Training and SOPs including causes, e.g. helminth infections, counselling content
 - Frame nutritional interventions as a medical intervention
- Nutritional interventions and food assistance
 - \checkmark Tailor according to nutritional status
 - Options include specially formulated food, food (e.g. food baskets) and financial support
 - People-centred delivery (convenience and minimize stigma)







Photo credit: Al image generation



Conclusion

- The association between TB and undernutrition and food insecurity is well documented
- Nutrition plays a critical role in TB treatment and prevention.
- Upcoming WHO guidance on nutritional interventions and food assistance for households of people with TB is more expansive.
- Implementation will require considerable multisectoral engagement and extensive partner collaboration.
- WHO will be conducting further consultation for the development of the operational handbook in 2025.







WHO's TB Knowledge Sharing Platform

English World Health Organization Consolidated Guidelines Operational Handbooks Training Catalogue Quick Search Recommendations Log in

WHO TB **KNOWLEDGE** SHARING PLATFORM

Access the modular WHO guidelines on tuberculosis, with corresponding handbooks and training materials.



World Health Organization

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Module 6: Tuberculosis and comorbidities

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WHO

WHO perational handbook on tuberculosis Module 6: Tuberculosis and comorbidities

Catalogue Handbooks on tuberculosis ctical "how to" guidance, with e proper implementation of

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PREVENTION (2)

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Ω SCREENING (1)

DIAGNOSIS (1)

TREATMENT (3)

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WHO **TB KNOWLEDGE** SHARING PLATFORM



World Health WHO's TB Knowledge Sharing Platform available at: https://extranet.who.int/tbknowledge Organization

World Health Organization

O guidance.







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