TURNING MALNUTRITION INTO A TB SIGNAL: USING LOW BMI TO PRIORITISE TUBERCULOSIS SCREENING AND RISK STRATIFICATION IN PRISONS IN KENYA

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Abstract

Low BMI is common in people with TB and predicts poor outcomes. We analysed routine data from all 1,019 TB patients notified in Kenya Prisons Service facilities in 2025. Low BMI (<18.5 kg/m²) was present in 65.0% at treatment start, more often with HIV coinfection (76.8% vs 62.1%; OR 2.0, 95% CI 1.4–2.9). Ten of 13 deaths occurred at BMI <16.5. BMI is a simple routine marker to prioritise TB screening and flag high-risk patients, but it has not been shown to detect TB before diagnosis.

Methods

Design: retrospective analysis of routine programme data.
Population: all 1,019 TB patients notified in KPS facilities, 2025.
Variables: BMI at treatment start, HIV status, mortality, six-month weight change after treatment completion.
Definitions: low BMI <18.5; very low <16.5 kg/m².
Analysis: proportions with 95% CI; HIV groups compared by odds ratio. Only diagnosed TB patients were included.

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Introduction

Tuberculosis (TB) and undernutrition reinforce each other. Undernutrition raises susceptibility to TB, and active TB causes weight loss. WHO recognises low body mass index (BMI) as a predictor of poor TB outcomes.

Kenya's TB prevalence survey (2016) found a high burden, with about 40% of cases missed.

Kenya Prisons Service (KPS) facilities serve both prisoners and the general public. BMI is a core measure taken routinely for people on TB treatment.

Facilities rely on cardinal symptom-based screening, which misses cases. Routine BMI guides nutritional care but is rarely used to inform who needs TB screening.

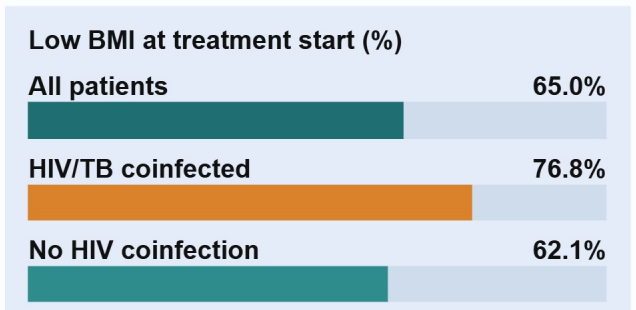
Aim: To describe low BMI among people with TB in Kenyan prisons and explore its potential for screening prioritisation and risk stratification.

<18.5
kg/m² = low BMI

<16.5
kg/m² = very low BMI

Results

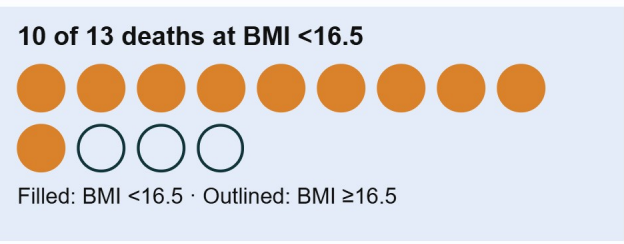
- **662 of 1,019** TB patients (65.0%) had low BMI at treatment start; mean BMI [16.3] kg/m².
- Low BMI was commoner with HIV/TB coinfection: **76.8% vs 62.1%** (OR 2.0, 95% CI 1.4–2.9).
- **10 of 13 deaths** (76.9%) occurred at BMI <16.5 kg/m².
- Of [n] patients assessed at six months, **98.2%** gained weight (mean 9.4 kg).



Measure	n / N	%	95% CI
Low BMI, all	662/1,019	65.0	62.0–67.8
Low BMI, HIV/TB	152/198	76.8	70.4–82.1
Low BMI, no HIV	510/821	62.1	58.8–65.4
Deaths at BMI <16.5	10/13	76.9	49.7–91.8
Weight gain, 6 mo	[n]	98.2	[ ]

Discussion

Nearly two in three people on TB treatment had low BMI at diagnosis, higher with HIV coinfection. Most deaths occurred at very low BMI, but deaths were few (n=13), so estimates are imprecise. Weight recovery during treatment is consistent with TB-related nutritional depletion. Only diagnosed patients were included, so selection bias limits generalisability and BMI cannot be shown to detect TB before diagnosis. Food insecurity, diabetes, substance use and incarceration length were not measured.



Conclusions

Low BMI was prevalent among TB patients in Kenyan prisons and associated with HIV coinfection and mortality.

As a simple routine marker, it could help prioritise TB screening and flag patients needing nutritional support.

Findings do not show low BMI detects TB before diagnosis. Prospective studies with non-TB comparison groups are needed.

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References

[Add references, for example the Kenya National TB Prevalence Survey (2016) and WHO guidance on nutritional care for people with TB. Please verify before printing.]