

Metformin-Associated Vitamin B12 Deficiency in Patients with Type 2 Diabetes in Sub-Saharan Africa: A Narrative Review

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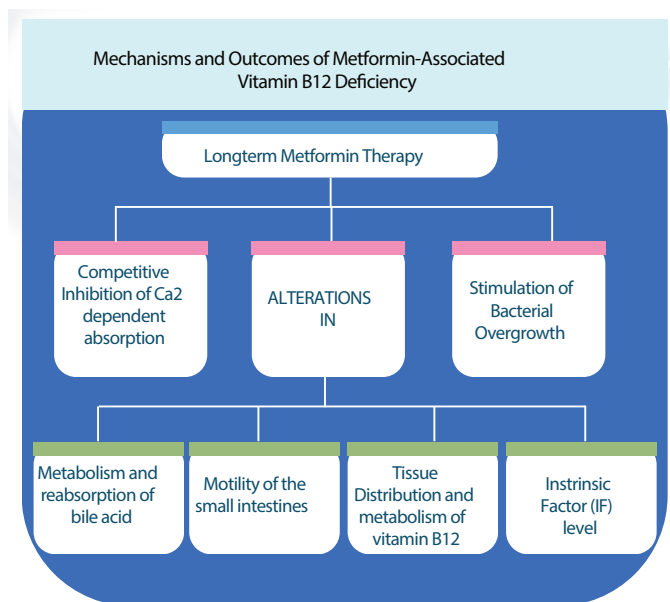
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Abstract

Background: Metformin, is a key therapy for type 2 diabetes in sub-Saharan Africa (SSA) and has been linked to vitamin B12 deficiency mainly due to malabsorption. There is a considerable burden of T2DM in SSA and understanding the prevalence and risk factors of metformin induced vitamin B12 deficiency is crucial for enhancing diabetes care.



Objectives: To determine the prevalence of and risk factors for metformin associated vitamin B12 deficiency in patients with T2DM in SSA and to provide an overview of the available guidelines on screening and treatment of vitamin B12 deficiency associated with metformin therapy.

Methodology: *Literature search:* PubMed, MEDLINE, SCOPUS, AJOL, EMBASE, and Cochrane Library databases were searched for relevant

articles between January 2002 and December 2022. Additional articles were searched in Grey literature as well as manual searches in reference lists and citations. Clinical practice guidelines on diabetes management from the SSA region were searched using research words.

Inclusion criteria: Studies assessing the effects of metformin on vitamin B12 in patients with T2DM in countries in SSA and all available clinical practice guidelines on diabetes management from SSA.

Exclusion criteria: Studies with insufficient data, review articles, and non-English articles or guidelines.

Data extraction and synthesis: From articles: Relevant data including publication information, study characteristics, intervention details and outcome measures. Quality assessment of the articles was performed using the Center for Evidence-Based Management (CEBMa) (2014) Tool. From Guidelines: relevant data including screening, diagnosis, and monitoring vitamin-B12 status and treatment of vitamin B12 deficiency.

Results: *Article selection:* Initial search yielded 24 articles. After screening titles and abstracts, 13 articles were eligible for full-text review but only 7 met the inclusion criteria. All were cross-sectional studies except one case-control study.

Guidelines Selection: Twenty-two guidelines from 18 countries were retrieved.

Key findings: N=1075 adult patients with T2DM in SSA.

The prevalence of MAB12D ranged between 5-41%.

Risk factors	<p>High metformin dose</p> <p>Long duration of metformin therapy</p> <p>Long duration of diabetes</p> <p>Advanced age</p> <p>High BMI and body weight</p> <p>A better glycemic control</p> <p>Non-Black ethnicity</p>
Guidelines	<p>Few available in SSA</p> <p>None were evidence-based</p> <p>None recommended routine screening of vitamin B12 deficiency in metformin-treated T2DM</p> <p>Selective screening was suggested in 3 guidelines from Namibia, Kenya and South Africa</p> <p>Treatment guidelines unclear in terms of dosing schedule and duration of therapy</p>

Conclusion: Considerable variation of the prevalence of MAB12D in SSA. Various plausible risk factors identified guidelines regarding screening, monitoring and treatment of MAB12D are generally lacking in SSA Guidelines were not evidence-based.

Recommendation: Selective screening in high-risk symptomatic individuals with T2DM on metformin therapy. Need to conduct RCTs in SSA for evidence-based guidelines development.

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Key words: Metformin, Biguanide, Vitamin B12 deficiency, Type 2 diabetes mellitus, Sub-Saharan Africa, Guidelines, Screening, Treatment

References

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