

Repetitive Transcranial Magnetic Stimulation In Alzheimer’s Disease Cognitive Impairment: A Systematic Review Of Clinical Trials

2025-AI-472-AAIC

Tejiri Napoleon¹, Deborah Akinrinde¹, Glory Olalekan Adebajo², Victor Femi-Lawal¹, Gbenga Alabi², Ojo Israel Ifeoluwa¹, Sodiq Lawal², Lawal Oluwatimilehin Abati², Chioma Nnedinma Duru³, Olawoyin Oluwatosin⁴, Ishaq Sanusi¹, Davies Oluwasijibomi³

¹College of Medicine, University of Ibadan, Ibadan, Nigeria, ²College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Nigeria, ³College of Medicine and Health Sciences, Gregory University, Uturu, Nigeria, ⁴College of Medicine, University of Lagos, Lagos, Nigeria

Key Takeaway: rTMS appears to improve cognition; especially episodic memory, language, and executive function, in most mild to moderate AD trials, with high-frequency stimulation of frontal, parietal, hippocampal, and cerebellar targets showing benefits and only mild, transient adverse events.

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
Alzheimer’s disease (AD) is a growing healthcare concern with limited treatment options. Repetitive transcranial magnetic stimulation (rTMS) has potentials in improving cognitive function in patients with Alzheimer's disease. In this systematic review, we evaluate the efficacy and safety of repetitive transcranial magnetic stimulation in treating patients with Alzheimer’s disease cognitive impairment.	Relevant clinical trials investigating rTMS in AD patients, were identified through a search of electronic databases, including PubMed/MEDLINE, SCOPUS, Cochrane Library, Google Scholar, and Embase. Studies published from the database inception up to 25th January, 2025 were included. Studies were included, if they assessed cognitive outcomes using standardized neuropsychological tests. Studies that used rTMS in combination with other interventions that could not be isolated, were also included.	14 studies met the inclusion criteria, involving a total of 657 participants, with mild to moderate AD. 11 studies demonstrated significant cognitive improvements in AD patients treated with rTMS, particularly in episodic memory, language and executive ability. High frequency rTMS protocols (5-20Hz) , targeting the dorsolateral prefrontal cortex (N=8) and parietal cortex (N=2), showed promising results in 8 studies. Studies where the hippocampus (N=2) and cerebellum (N=1) were targeted, demonstrated improvement in cognitive functions. 8 studies recorded no adverse events. Adverse events were generally mild and transient, with headache, scalp discomfort, pain and fatigue being the most common.	Preliminary evidence suggests that rTMS may offer cognitive benefits in AD, though heterogeneity in protocols limits definitive conclusions. The optimal duration, frequency, treatment protocol, target regions and mechanism of action of rTMS in AD cognitive impairment require further investigations. Further research with extended duration and follow-up periods, is required to establish its role in the treatment of cognitive impairment due to AD.	1. Estimation of the global prevalence of dementia in 2019 and forecasted prevalence in 2050: an analysis for the Global Burden of Disease Study 2019. Lancet Public Health. 2022 Feb;7(2): e105–25. https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(21)00249-8/fulltext 2. International AD, University M. World Alzheimer Report 2021. Alzheimer’s Disease International [Internet]. 2021;2–314. Available from: https://www.alzint.org/resource/world-alzheimer-report-2021/ 3. Livingston G, Huntley J, Sommerlad A et al. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. Lancet. 2020 Aug;396(10248):413–46. https://www.thelancet.com/article/S0140-6736(20)30367-6/fulltext
CONTACT  Napoleongreat3@gmail.com bhigafrica@gmail.com +234 802 675 7418  Neuroscience Next AFFILIATIONS: 				