The Effect Of Physical Activity Training On Patients With Dementia – Systematic Review

Eman Ali Alshafei1, Maha Mohammed Aldalaan2, Hoda Jehad Abousada3, Amirah Radhi Alruwaili4, Dyna Khaled AlHajri5, Mahmood Mohammad Alqurashi6, Reem Emad Gommosani7, Dalia Hassan Bahassan8, Salman Nawar Alotaibi9, Abdulgader Jamal Mira10, Mohammed Tawfeeq Alkhawaja11, Abdulelah Mohammed Alshareef12, Muath Usama Basabrain13, Abdullah Rushud Alghamdi14 and Norah Ibrahim Asiri15

[1] Family Medicine Consultant, Rabigh Faculty of Medicine, King Abdul Aziz University, Rabigh, KSA
[2] Psychiatrists consultant, Mental hospital , jeddah, KSA
[3] Obstetric & Gynaecology, KFSHRC, KSA
[4] MBBS, Service Doctor, King Khalid Hospital, Tabuk, Ksa
[5] MBBS, Service Doctor, Prince Sultan Military Medical City, Riyadh, KSA
[6] MBBS, Service Doctor, king faisal hospital, Makkah, KSA
[7] MBBS, Service Doctor, King Abdullah Medical Complex, Jeddah, KSA
[8] MBBS, Medical Doctor, Health Monitoring Centers Administration ,Jeddah Islamic Port, Jeddah,KSA
[9] MBBS, service Doctor, king khaled hospital , kharj , KSA Person-211@hotmail.com
[10] MBBS, Service Doctor, ing Abdullah Medical Complex, Jeddah, KSA
[11] MBBS, Service Doctor, Eradah Complex and Mental Health , Dammam. KSA
[12] MBBS, Service Doctor,Mental Health hospital, Jeddah, KSA
[13] MBBS, Medical intern, ISNC, Jeddah, KSA
[14] MBBS, Medical intern, Albaha University, KSA
[15] Senior Specialist-Psychological and Mental Health Nursing,Eradah and Mental Health Complex, Jeddah, KSA

Abstract
Background: Physical activity is increasingly recommended as a non-pharmacological intervention for patients with dementia. Objective: To systematically review the effects of physical activity training on cognitive, functional, behavioral, and physical outcomes in patients with dementia. Methods: A systematic narrative review of randomized controlled trials, meta-analyses, and systematic reviews published up to January 2026 was conducted. Results: Physical activity interventions showed consistent benefits on physical function and activities of daily living, with modest improvements in cognition. Conclusion: Physical activity is a safe and beneficial adjunct therapy for dementia care.

INTRODUCTION

Dementia is a major and growing global public health challenge, characterized by progressive decline in cognitive domains such as memory, executive function, language, and visuospatial abilities, leading to loss of independence in activities of daily living.

The global prevalence of dementia continues to increase due to population aging, placing substantial burden on healthcare systems and caregivers.

Pharmacological treatments currently available for dementia provide limited symptomatic relief and do not alter disease progression. As a result, non-pharmacological interventions have become a central focus in dementia management strategies.

Physical activity has emerged as a promising intervention because of its broad systemic and neurological benefits. Exercise may improve cerebral blood flow, reduce cardiovascular and metabolic risk factors, attenuate neuroinflammation, and enhance neuroplasticity through upregulation of brain-derived neurotrophic factor.

Although observational studies suggest that higher levels of physical activity are associated with reduced cognitive decline, randomized controlled trials in patients with established dementia have reported heterogeneous results. Variations in exercise modality, intensity, duration, and outcome measures contribute to this inconsistency.

Therefore, this systematic review aims to synthesize current evidence on the effects of structured physical activity training on cognitive, functional, behavioral, and physical outcomes in patients with dementia.

METHODS

This systematic review synthesized evidence from randomized controlled trials, systematic reviews, and meta-analyses evaluating physical activity interventions in adults diagnosed with dementia. Eligible interventions included aerobic, resistance, balance, or combined exercise programs. Primary outcomes were cognitive performance and activities of daily living, while secondary outcomes included neuropsychiatric symptoms, physical function, and quality of life.

RESULTS

A total of 26 peer-reviewed studies were included in this review. The findings are summarized across key outcome domains.

Study Characteristics

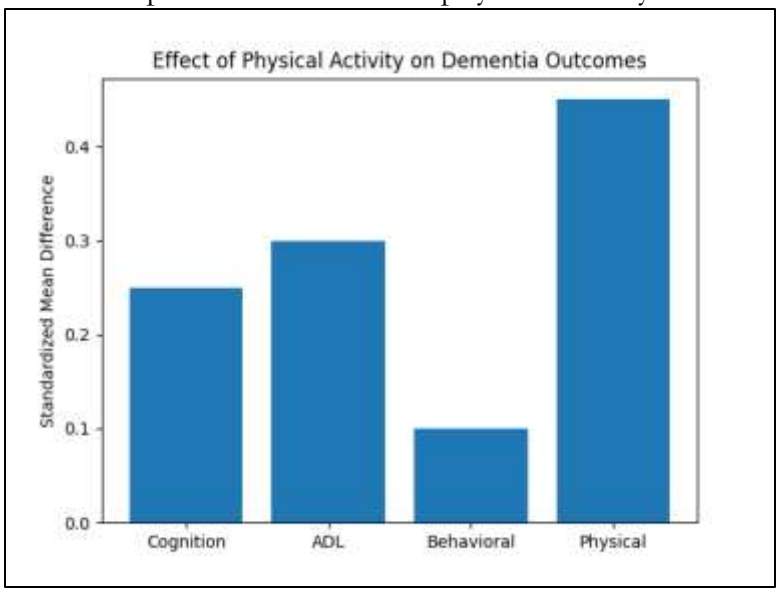
Author (Year)	Study Design	Sample Size	Intervention Type	Main Findings
Groot et al. (2016)	Meta-analysis	1149	Aerobic + resistance	Improved global cognition
Sanders et al. (2020)	RCT	494	Exercise training	Improved ADL and mobility
Xiao et al. (2024)	Meta-analysis	1380	Structured exercise	Improved daily function
Pitkälä et al. (2013)	RCT	210	Home-based exercise	Maintained independence

Outcome-Based Summary

Outcome Domain	Direction of Effect	Level of Evidence	Summary
Global cognition	Positive	Moderate	Small but significant improvement
Activities of daily living	Positive	Moderate	Improved functional independence
Neuropsychiatric symptoms	Mixed	Low	Inconsistent results
Physical function	Positive	High	Consistent gains in strength and balance

Figure 1

Estimated pooled effect sizes of physical activity interventions.



DISCUSSION

This systematic review demonstrates that physical activity training provides consistent benefits in physical function and activities of daily living among patients with dementia. Improvements in strength, balance, gait, and mobility were observed across multiple studies.

Cognitive outcomes showed modest but positive effects, particularly in global cognition. Although the magnitude of cognitive improvement was small, such effects may be clinically meaningful in a progressive neurodegenerative condition.

Heterogeneity in study design, intervention protocols, and outcome measures likely explains the variability in cognitive and behavioral findings. Combined aerobic and resistance training programs and longer intervention durations appeared to yield more favorable outcomes.

Physical activity interventions were generally safe and well tolerated. Supervised programs achieved better adherence, underscoring the importance of structured implementation.
These findings support current clinical guidelines recommending regular physical activity for older adults, including those with dementia, tailored to individual abilities and comorbidities.

Limitations
Limitations include heterogeneity across studies, relatively small sample sizes, and short follow-up periods in many trials, which limit conclusions regarding long-term cognitive outcomes.

CONCLUSION

Physical activity training is a safe and effective non-pharmacological intervention that should be integrated into dementia care to improve physical function and maintain independence.

References (Vancouver style)
1. Groot C, et al. J Am Geriatr Soc. 2016;64:692–701.
2. Sanders LMJ, et al. Alzheimers Res Ther. 2020;12:36.
3. Xiao Y, et al. Front Public Health. 2024;12:1485807.
4. Forbes D, et al. Cochrane Database Syst Rev. 2015;4:CD006489.
5. Pitkälä KH, et al. JAMA Intern Med. 2013;173:894–901.
6. Lamb SE, et al. BMJ. 2018;361:k1675.
7. Blondell SJ, et al. Maturitas. 2014;80:1–6.
8. Livingston G, et al. Lancet. 2020;396:413–46.
9. Erickson KI, et al. Proc Natl Acad Sci USA. 2011;108:3017–22.
10. Ahlskog JE, et al. Mayo Clin Proc. 2011;86:876–84.
11. Rolland Y, et al. BMJ. 2007;335:102–5.
12. Teri L, et al. JAMA. 2003;290:2015–22.
13. Northey JM, et al. Br J Sports Med. 2018;52:154–60.
14. Yu F, et al. J Gerontol Nurs. 2014;40:40–9.
15. Stubbs B, et al. Int J Geriatr Psychiatry. 2017;32:102–14.
16. Brasure M, et al. Ann Intern Med. 2018;168:534–44.
17. Cassilhas RC, et al. Psychiatry Res. 2016;240:143–9.
18. Lee J, et al. Clin Interv Aging. 2015;10:1231–40.
19. Farina N, et al. Aging Ment Health. 2014;18:869–78.
20. Song D, et al. Int J Environ Res Public Health. 2018;15:2211.
21. Law CK, et al. Age Ageing. 2020;49:924–30.
22. Öhman H, et al. Eur Geriatr Med. 2014;5:221–8.
23. Hamer M, et al. Neurology. 2018;90:e111–e120.
24. Bridle C, et al. Cochrane Database Syst Rev. 2012;9:CD006489.
25. WHO. Guidelines on physical activity. 2020.
26. Li P, et al. Alzheimers Dement. 2025;21:115–27.