

2022

## Physical Activity for ADL Performance in Older Adults with Dementia: A Systematic Review

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### Recommended Citation

Hesselstine, Clancy; Heun, Josiah; Porter, Murphy; Wyrick, Sam; Smallfield, Stacy; and Whitlow, Molly, "Physical Activity for ADL Performance in Older Adults with Dementia: A Systematic Review" (2022). *Student Systematic Reviews: Occupational Therapy*. 1.  
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# Physical Activity for ADL Performance in Older Adults with Dementia: A Systematic Review

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# Background

- 5.8 million US adults live with dementia. (CDC, 2019)
- Exercise may slow cognitive decline in dementia. (Ahlskog, 2011)

**Does physical exercise maintain or improve ADL performance for adults with dementia?**



# Method: Search Strategy

CINAHL, PubMed, Cochrane Library, and Scopus

- Key terms:
  - Dementia
  - Adult
  - Physical Activity
  - Exercise
  - Activities of daily living
  - ADLs



# Method: Criteria

## Inclusion Criteria:

- Published between 2012-2022
- Dementia diagnosis
- Age > 18
- English language
- Physical exercise as intervention
- ADL as outcome

## Exclusion Criteria:

- Review contained  $\geq 50\%$  of the studies of another review
- Systematic reviews of systematic reviews



Records identified via database search  
n=399



Records after duplicates removed  
n=313



Records screened  
n=313



Full text articles assessed for eligibility  
n=33



Articles included in review  
n=7

Reason for record exclusion

- Not a systematic review  
n = 280
- No outcomes related to ADLs  
n = 12
- No exercise as intervention  
n = 8
- Dementia not studied  
n = 4
- A systematic review of systematic reviews  
n = 1
- More than 50% of RCTs were identical to another systematic review (the larger study was kept)  
n=1

# Results



GENERAL **IMPROVEMENT** IN  
ADLS WITH LOW INTENSITY  
EXERCISE



**FOUR** STUDIES HAD **POSITIVE**  
OUTCOMES RELATED TO ADL  
PERFORMANCE



**THREE** STUDIES HAD **MIXED**  
OUTCOMES RELATED TO ADL  
PERFORMANCE





# Discussion: Findings

## Strong evidence: routine use

- Improve or maintain ADL performance
- Low-intensity
- Long duration
- Less frequent
- Longer intervention period

## Moderate evidence: routine use

- Shorter duration
- More frequent exercises

## Low evidence: case-by-case use

- High-intensity
- Shorter interventions

Exercise Factors	Low-intensity duration (yoga, Tai Chi, walking)	High-intensity (strength training, dancing, brisk walking)
Short duration ≤30 minutes	Light Green	Yellow
Long duration >30 minutes	Green	Yellow
Less frequent ≤ 3 times a week	Green	Green
More frequent >3 times a week	Light Green	Light Green
Length ≤ 8-week duration	Yellow	Yellow
Length >8-week	Green	Yellow

# Discussion: Limitations

- Small sample size in some RCTs
- Lack of detail in methods and interventions used
- Non-English language articles were excluded
- High attrition rates
- Elevated risk of performance bias
- Heterogeneity in the compared studies
- No information on the specific ADLs improved



# Discussion: Future Research

Exercise  
frequency,  
duration, &  
intensity

Interactions  
between  
exercise  
characteristics

Exercise based  
on severity of  
dementia

Homogeneity  
across studies



# Bottom Line for OT

Bottom line for occupational therapy

- Physical activity intervention can **maintain or improve ADL performance**
- The most supported exercise characteristics:
  - Low-intensity (yoga, Tai Chi, walking)
  - Long duration (duration >30 mins per session)
  - Less frequent (exercise sessions  $\leq 3$  a week)
  - Longer intervention exercises (intervention period > 8-week)
- Exercise choice increases long-term adherence (Collado-Mateo, 2021)



# References

Ahlskog, J. E., Geda, Y. E., Graff-Radford, N. R., & Petersen, R. C. (2011). Physical exercise as a preventive or disease-modifying treatment of dementia and brain aging. *Mayo Clinic Proceedings*, 86(9), 876–884. <https://doi.org/10.4065/mcp.2011.0252>

Centers for Disease Control and Prevention. (2019, August 20). *Minorities and Women Are at Greater Risk for Alzheimer's Disease*. U.S. Department of Health and Human Services. <https://www.cdc.gov/aging/publications/features/Alz-Greater-Risk.html>

Collado-Mateo, D., Lavín-Pérez, A. M., Peñacoba, C., Del Coso, J., Leyton-Román, M., Luque-Casado, A., Gasque, P., Fernández-Del-Olmo, M. Á., & Amado-Alonso, D. (2021). Key factors associated with adherence to physical exercise in patients with chronic diseases and older adults: An umbrella review. *International Journal of Environmental Research and Public Health*, 18(4), 2023. <https://doi.org/10.3390/ijerph18042023>

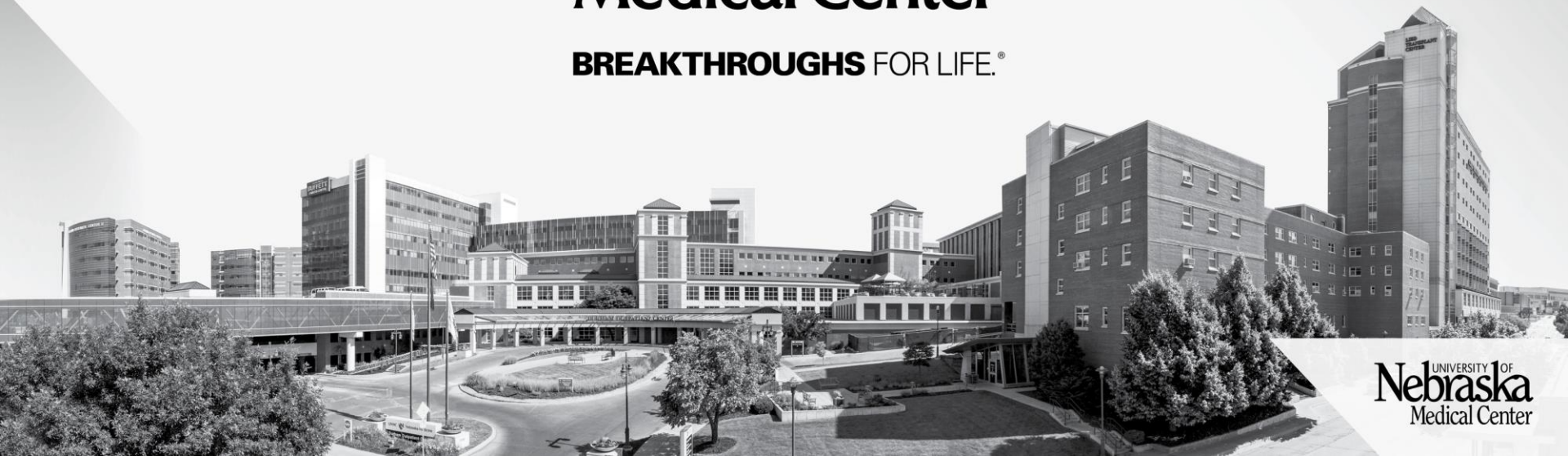
Giebel, C. M., Sutcliffe, C., & Challis, D. (2015). Activities of daily living and quality of life across different stages of dementia: a UK study. *Aging & Mental Health*, 19(1), 63–71. <https://doi.org/10.1080/13607863.2014.915920>





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Limitations	Articles
Small sample size in some examined RCTs included in the systematic reviews $\leq 25$ participants	(Brett, 2016), (Forbes, 2015), (Lewis, 2017)
Lack of detail, specifically in methods, intervention, and reporting adherence in included articles	(Karssemeijer, 2017)
Articles not written in English were excluded	(Brett, 2016), (Forbes, 2015), (Lewis, 2017), (Park, 2019), (Karssemeijer, 2017), (Yeh, 2021)
Some included articles had high attrition (drop out) rates	(Lewis, 2017)
Elevated risk of performance bias as blinding was not possible in some studies	(Forbes, 2015), (Lewis, 2017), (Yeh, 2021)
Heterogeneity in the compared studies features (intervention, duration, frequency, etc.)	(Forbes, 2015), (Karssemeijer, 2017)

Duration of exercise by intensity			
Types of Exercises	# of articles (row totals)	Short duration $\leq 30$ minutes	Long duration $>30$ minutes
Low-intensity	5	(Brett, 2016). (Park, 2019)	(Brett, 2016), (Lewis, 2017), (Karssemeijer, 2017), (Yeh, 2021), (Park, 2019)
	0	None	None
	1	None	(Forbes, 2015)
	Column totals	2/2 supporting exercise	5/6 supporting exercise
High-intensity	5	(Karssemeijer, 2017), (Zhou, 2022)	(Forbes, 2015), (Karssemeijer, 2017) (Lewis, 2017), (Yeh, 2021), (Zhou, 2022)
	2	None	(Forbes, 2015), (Zhou, 2022)
	4	(Brett, 2016), (Forbes, 2015)	(Forbes, 2015), (Zhou, 2022), (Park, 2019)
	Column totals	2/4 supporting	3/6 articles supporting exercise; 1/6 article not supporting exercise; 2/6 articles with mixed findings (both have some supportive findings, some mixed findings, some findings that do not support)



Frequency of exercise by intensity			
Types of Exercises	# of articles	Less frequent $\leq 3$ times a week	More frequent $>3$ times a week
Low-intensity	6	(Brett, 2016), (Lewis, 2017), (Karssemeijer, 2017) (Park, 2019), (Yeh, 2021)	(Brett, 2016), ( <b>Forbes, 2015</b> ), (Karssemeijer, 2017), (Park, 2019)
	1	None	( <b>Forbes, 2015</b> )
	1	(Forbes, 2015)	( <b>Forbes, 2015</b> )
	Column totals	5/6 supporting exercise	3/4 articles supporting exercise; 0/4 article not supporting exercise; 1/4 articles with mixed findings (both have some supportive findings, some mixed findings, some findings that do not support)
High-intensity	5	(Lewis, 2017), (Karssemeijer, 2017), (Yeh, 2021)	(Lewis, 2017), ( <b>Forbes, 2015</b> ), ( <b>Zhou, 2022</b> )
	2	None	( <b>Forbes, 2015</b> ), ( <b>Zhou, 2022</b> )
	2	(Forbes, 2015)	( <b>Forbes, 2015</b> ), ( <b>Zhou, 2022</b> )
	Column totals	3/4 supporting exercise	1/3 articles supporting exercise; 0/3 article not supporting exercise; 2/3 articles with mixed findings (both have some supportive findings, some mixed findings, some findings that do not support)

Length of exercise intervention period by intensity			
Types of Exercises	# of articles	Length ≤ 8-week duration	Length >8-week
Low-intensity	5	None	(Brett, 2016), (Lewis, 2017), (Karssemeijer, 2017), (Yeh, 2021), (Park, 2019)
	0	None	None
	1	None	(Forbes, 2015)
	Column totals	0/0 supporting exercise	5/6 supporting exercise
High-intensity	4	(Karssemeijer, 2017)	(Lewis, 2017), (Karssemeijer, 2017), (Yeh, 2021), <b>(Zhou, 2022)</b>
	1	None	<b>(Zhou, 2022)</b>
	3	None	(Forbes, 2015), (Park, 2019), <b>(Zhou, 2022)</b>
	Column totals	1/1 supporting exercise	3/6 articles supporting exercise; 2/6 article not supporting exercise; 1/6 articles with mixed findings (both have some supportive findings, some mixed findings, some findings that do not support)