

Physical Activity, Brain Structure, and Cognitive Performance: Baseline Findings from the LatAm-FINGERS Study

Natalia Gomes Gonçalves, Lucia Crivelli, Ismael Luis Calandri, Rosa María Salinas, Lina Marcela Velilla, Mônica Sanches Yassuda, Paulo Caramelli, Ricardo Nitrini, Gustavo Emilio Sevlever, Ana Luisa Sosa, Daisy Acosta, Ana María Charamelo Baietti, María Isabel Cusicanqui, Nilton Custodio, Sergio Dansilio De Simone, Carolina Delgado Derio, Lissette Duque-Peñailillo, Juan Carlos Duran, Ivonne Z. Jiménez-Velázquez, Jorge Mario Leon-Salas, Yanina Bergamo, María Florencia Clarens, Ignacio Demey, María Belén Helou, Carlos Márquez, María Eugenia Martin, Maria da Graça Morais Martin, Diego Querze, Ezequiel Ignacio Surace, Sabrina Acosta-Egea, Esteban Aguirre–Salvador, Leonardo Cruz de Souza, Gustavo Henrique da Cunha Peixoto Cançado, Sonia Maria Dozzi Brucki, Clarisse Vasconcelos Friedlaender, Karina Braga Gomes, Myriam Gutierrez, Carlos Laforcada Ríos, Joyce Graciela Martinez Galindo, Rosa Montesinos, Alberto Nuñez-Herrera, Sebastián Ospina-Henao, Guillermina Rodríguez, Victoria Ruiz Masson, Mónica Sánchez, Christian E. Schenk, Ligia Soto, Mark Espeland, Krister Hakansson, Ricardo Francisco Allegri, Claudia Kimie Suemoto, Andrés Damian

Introduction

Previous studies have found that physical activity is associated with better cognitive performance. Using baseline data from the LatAm FINGERS cohort, we examined associations between physical activity, brain structure, and cognitive performance.

Methods

The sample included adults 50+ years with available neuroimaging data. Brain parenchymal fraction (BPF) was calculated as the ratio of the sum of gray matter and white matter volumes to intracranial volume. Physical activity was measured using the International Physical Activity Questionnaire. Participants were classified as physically inactive (<150 minutes/week of moderate-to-vigorous physical activity) or physically active (≥150 minutes/week). Cognition was assessed with the following tests: Logical Memory (Story Recall), Wechsler Memory IV Digit Span (forwards, backwards, sequencing), Digit Symbol Substitution Test score from the Wechsler Adult Intelligence Scale-Revised, Category Fluency Test, Phonological fluency, and the Trail Making Test (versions A and B). Using the appropriate tests, we created composites for processing speed, memory, executive functioning, and global cognition. Linear regression models were used to investigate the association of physical activity with BPF and cognitive performance, adjusted for age, sex, race/ethnicity, country, education, and stroke.

References

Iso-Markku P, Aaltonen S, Kujala UM, et al. Physical Activity and Cognitive Decline Among Older Adults: A Systematic Review and Meta-Analysis. JAMA Netw Open. 2024;7(2):e2354285. doi:10.1001/jamanetworkopen.2023.54285

Results

In 587 participants, mean age was 67.0±4.5, mean education was 14.9±4.0 years, 74.8% were women, 55.1% were Mestizo/Brown, and 21.3% were physically active (Table 1). Physical activity was associated with better memory performance ($\beta = 0.26$, 95% CI = 0.04; 0.47, $p = 0.018$), but not with BPF (Table 2).

Table 2. Association of physical activity with brain parenchymal fraction and cognitive performance (n = 587).

	Unadjusted		Model 1	
	β (95% CI)	p	β (95% CI)	p
Brain parenchymal fraction	-0.10 (-0.30; 0.09)	0.303	0.11 (-0.05; 0.28)	0.181
Cognitive performance				
Memory	0.31 (0.11; 0.51)	0.002	0.26 (0.04; 0.47)	0.018
Executive function	0.05 (-0.15; 0.25)	0.599	0.15 (-0.04; 0.35)	0.130
Processing speed	-0.21 (-0.40; -0.01)	0.042	0.00 (-0.21; 0.20)	0.964
Global cognition	0.07 (-0.13; 0.27)	0.500	0.17 (-0.02; 0.36)	0.080

β : estimate, CI: confidence interval
Model 1: Linear regression adjusted for age, sex, race/ethnicity, country, education, and stroke.

Given the increasing prevalence of dementia, particularly in Latin America, promoting physical activity may be an effective preventive measure by maintaining memory performance in older adults with all levels of education.

Conclusion

These findings support promoting physical activity as a strategy to preserve memory function among older adults in Latin America and highlight the need for further research to understand the underlying biological pathways.

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Contact

natalia.g@fm.usp.br