

Depression and cognitive performance across multiple domains in middle-aged and older adults: ELSI-Brazil

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Background: Depression is highly prevalent in older adults and has been consistently associated with cognitive impairment. However, evidence on how depression relates to specific cognitive domains remains scarce, particularly in middle-income countries. We aimed to evaluate the association between depression and cognitive performance across multiple domains among older adults and identify which depressive symptoms are associated with worst performance.

Methods: Cross-sectional analyses of the ELSI-Brazil baseline, a nationally representative sample of Brazilians aged 50 years and older. Depression was defined through a CESD-8 $\geq$ 4. Cognitive functions were: 10-word list with immediate and delayed recall, verbal fluency and total cognition, transformed in a standardized (age, sex and education) z-score. Linear regression models were applied to assess the association between depression and cognitive domain scores, estimating beta coefficients, adjusted for age, sex, education, household income, number of chronic illnesses, sedentarism, current smoking, and current drinking. An adjusted linear regression was also applied to verify which CES-D-8 item were associated with total cognition score.

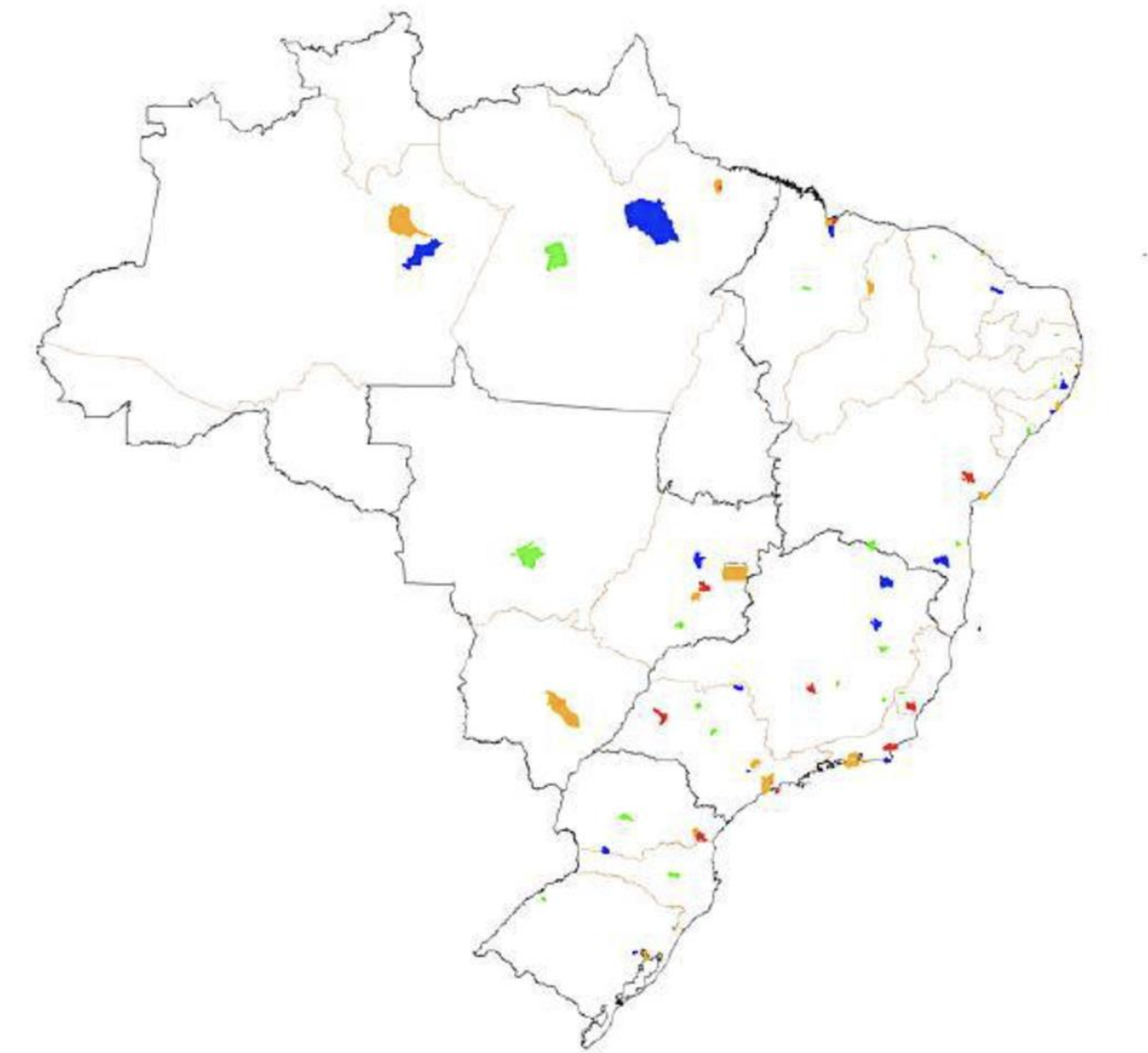


Figure 1 ELSI-Brazil: selected municipalities.

Table 1 Characteristics of individuals according to depression (N=7962)				
	Total	With depression	Without depression	p value
Age (mean, SD)	62.1 (9.4)	62.8 (9.4)	62.6 (9.4)	<0.001
Female Sex (N, wgt%)	1875 (67.5)	2588 (46.9)	4463 (53.7)	<0.001
Education (mean, SD)	4.9 (4.0)	6.0 (4.5)	5.6 (4.4)	<0.001
Household income per capita (mean, SD)	901.6 (971.3)	1266.6 (2430.1)	1140 (2054.8)	<0.001
Number of chronic illnesses (mean, SD)	2.9 (1.9)	1.9 (1.6)	2.3 (1.7)	<0.001
Current Drinking (N, wgt%)	629 (24.9)	1604 (33.7)	2233 (30.8)	<0.001
Current Smoking (N, wgt%)	568 (20.8)	305 (15.7)	1373 (17.4)	<0.001
Sedentaris m	858 (30.8)	1354 (25.5)	2212 (27.2)	<0.001
Immediate Memory recall	-0.3 (1.0)	-0.1 (1.0)	-0.2 (1.0)	<0.001
Delayed Memory recall	-0.3 (0.9)	-0.1 (1.0)	-0.2 (1.0)	<0.001
Combined Memory Recall	-0.3 (0.9)	-0.1 (1.0)	-0.2 (1.0)	<0.001
Verbal Fluency	-0.3 (0.9)	-0.1 (0.9)	-0.1 (1.0)	<0.001
General cognition	-0.5 (1.0)	-0.1 (1.0)	-0.2 (1.0)	<0.001

Results: 7962 participants were included. Individuals with depression were younger, more frequently female, had lower educational attainment and household income and a higher burden of chronic illnesses (all $p < 0.001$). Depressed participants exhibited significantly worse performance across all cognitive domains.

In linear regression models, depression was consistently associated with poorer cognitive performance across all domains, with immediate memory recall ($\beta = -0.19$; 95% CI: -0.26 to -0.14), delayed memory recall ($\beta = -0.25$; 95% CI: -0.32 to -0.19), combined memory recall ($\beta = -0.26$; 95% CI: -0.31 to -0.19), and total cognition ($\beta = -0.36$; 95% CI: -0.42 to -0.30). CES-D items 6 - Enjoyed life ($\beta = -0.18$; 95% CI: -0.25 to -0.11)), 7 - Felt sad ($\beta = -0.15$; 95% CI: -0.24 to -0.07) and 8 - Could not get going ($\beta = -0.22$; 95% CI: -0.29 to -0.15) were associated with worst total cognition.

Conclusion: Depression was independently associated with worse cognition across all evaluated domains, with some specific depressive symptoms associated with worst overall cognition.

References:

- [1] Lima-Costa MF, de Melo Mambrini JV, Bof de Andrade F, et al. Cohort Profile: The Brazilian Longitudinal Study of Ageing (ELSI-Brazil). Int J Epidemiol. 2023;52(1):e57-e65. doi:10.1093/ije/dyac132
- [2] Z Zivin K, Llewellyn DJ, Lang IA, et al. Depression Among Older Adults in the United States and England. The American Journal of Geriatric Psychiatry. 2010;18(11):1036-1044. doi:10.1097/JGP.0b013e3181dba6d2
- [3] Maier A, Riedel-Heller SG, Pabst A, Lupp A. Risk factors and protective factors of depression in older people 65+. A systematic review. PLoS One. 2021;16(5):e0251326. doi:10.1371/journal.pone.0251326
- [4] Triolo F, Belvederi Murri M, Calderón-Larrañaga A, et al. Bridging late-life depression and chronic somatic diseases: a network analysis. Transl Psychiatry. 2021;11(1):557. doi:10.1038/s41398-021-01686-z

Table 2 Linear Regression of Cognitive Domain and Depression (N=7962)	
	Beta (95% CI)
Immediate Memory recall	-0.19 (-0.26 -0.14)
Delayed Memory recall	-0.25 (-0.32 -0.19)
Combined Memory Recall	-0.26 (-0.31 -0.19)
Verbal Fluency	-0.22 (-0.28 -0.16)
General cognition	-0.36 (-0.42 -0.30)
(adjusted by age, sex, education, income, number of chronic illness, sedentarism, current smoking and current drinking)	

Table 3 Linear Regression of General Cognition with CES-D-8 by item (N=7962)	
	Beta (95% CI)
CES-D-1 (Depressed)	-0.07 (-0.17; 0.03)
CES-D-2 (Everything was an effort)	0.04 (-0.03; 0.11)
CES-D-3 (Restless sleep)	-0.01 (-0.06; 0.05)
CES-D-4 (Happy)	0.08 (-0.01; 0.16)
CES-D-5 (Lonely)	-0.09 (-0.19; 0.01)
CES-D-6 (Enjoyed life)	-0.18 (-0.25; -0.11)
CES-D-7 (Sad)	-0.15 (-0.24; -0.07)
CES-D-8 (Could not get going)	-0.22 (-0.29; -0.15)
(adjusted by age, sex, education, income, number of chronic illness, sedentarism, current smoking and current drinking)	

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