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Is depression associated with cognitive decline in a diverse cohort of the oldest-old? Findings from the LifeAfter90 Study

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Abstract

Background: Depression impacts 50% of the elderly population and is a risk factor for dementia but its prevalence and role in cognitive decline in Non-Whites and the oldest-old is unclear.

Method: LifeAfter90 is a racially/ethnically diverse cohort of individuals aged 90+ that launched in 2018 with the aim of characterizing cognitive and brain aging after the 9th decade of life. Participants are members of an integrated healthcare delivery system without a dementia diagnosis in their medical record at recruitment. Depression at baseline was evaluated with the Global Depression Scale (GDS) and defined as $GDS \geq 4$. Cognitive testing every 6 months uses the Spanish and English Neuropsychological Assessment Scales (SENAS), to assess cognitive domains of episodic memory, semantic memory, and executive function. Linear mixed models with random intercepts, evaluated the baseline and longitudinal association of depression with each SENAS domain. The models used years since baseline as the time variable, and adjusted for baseline age, sex, race/ethnicity, education, and practice effects. An interaction term (depression*time) tested for differences in decline in cognitive domains by baseline depression status.

Result: Of 655 participants 32% are White, 22% Asian, 22% Black, 15% Latino, and 8% Other/Multiracial. 35% had \leq high school education, 38% were male, and mean age was 93 years. At baseline, 32% were classified as having depression with the highest prevalence among Latinos and those with \leq high school education (Table 1). The average follow-up was 0.9 years (range: 0-1.9). Depression was associated with poorer semantic memory ($\beta = -0.17$) and executive function ($\beta = -0.18$) but not with episodic memory (Table 2). Semantic memory ($\beta = -0.28$) and executive function ($\beta = -0.11$) decreased over time, however episodic memory did not. The semantic memory and executive function decline did not differ by depression (Figure 1 & Table 2).

Conclusion: Depression impacts one third of this ethnically diverse cohort of oldest-old individuals and is more prevalent in Latino participants. While depression is associated with poorer baseline semantic memory and executive function; it is not associated with episodic memory, nor is it associated with greater cognitive decline. These results suggest that while depression may impact cognitive performance it may not impact cognitive change in those aged 90+.

TABLE 1

Characteristic	Overall (N=631)	GDS < 4 (N=429)	GDS \geq 4 (N=202)
Average Age, mean y (range)	92.8 (90-105)	92.8 (90-103)	92.9 (90-105)
Male, N(%)	237 (37.6)	159 (37.1)	78 (38.6)
Education, N (%)			
<High School	224 (35.5)	141 (32.9)	83 (41.0)
Some College	192 (30.4)	134 (31.2)	58 (28.7)
\geq College graduate	215 (34.1)	154 (35.9)	61 (30.2)
Race/ethnicity, N (%)			
White	200 (31.1)	135 (34.5)	65 (32.2)
Asian	141 (22.4)	102 (23.8)	39 (19.3)
Black	140 (22.2)	101 (23.5)	39 (19.3)
Latino	97 (15.4)	52 (12.2)	45(22.3)
Other/Multiracial	53 (8.4)	39 (9.1)	14 (6.9)
SENAS baseline scores, mean (range)			
Verbal episodic memory	-0.92 (-2.69, 0.89)	-0.89 (-2.52, 0.89)	-0.97(-2.69, 0.61)
Semantic memory	-0.82 (-3.84, 1.62)	-0.77 (-3.25, 1.62)	-0.92 (-3.84, 1.53)
Executive function	-0.53 (-2.30, 1.87)	-0.45 (-2.30, 1.59)	-0.68 (-2.23, 1.87)

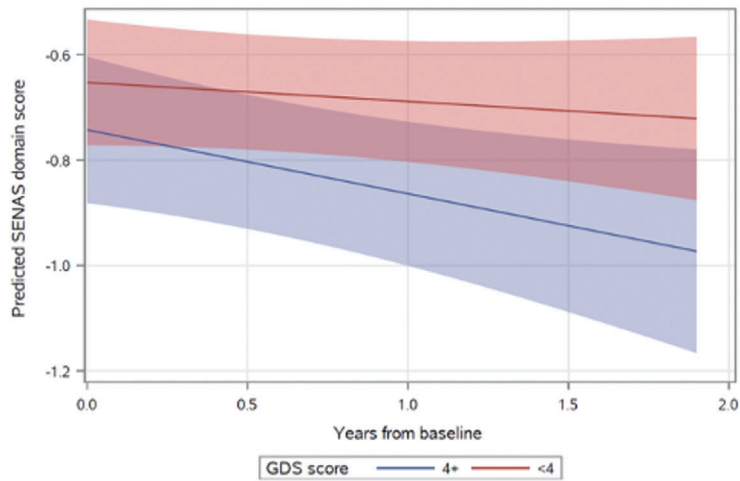
TABLE 2

	Episodic Memory		Semantic Memory		Executive Function	
	β	95%CI	β	95%CI	β	95%CI
GDS \geq 4	-0.09	(-0.20, 0.02)	-0.17	(-0.31, -0.02)	-0.18	(-0.28, -0.08)
Time (years from baseline)	-0.04	(-0.12, 0.05)	-0.28	(-0.39, -0.17)	-0.11	(-0.16, -0.06)
GDS \geq 4* time	-0.09	(-0.19, 0.02)	-0.02	(-0.13, 0.09)	0.02	(-0.05, 0.09)

Estimates are from linear mixed models adjusting for age at baseline, sex, education (\leq HS, some college, \geq college graduate), race/ethnicity (White, Asian, Black, Latino, other/multiracial), and practice effects (indicator variable for first visit)
Abbreviations: SENAS = Spanish and English Neuropsychological Assessment Scales

Figure. Predicted value of SENAS Scores by Baseline Depression (GDS ≥ 4)

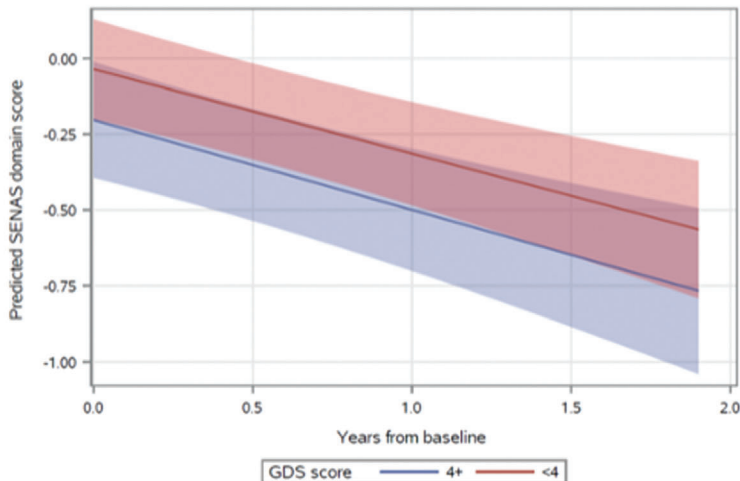
Episodic Memory



Depression * time
 $\beta = -0.09, p = 0.10$

Fit computed at Age=92.8 First visit=0.395 Education=College+ Race=White Gender=Female

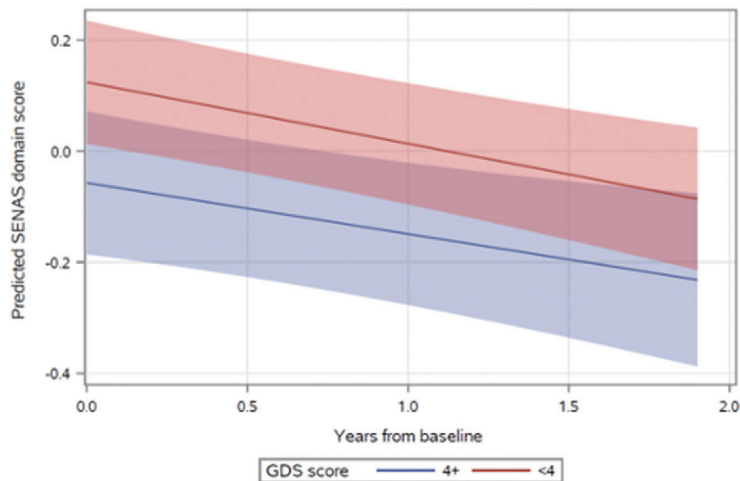
Semantic Memory



Depression * time
 $\beta = -0.02, p = 0.75$

Fit computed at Age=92.83 First visit=0.474 Education=College+ Race=White Gender=Female

Executive Function



Depression * time
 $\beta = 0.02, p = 0.58$

Fit computed at Age=92.81 First visit=0.394 Education=College+ Race=White Gender=Female

FIGURE 1