

Neuropsychological profiles across the cognitive aging–dementia spectrum in Panamanian older adults: The PARI-HD Longitudinal Cohort

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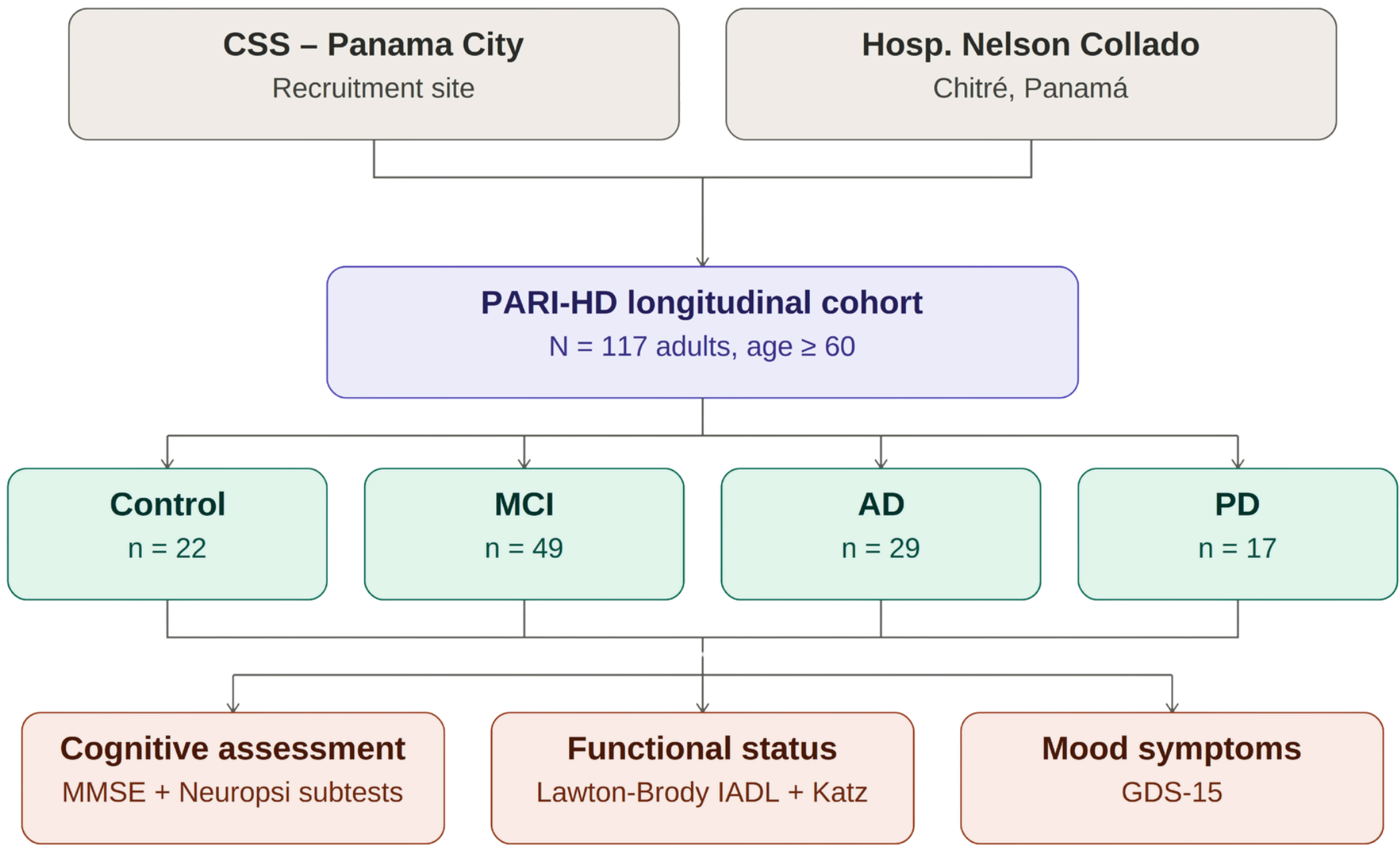
INTRODUCTION

By 2050, lower- and middle-income countries (LMICs) are expected to experience significant population aging, with nearly one-third of the population living with chronic conditions (Nichols et al., 2022; World Health Organization, 2020).

This demographic shift will unfold within developing-country contexts marked by persistent structural challenges (United Nations, 2019). Healthcare access for older adults remains limited in these settings, particularly for diagnostic services (Aranco et al., 2022; Astudillo et al., 2019).

Understanding neuropsychological differences across diagnostic groups is therefore crucial for improving clinical assessment and early detection strategies in aging populations from developing countries (Gamba-Rincón et al., 2017).

METHODOLOGY



RESULTS

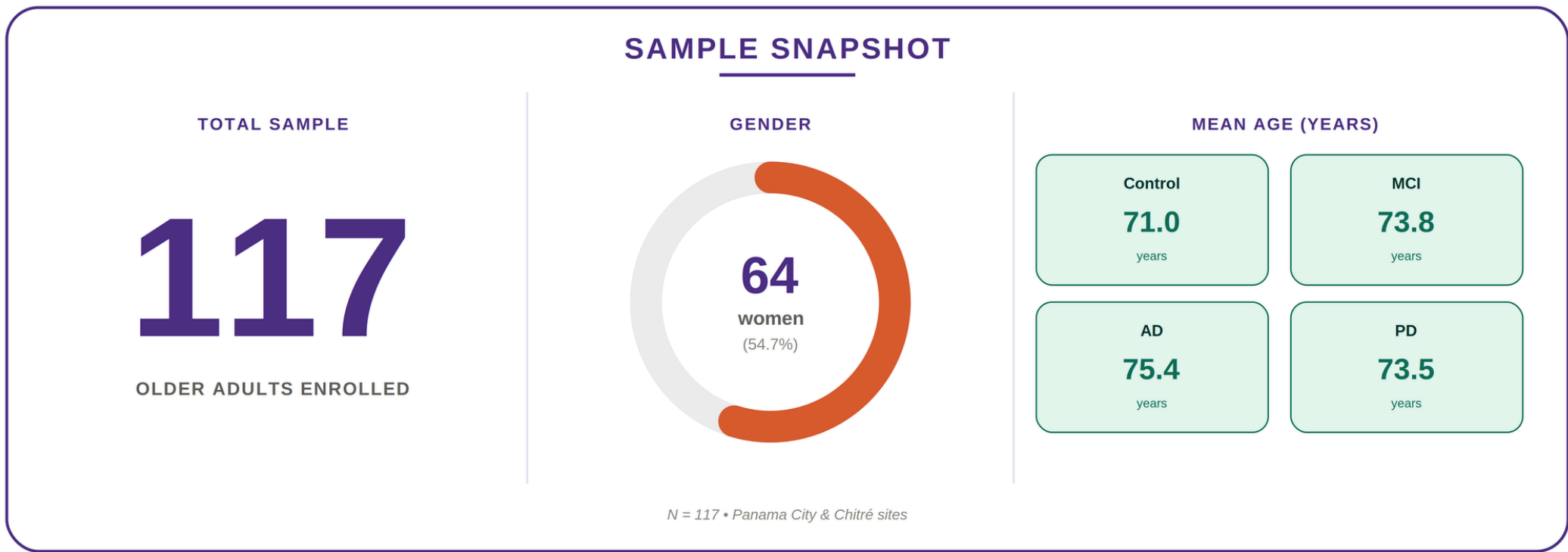


Table 1
Participants' Neuropsychological Characteristics (N=117).

	Control (n=22) n(%) / M(SD)	MCI (n=49) n(%) / M(SD)	AD (n=29) n(%) / M(SD)	PD (n=17) n(%) / M(SD)	p
Global Cognition	27.5 (3.1)	23.9 (4.8)	20.9 (5.1)	24.5 (3.9)	.000*
Attention	5.3 (0.8)	4.7 (0.9)	4.7 (0.9)	4.7 (0.9)	.086
Memory					
Short Term Verbal Memory	5.8 (1.4)	3.9 (2.1)	2.9 (1.5)	4.7 (1.7)	.000*
Long Term Verbal Memory	5.3 (2.8)	2.1 (2.5)	0.5 (1.0)	1.6 (2.2)	.000*
Semantic Memory	4.9 (3.0)	2.6 (2.3)	1.0 (1.6)	2.8 (1.9)	.000*
Declarative Memory	8.1 (2.5)	4.3 (3.6)	2.4 (2.4)	5.2 (3.4)	.000*
Executive Function					
Working Memory	4.6 (0.8)	3.9 (1.1)	3.7 (0.7)	3.8 (0.7)	.061
Category Formation	15.9 (5.0)	11.8 (5.0)	9.4 (4.5)	12.8 (5.3)	.002*
Inhibitory Control	11.3 (4.4)	9.0 (5.4)	6.0 (3.8)	7.9 (3.1)	.003*

Notes: Variables were controlled for age and years of education.

Table 2
Post Hoc (Bonferroni) Comparisons Between Diagnostic Groups in Cognitive Domains With Significant Differences

Cognitive Domain	Comparison (I vs. J)	Mean Difference (I-J)	p
Global Cognition	Control vs. MCI	3.57*	.003
	Control vs. AD	6.65*	< .001
Memory	Short-Term Verbal Memory	Control vs. MCI	1.70*
		Control vs. AD	2.73*
		AD vs. PD	-1.80*
Long-Term Verbal Memory	Control vs. MCI	2.91*	< .001
	Control vs. AD	4.36*	< .001
	Control vs. PD	3.41*	< .001
	MCI vs. AD	1.45*	.035
Semantic Memory	Control vs. MCI	2.05*	.003
	Control vs. AD	3.58*	< .001
Declarative Memory	MCI vs. AD	1.53*	.020
	AD vs. PD	-1.82*	.043
Executive Function	Control vs. MCI	3.16	.056
	Control vs. AD	5.16*	.001
Inhibitory Control	Control vs. AD	4.70*	.002
	MCI vs. AD	2.88*	.035

Note. MCI = mild cognitive impairment; AD = Alzheimer's disease; PD = Parkinson's disease. Comparisons were adjusted for age and years of education. Attention and Working Memory are not included because the overall ANOVA was not significant (p = .086 and p = .061, respectively). *p < .05.

CONCLUSION

- Verbal memory and executive function — not attention — are the strongest markers across the cognitive-impairment spectrum.
- A brief, low-cost battery can support early detection in LMIC settings.

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DISCUSSION

- Clear gradient: Control > MCI/PD > AD across most domains
- Verbal memory declines earliest — significant even at the MCI stage (ps < .001)
- Executive dysfunction (category formation, inhibitory control) distinguishes AD, but emerges later than memory decline
- Attention & working memory relatively spared across groups
- MCI ≈ PD profiles — additional markers needed to differentiate
- Clinical impact: a brief battery (Neuropsi + MMSE) discriminated groups without costly neuroimaging or biomarkers — ideal for LMIC healthcare systems

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