

COGNITIVE IMPAIRMENT IN ADULTS WITH END-STAGE KIDNEY DISEASE ON HAEMODIALYSIS:

THE COGNITIVE-HD STUDY

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DIAPERUM

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Introduction

- Cognitive impairment is common in the end-stage kidney disease (ESKD) population. In the general population, it is known to be associated with poorer physical and social functioning (1,2).
- In the ESKD population, there is ongoing uncertainty regarding:
 - which domains of cognition are most affected;
 - associations between cognitive impairment and physical/social functioning.

Objectives

Amongst a population of adults with ESKD on haemodialysis, our study therefore aimed to describe:

- the prevalence and patterns of impairment in 5 cognitive domains; and
- the association between impairment on at least one cognitive domain and physical/social functioning.

Methods

- DESIGN:** cross-sectional project within the COGNITIVE-HD cohort study (3).
- POPULATION:** all community-dwelling adults with ESKD on haemodialysis within a haemodialysis network in Italy between July 2013 and April 2014.
- EXCLUSION CRITERIA:** unable to understand Italian language or undertake assessment, no informed consent, anticipated transplantation or death within 6 months.
- COGNITIVE ASSESSMENT:** standardised neuropsychological assessment
 - Domain impairment = z-score at least 1.5 SD below normative sample mean for test(s) in that domain
 - Cognitive impairment = impairment on at least one domain

Domain	Test(s)
Memory	Rey Auditory Verbal Learning Test
Attention	Symbol Digit Modalities Test Digit Span Forward Test Digit Span Backward Test
Executive Function	Phonemic Fluency Test
Language	Repeatable Battery of Neuropsychological Status: Semantic Fluency and Picture Naming
Perceptual-motor	Repeatable Battery of Neuropsychological Status: Figure Copy and Line Orientation

- FUNCTIONAL ASSESSMENT:** activities of daily living (ADL) scale
 - Impairment = unable to complete at least one ADL
- COVARIATES:** from centralised database and standardised assessment.

Participant Characteristics

Of 958 patients, 741 (77%) were eligible and provided informed consent

Characteristic	N=741*
Age (median, IQR)	70.90 (17.49)
Male sex (n, %)	450 (60.7)
White/Hispanic ethnicity (n, %)	734 (99.1)
Secondary education or higher (n, %)	395 (53.3)
Hypertension (n, %)	565 (76.3)
Diabetes (n, %)	208 (28.1)
Charlson Comorbidity Index (CCI) score (median, IQR)	6.00 (3.00)
Months on dialysis (median, IQR)	49.59 (77.57)
Hospital Anxiety and Depression Scale (HADS) (median, IQR)	
Anxiety score	6.00 (7.00)
Depression score	5.00 (6.00)

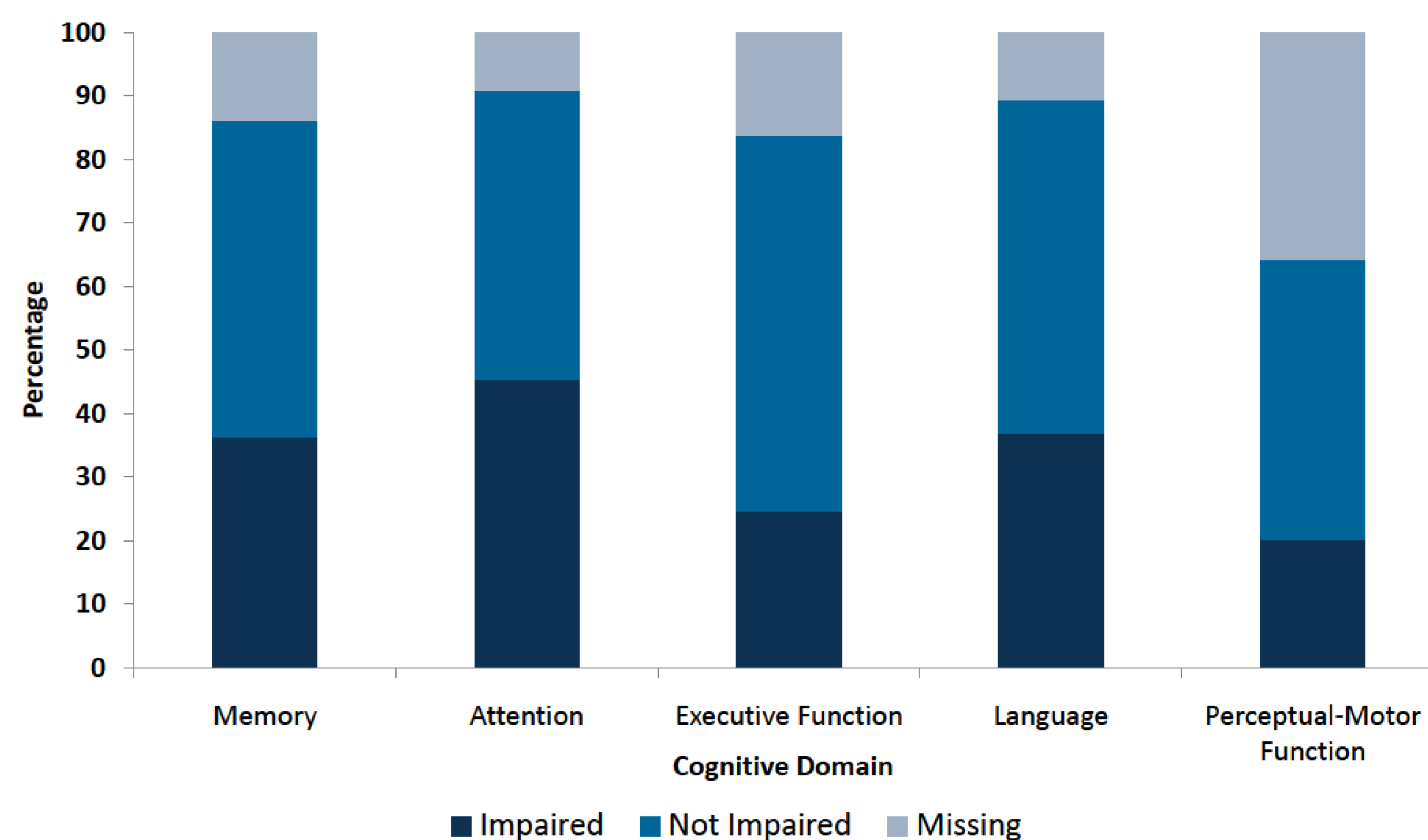
*Some covariates had missing data. For categorical variables, denominator for percentages includes missing data.

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Prevalence and Patterns of Cognitive Impairment

Proportion of patients classified as impaired for each cognitive domain



Of the 741 patients assessed:

- 70.6% (n = 523) were impaired on at least one cognitive domain tested
- 20.7% (n = 153) were not impaired on any domain tested*
- 8.8% (n = 65) had missing data for all cognitive domains

*Includes patients with normal performance on one or more domains and missing data for all other domains

Associations Between Cognitive and Functional Impairment

- We built a logistic regression model (n = 676) to examine the association between cognitive impairment (on at least one domain) and functional impairment (on at least one ADL).
- We excluded patients with missing data for all cognitive domains and considered 23 covariates. In the final model below, cognitive impairment was a significant predictor of functional impairment after controlling for relevant covariates ($\chi^2 = 5.72$, 1df, p = .017).

Variable in Model (n=676)	Odds Ratio (95% CI)
Cognitive impairment	1.99 (1.13-3.50)*
Age (years)	1.01 (0.99-1.03)
Male gender	0.69 (0.45-1.07)
Secondary education or higher	0.76 (0.50-1.16)
Physically active	0.52 (0.31-0.88)*
CCI comorbidity (score)	1.33 (1.17-1.51)***
Hypertension diagnosis	0.50 (0.32-0.78)**
HADS-depression (score)	1.11 (1.05-1.17)***
HADS-anxiety (score)	1.06 (1.01-1.11)*
BMI (kg/m ²)	1.06 (1.02-1.10)**
Albumin (g/L)	0.91 (0.86-0.96)**

*p<.05 **p<.01 ***p<.0001

Conclusions

- In this cohort of patients with ESKD on haemodialysis, cognitive impairment was prevalent across numerous domains, and was strongly associated with functional impairment.
- A key limitation is that missing cognitive data may have led to an underestimation of cognitive impairment and associations between cognitive and functional impairment.
- Future work should focus on enhancing physical and social functioning of patients with ESKD who have cognitive impairment.

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