Does disability in cognitive-driven ADLs predict dementia in Parkinson's disease?

Anna Loshakov MD[1], Ann Gruber-Baldini PhD[2], Sunita Shakiya PhD[2], Lisa Shulman MD[1]

Departments of [1]Neurology and [2]Epidemiology and Public Health, University of Maryland School of Medicine

Objective:

To assess the predictive value of cognitive-driven ADL disability for cognitive decline in patients with Parkinson's disease.
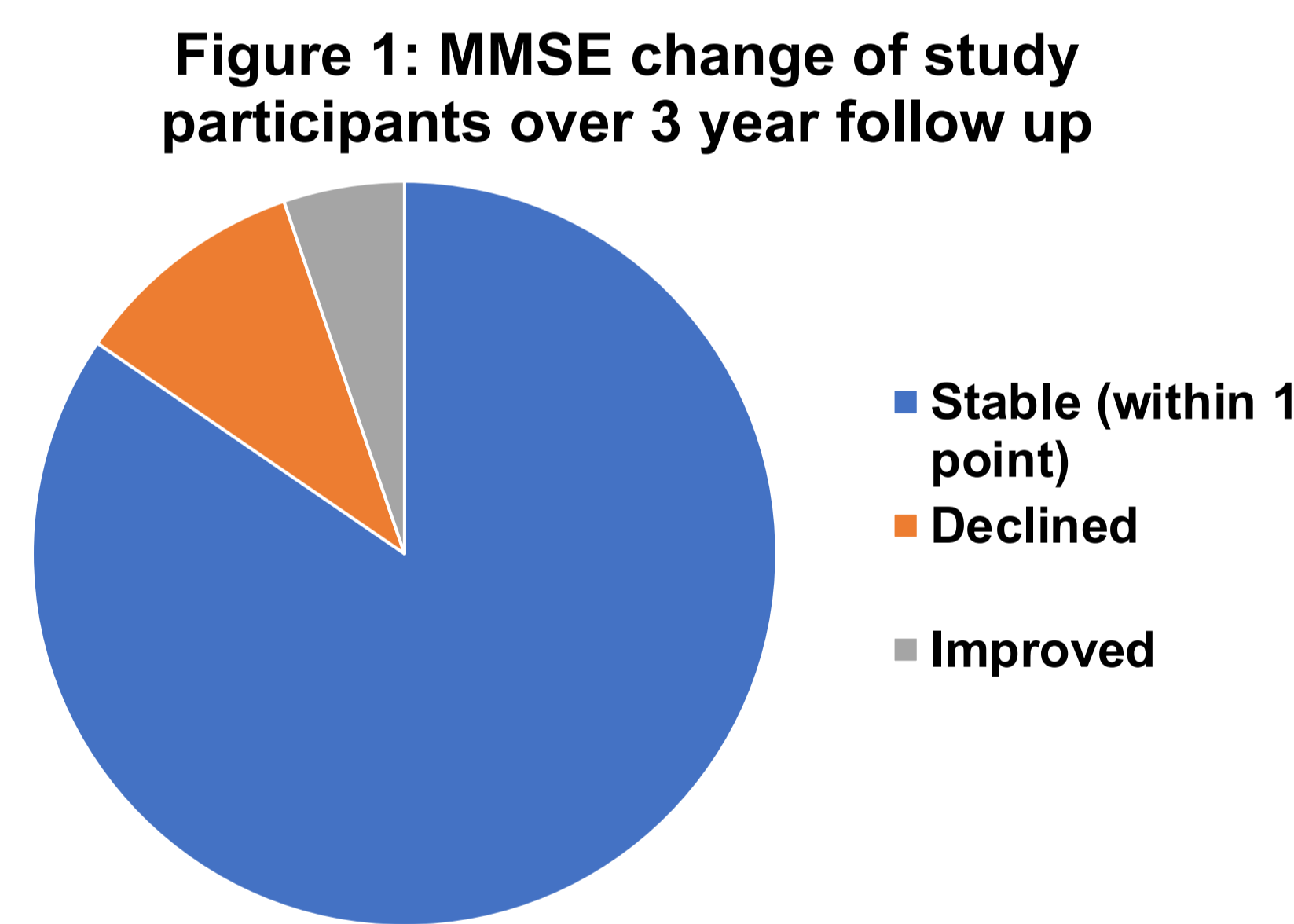
Background:

• It is unknown which patients with PD develop Mild Cognitive Impairment (MCI) and progress to dementia.

• Better predictive factors can help clinicians offer better prognostic information and identify good candidates for early interventional therapies.

• Cognitive disability that is out of proportion to motor disability has been shown to be a predictive factor for progression to dementia in a smaller sample[1].

Methods:

• Sample: 337 patients with PD who completed the OARS disability scale assessing level of function on 14 common ADLs and IADLS, as well as a cognitive test (MMSE or MoCA score rescaled to MMSE equivalent) at baseline and at follow up after 3 years, +/- 6 months.

• OARS questions were split into primarily motor-driven and primarily cognitive-driven tasks[2], and a cognitive:motor ratio of OARS responses was created. The ratio was created to define a subgroup of patients with more cognitive-driven than motor-driven IADL impairment.

• Pearson correlations were analyzed between:
  • Each OARS task and cognitive score at each time point
  • Cognitive:motor ratio and cognitive change between time points

Table 1: Demographics of Sample Population

N = 337	Mean
Age	65 +/- 9.8
Sex	33.8% female
Race	91.9% white
PD diagnosis duration at baseline	5.1 +/- 5.9
UPDRS motor score	23.4 +/- 11.0
OARS at baseline	21.2 +/- 9.2
MMSE at baseline	28.7 +/- 2.4

Figure 1: MMSE change of study participants over 3 year follow up

- Stable (within 1 point)
- Declined
- Improved

Example of OARS questionnaire response scale:

I. Can you walk?
Choose the response that describes your ability to walk.
○ 1. No difficulty
○ 2. Slower or with greater difficulty, but still without help
○ 3. Need some help (must have the help of a cane, walker, or another person)
○ 4. Need moderate help and only walk short distances, even with help
○ 5. Completely unable to walk.

Table 2: Pearson correlation coefficients between each OARS task and MMSE

OARS tasks	Baseline MMSE		MMSE at 3 years		Change in MMSE	
Cognitive IADLs	r	p	r	p	r	p
Using the telephone	-.52	<.001	-.40	<.001	-.01	0.90
Taking medication	-.52	<.001	-.41	<.001	-.02	0.77
Handling money	-.48	<.001	-.39	<.001	-.03	0.63
Combined cognitive IADLs	-.56	<.001	-.45	<.001	-.02	0.72
Motor ADLs/IADLs	r	p	r	p	r	p
Walking	-.38	<.001	-.34	<.001	-.06	0.25
Eating	-.46	<.001	-.36	<.001	.00	0.95
Dressing	-.41	<.001	-.29	<.001	-.04	0.50
Grooming	-.47	<.001	-.36	<.001	.00	0.94
Getting in and out of bed	-.39	<.001	-.30	<.001	-.01	0.86
Bathing/showering	-.42	<.001	-.34	<.001	-.02	0.68
Using the toilet	-.44	<.001	-.36	<.001	-.04	0.52
Traveling	-.40	<.001	-.36	<.001	-.07	0.18
Shopping	-.42	<.001	-.34	<.001	-.01	0.82
Preparing meals	-.40	<.001	-.35	<.001	-.06	0.29
Doing housework	-.38	<.001	-.29	<.001	.00	0.97
Combined motor ADLs/IADLs	-.49	<.001	-.40	<.001	-.01	0.81
Cognitive:motor ratio	-.05	0.41	-.03	0.65	-.02	0.78

| ADL | IADL | No correlation | Weak correlation | Moderate correlation | Strong correlation |

Results:

• Greater disability (higher OARS ratings) correlated with greater cognitive impairment (lower MMSE or recoded MoCA scores) at baseline and at 3 year follow up.

• Greater disability correlated more strongly with concurrently measured MMSE than with follow up MMSE.

• The strongest correlations were seen with using the telephone and taking medication ($r < -.50$), followed by handling money. Moderate correlations were found with each task.

• No significant correlations were found between the cognitive:motor ratio and MMSE at baseline, MMSE at follow up, or change in MMSE.

Conclusions:

• While each OARS item has both cognitive and motor components, certain IADLs are more cognitively driven (telephone, medications, and finances).

• The cognitive:motor ratio identified only a small number of patients who progressed to cognitive decline, and did not show statistically significant correlation with this outcome. It was not an effective predictor of cognitive decline in this cohort.

• Correlations between motor tasks and cognitive impairment were nearly as high as those of cognitive tasks. Patients with PD have been shown to more accurately report motor disability than cognitive disability[4], so cognitive disability may be underreported in this sample.

• Limitation: Not much decline in cognition over the observed time. Most patients performed the MMSE, which has been shown to be a less sensitive measure in PD than the MoCA[3]. Evaluation of the MoCA over a longer time period may yield different results.

References:
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