SUBJECTIVE AND OBJECTIVE MOTOR FUNCTION IS ASSOCIATED WITH PRODROMAL PARKINSON'S DISEASE: A POPULATION BASED COHORT STUDY

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Introduction

Identification and characterization of PD in its prodromal stage is crucial[1].

The MDS has published research criteria for prodromal PD[2].

- UPDRSIII is mainly suggested by MDS[2]. No specific proposals for **alternatives to UPDRS** are given.
- Non-motor symptoms (e.g. depression, constipation) are also part of prodromal PD criteria.
- Individuals' **complaints** regarding motor difficulties are not considered.
- **Physical activity**, as an indirect measure of motor function, may also be considered as an additional marker.

The **aim** of the present study was to investigate the association between **clinically simple** and brief objective, **subjective** and **indirect** motor measures and the probability of prodromal PD in an older PD-free population.

Methods and Materials

Population-based cohort of older adults (≥65yrs, HELIAD study)[3]. PD participants were excluded (*n*=34).

For *n*=1731 without PD (Table 1):

- Subjective motor function was evaluated with a 12-item motor complaints questionnaire
- Objective motor function indirectly with a physical activity questionnaire[4] and two gait speed tests.
- Probability of prodromal PD was calculated according to the MDS research criteria[5,6].
- Regression multi-adjusted models (including co-morbidities such as arthritis) were used to investigate the associations between each motor measure and the probability of prodromal PD.

Table 1. Participants main characteristics according to prodromal PD (pPD) status

	Non-pPD group (i.e. pPD probability<30) (*n*=1682)	Possible/Probable pPD (i.e. pPD probability ≥30) (*n*=49)	*p*-value
Age, median (Q1, Q3), years	73 (69, 77)	76 (73, 79)	**0.001**
Education, median (Q1, Q3), years	6 (5, 12)	6 (3, 6)	**0.002**
Sex, male, No. (%)	683 (40.6)	22 (44.9)	0.547
Smoking, No. (%)	175 (10.4)	4 (8.2)	0.607
Number of clinical co-morbidities, median (Q1, Q3)	1 (1, 2)	2 (1, 3)	**0.009**

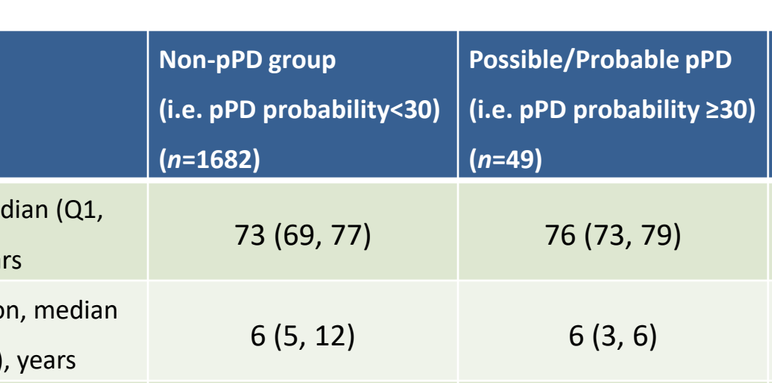

Figure 1. Distribution of the probability score for Prodromal PD

Results

The median probability of prodromal PD was 1.92% (range: 0.1-96.7%, Figure 1).

Forty nine participants (3%) had 30% or more prodromal PD probability and were considered as having possible/probable prodromal PD[5,6]. They had a significantly higher total motor complaint score (p<0.001) and reported having most of the motor complaints (10 out of 12, p<0.05) more frequently than the non-prodromal PD group.

For each unit **increase in motor complaints** score there was a 27% **higher probability score** for prodromal PD, [β(95%CI): 1.268 (1.209, 1.331), p<0.001].

For **each kcal/kg/day lower energy expenditure** (corresponding to 20min of light walking/day for a 75-kg man) there was a 3% **higher probability score** for prodromal PD [β(95%CI): 1.030 (1.017, 1.043), p<0.001).

Having at least one subjective motor complaint increased the odds of having possible/probable prodromal PD (p<0.05).

Including subjective and indirect motor variables in the same model showed that both (complaints and physical activity) contributed significantly to the model (p<0.01).

Excluding subthreshold Parkinsonism from the calculation showed that gait speed less than 0.8m/s was also associated with higher probability score for prodromal PD (p<0.001).

Results were unchanged when we excluded dementia and MCI (*n*=206) participants, or those aged>80 yrs old (*n*=146).

Discussion

We found that both subjective (motor complaints score) and indirect measures (physical activity) were associated with a higher overall prodromal PD probability score and higher odds of having possible/probable prodromal PD

Study **limitations**:

- Cross-sectional study
- Lack of data on some MDS criteria (4/17 MDS markers, 2/10 prodromal)
- No assessment of upper limb body function

Study **strengths**:

- Strengths of the core HELIAD study design (population representativeness, Neurologists' evaluation, etc).
- The first one investigating the association between subjective motor function and prodromal PD state, in which preventive strategies may be more valuable.
- Objective motor function assessed with several tests. Comprehensive approach, assessing subjective, lifestyle and objective measures of motor function in the same time; all are in agreement
- Multi-adjusted for possible confounders and supplementary analyses

These data need to be verified prospectively in the present and other cohorts. Alternatively, further measures of subjective and objective minimal motor impairment need to be developed to raise the diagnostic sensitivity of pPD, which will be a key to finding disease-modifying treatments for this disease.

Conclusions

Subjective motor complaints, as well as simple objective motor measures assessing **physical activity** or **gait speed** are **associated with higher probability of prodromal PD** in older adults.

These data may serve to enable early identification of prodromal PD cohorts.

References

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