Conclusions: The Spanish version of the WOQ-19 may be a useful instrument for the screening of wearing off in Mexican patients with PD. Our findings suggest that the presence of at least four symptoms provided the best performance for the WOQ-19 in our sample.

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Gender and age-based differential item functioning (DIF) analysis of MDS-UPDRS

C.G. Goetz, L. Wang, G.T. Stebbins, B.C. Tilley, S. Luo (Chicago, IL, USA)

Objective: Test if DIF due to gender or age is present in MDS-UPDRS items.

Background: Testing a rating scale for DIF is a core step in comprehensive validation methodology. DIF occurs for the MDS-UPDRS when the probability of item scores differs among people with similar levels of Parkinsonism but belong to different groups on a secondary trait (gender or age). If DIF is present, interpretation of an item score needs to include consideration of the secondary trait as well as Parkinsonism severity. There are 2 types of DIF: uniform (U-DIF), where the influence on item scores by the secondary trait is constant over all levels of Parkinsonism; and non-uniform (NU-DIF), where the influence on item scores by the secondary trait varies across levels of Parkinsonism.

Methods: Using the cross-sectional MDS-UPDRS translation database (N=5,476), we first confirmed unidimensionality of each MDS-UPDRS Part using CFA techniques. We then tested the impact of gender and age (28-51, 52-75, 76-97 yrs) on U-DIF and NU-DIF for each Part. We required that two independent methods, MIMIC and *lordif*, both identified item-specific DIF to qualify for consideration. Because very few of those patients studied had scores of 4, we collapsed scores of 3 and 4 into one category to allow the methods to converge mathematically. The DIF impact was determined by McFadden pseudo R^2 cut-offs (large, moderate, negligible) and considered items pertinent if they exceeded the criteria beyond negligible $R^2 \geq 0.035$.

Results: For most MDS-UPDRS items, there was no gender- or age-based NU-DIF or U-DIF. For gender, if DIF occurred, impact was always negligible. For age, no item met the criteria for pertinent impact of NU-DIF. Two items from Part 2 (Motor Experiences of Daily Living) showed U-DIF of moderate impact: 2.11 Getting out of bed (R^2=0.060) and 2.12 Walking and balance (R^2=0.053).

Conclusions: Gender has no pertinent DIF impact for the MDS-UPDRS, allowing the scale to be utilized as a core outcome measure across populations with varying gender distributions. For age, items 2.11 and 2.12 demonstrated pertinent U-DIF. As subject age increases, higher scores on these two activities occur at all levels of overall Part 2 severity. Interpretation of these items needs to include consideration of patient age as well as Parkinsonism in evaluating MDS-UPDRS Motor Experiences of Daily Living (Part 2).

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A step forward to the future: UPDRS kinematic measures for telemedicine

G. Albani, C. Azzaro, F. Parisi, C. Ferraris, M. Giuberti, L. Contin, D. Pianu, L. Pradotto, V. Cimolin, N. Cau, M. Galli, R. Nerino, G. Ferrari, A. Mauro (Piancavallo, Italy)

Objective: We set up an experimental instrumentation to quantify selected items of UPDRS by a Kinect technology and body sensory-network (BSN), destinated to an easy home-performance.

Background: Remote medical communications in the form of telemedicine is one of the challenges to Parkinson's disease (PD) problems. Among the tougher hurdles to overcome, there is an accurate, low-cost and manageable quantification of motor symptoms.

Methods: For automatic assignment of UPDRS scores, we studied 20 controls subjects and 64 PD patients both by a BSN-based approach (for leg agility, sit-to stand and gait tasks), composed of a few body-horn wireless inertial nodes and an human-computer interface(Microsoft Kinect®) ((for finger-tapping task) based on a RGB-Depth camera, a monitor and two light-weight gloves with coloured markers. Movements are automatically translated in kinematic parameters and then classified by dedicated algorytms correlating with corresponding UPDRS clinical scores. We calculated the average of the predicted UPDRS classes weigthed by the probabilities that an evaluation belongs to a specific UPDRS classes, by a continuous measure that we call the neuromotor impairment W [figure1]

Results: We found 19 and 34 kinematic parameters respectively both for finger and lower limbs movements correlating which corresponding UPDRS scores tasks [figure2].

Conclusions: These results show that the proposed technology is an accurate, feasible and low-cost approach useful for at distance evaluation of PD patients.

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Patient reported outcomes in Parkinson's disease (PRO-PD) rating scale validation

L.K. Mischley (Kenmore, WA, USA)

Objective: To evaluate whether a novel outcome measure, Patient-Reported Outcomes in Parkinson's disease (PRO-PD), correlates with disease duration, quality of life and established measures of PD severity.

Background: The PRO-PD is an outcome measure designed to capture disease status and severity in an inexpensive, clinically relevant, and comprehensive fashion. It was designed to require minimal time and instruction, while assessing patient perception of both motor and non-motor symptoms. The participant is asked to rate symptom severity, on average, over the previous seven days. The PRO-PD is the cumulative score of 33 slider bars. The goal was to create a continuous outcome measure that does not require a clinical exam, is not responsive to fluctuations in dopaminergic medications, takes only a few minutes to complete, and allows for stratification by symptom(s).

Methods: The PRO-PD is an outcome measure in three ongoing studies; the baseline data from these datasets was pooled and investigated. Symptom frequency and severity are described, Pearson's correlation coefficients and regression analysis were used to determine whether PRO-PD scores increased as a function of time and correlated with established clinical outcome measures.

Results: Three studies provided 902 participants for analysis, 58 of whom were physically examined. The most frequently reported PD symptoms were impaired handwriting/ typing (91.8%), fatigue (91.2%), slowness (89.8%), daytime sleepiness (89.7%), muscle cramps (88.9%), forgetfulness (87.6%), impaired sense of balance (86.9%), and hyposmia (86.0%) Of the 33 variables, only tremor and nausea did not show a statistically significant increase over time. PRO-PD scores correlated with disease duration (r=0.388, P < 0.000), total UPDRS (r=0.446, P=0.008), patient-assessed Hoehn & Yahr (r=0.636, P < 0.000), PDQ-39 (r=0.763, P<0.000), PROMIS Global quality of life question (r=-0.744, P<0.000), and the Timed Up and Go (TUG) (r=0.457, P<0.006). PRO-PD non-motor subscore correlated with Non-Motor Symptom Scores (NMSS) (r=0.911, P<0.000).

Conclusions: PRO-PD correlates with other established exam-based measures of disease severity. This simple, open-access, patient-centered outcome measure may have utility for patients, providers, and researchers. Future validation efforts should evaluate test-retest reliability and change over time within individuals.

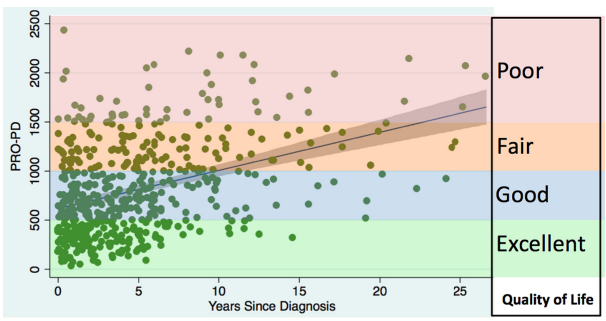

Fig. 1 (1566).