Parkinsonism and Related Disorders xxx (2017) 1–6

Contents lists available at ScienceDirect

Parkinsonism and Related Disorders

journal homepage: www.elsevier.com/locate/parkreldis

Validation of the Hebrew version of the Movement Disorder Society—Unified Parkinson's Disease Rating Scale

Jennifer Zitser [a, *], Chava Peretz [b], Aya Ber David [a], Herzl Shabtai [a], Adi Ezra [a], Meir Kestenbaum [a], Marina Brozgol [a], Alina Rosenberg [b], Talia Herman [a], Yakov Balash [a], Avi Gadoth [a], Avner Thaler [a, e], Glenn T. Stebbins [c], Christopher G. Goetz [c], Barbara C. Tilley [d], Sheng T. Luo [d], Yuanyuan Liu [d], Nir Giladi [a, e, f], Tanya Gurevich [a, e, f]

[a] Movement Disorders Unit, Neurological Institute, Tel Aviv Medical Center, Tel-Aviv, Israel
[b] School of Public Health, Sackler School of Medicine, Tel-Aviv University, Tel-Aviv, Israel
[c] Department of Neurological Services, Rush University Medical Center, Chicago, IL, USA
[d] Department of Biostatistics, School of Public Health, University of Texas Health Science Center at Houston, Houston, TX, USA
[e] Sackler School of Medicine, Tel-Aviv University, Tel-Aviv, Israel
[f] Sagol School of Neuroscience, Tel-Aviv University, Tel-Aviv, Israel

ARTICLE INFO

Article history:
Received 8 June 2017
Received in revised form
27 July 2017
Accepted 12 September 2017

Keywords:
Parkinson's disease
Rating scales
Clinimetrics
MDS-UPDRS
Validation

ABSTRACT

Background: The Movement Disorders Society (MDS) published the English new Unified Parkinson's Disease Rating Scale (MDS-UPDRS) as the official benchmark scale for Parkinson's disease (PD) in 2008. We aimed to validate the Hebrew version of the MDS-UPDRS, explore its dimensionality and compare it to the original English one.

Methods: The MDS-UPDRS questionnaire was translated to Hebrew and was tested on 389 patients with PD, treated at the Movement Disorders Unit at Tel-Aviv Medical Center. The MDS-UPDRS is made up of four sections. The higher the score, the worst the clinical situation of the patient is. Confirmatory and explanatory factor analysis were applied to determine if the factor structure of the English version could be confirmed in the Hebrew version.

Results: The Hebrew version of the MDS-UPDRS showed satisfactory clinimetric properties. The internal consistency of the Hebrew-version was satisfactory, with Cronbach's alpha values 0.79, 0.90, 0.93, 0.80, for parts 1 to 4 respectively. In the confirmatory factor analysis, all four parts had high (greater than 0.90) comparative fit index (CFI) in comparison to the original English MDS-UPDRS with high factor structure (0.96, 0.99, 0.94, 1.00, respectively), thus confirming the pre-specified English factor structure. Explanatory factor analysis yielded that the Hebrew responses differed from the English one within an acceptable range: in isolated item differences in factor structure and in the findings of few items having cross loading on multiple factors.

Conclusions: The Hebrew version of the MDS-UPDRS meets the requirements to be designated as the Official Hebrew Version of the MDS-UPDRS.

1. Introduction

Parkinson's disease (PD) is a progressive disease that affects movement and many non-motor systems [1]. There is currently no cure for PD. It is believed that the natural course of the disease can be modified by treatment, however, therapeutic interventions can also be associated with both motor and non-motor complications. Since there is no biomarker or other gold standard index to determine the severity of PD as a whole, the severity of each of the different PD elements is assessed separately, based on clinical rating scales. The most common scale in current use is the Unified Parkinson's Disease Rating Scale (UPDRS) [2], which is applied to follow the longitudinal disease course. After its introduction in the 1980s, the UPDRS became the gold standard clinical rating scale for PD [3,4]. In 2008, a new Movement Disorders Society (MDS)-sponsored revision of the UPDRS, known as the MDS-UPDRS, successfully passed clinimetric testing with high internal

* Corresponding author. Movement Disorders Unit, Department of Neurology, Tel Aviv Medical Center, 6 Weizman Street, Tel Aviv, 6423906, Israel.
E-mail address: jenny.zitser@gmail.com (J. Zitser).

https://doi.org/10.1016/j.parkreldis.2017.09.012
1353-8020/

consistency and reliability for each of its parts [5]. Specifically, the MDS-UPDRS is made up of four sections [6]: *Part I*: evaluation of mentation, behavior, and mood; *Part II*: self-evaluation of the activities of daily life (ADLs), including speech, swallowing, handwriting, dressing, hygiene, falling, salivating, turning in bed, walking, cutting food; *Part III*:clinician motor examination of parkinsonism signs including the Hoehn & Yahr staging of severity of Parkinson's disease [7]; *Part IV*: evaluation of motor fluctuations, dyskinesia and dystonia. The MDS-UPDRS use scores rated by both the patient and the physician to assess the gravity of the disease and the accompanying symptoms. It helps the clinician to stage the disease. The six items that deal with complex behaviors in *Part I* and all of the items that relate to fluctuations and dyskinesia in *Part IV* require rater (clinician) led interviews of the patient, caregiver or both. The remaining seven questions of *Part I* as well as all items in *Part II* are answered with a straight-forward patient questionnaire and do not require any input from the rater [5].

The MDS-UPDRS was specifically designed to be less ambiguous than its predecessor, and the major patient/caregiver involvement means that it is vital that they understand the questions, preferably in their mother tongue. Evidence about the achievement of that objective requires future studies directly comparing both scales. The MDS-UPDRS has 50 items (65 scores) while the UPDRS has 42 items (55 scores). The apparent disadvantage of the MDS-UPDRS being longer to administer becomes inconsequential given the amount and quality of the data it provides. The average time for its administration is around 30 min [5]. In order to successfully translate and be designated as an “Official MDS translation” in a foreign language, the MDS has set strict protocol and criteria for cross validating non-English versions of the MDS-UPDRS. Traditional Chinese, Estonian, French, German, Greek, Hungarian, Italian, Japanese and Korean versions are currently available [8]. We aimed to validate the Hebrew version of the MDS-UPDRS, to explore the dimensionality of the Hebrew version, and to compare it to that of the English version.

2. Materials and methods

2.1. Translation of the MDS-UPDRS

The process of developing an officially approved translation of the MDS-UPDRS involves five core steps: (1) registration and start-up; (2) translation and independent back-translation; (3) cognitive pretesting to establish that the translation is clear and that it is comfortably administered to and completed by native-speaker raters and patients; (4) field testing in the native language using a large sample of Parkinson's disease patients; and (5) full clinimetric testing [9].

The cross cultural validation was performed as follows: First, the MDS-UPDRS was translated into Hebrew by an expert translation company; Afterwards it was reviewed and modified for an appropriate level of language by a team of PD experts in Israel led by Nir Giladi; It was then back-translated to English by the expert translation company (who were fluent in English and Hebrew and not involved in the original translation). This back-translation was reviewed by a team of US experts (Glenn Stebbins, Christopher Goetz, Nancy LaPelle, and Barbara Tilley) who had been involved in the development of the original American version [6].

2.2. Cognitive pretesting

We constructed a qualitative structured interview format to evaluate specific items of the MDS-UPDRS in terms of task difficulty for the examiner and the respondent and the respondent's interest, attention span, discomfort and comprehension. Items were selected for cognitive pretesting when the observed differences were between the back translated Hebrew version and the English version. In addition, specific items that were identified in cognitive testing of the American version were also tested [6]. Items had an ordinal scale of six responses; e.g. “how helpful are the instructions for the patient?” with responses ranging from 1 = not helpful to 6 = very helpful, or, “how difficult was it for you as the rater to select the appropriate response option?” very difficult = 1 up to 6 = very easy.

The items included in the cognitive pretesting were: Cognitive impairment, depression, anxious mood, handwriting, freezing, finger tapping, hand movements, leg agility, arising from chair, postural tremor, time spent with dyskinesias and functional impact of dyskinesias. A total of 25 patients with Parkinson's disease and their examiners were interviewed in three rounds using the type of structured interview format typical for cognitive pretesting between November 2011 to July 2013. The final version of the translation was determined when the cognitive pretesting had been completed free of any problems.

2.3. Study population and examiners

The participants were 389 patients from the Movement Disorders Unit of the Tel Aviv Sourasky Medical Center who were recruited between November 2014 and August 2015. Seven experienced Israeli movement disorder specialists were recruited to examine native Hebrew-speaking PD patients of all ages and at all disease stages.

2.4. Statistical analysis

The descriptive statistics included frequencies and summary measures, and the analytical statistics included factor analysis, both confirmatory factor analysis (CFA) and secondary exploratory factor analyses (EFA). . A CFA of the overall factor structure (assuming categorical scale of the questionnaire components) was conducted to determine if the factor structure for the English language MDS-UPDRS [5] could be confirmed in the Israeli data. The CFA was conducted separately for MDS-UPDRS Parts I to IV. We evaluated the CFA results based on the Comparative Fit Index (CFI), and a CFI for each Part (I-IV) of 0.90 or greater was considered as a successful translation compared to the English language version (Table 1). An EFA (with an orthogonal CF-VARIMAX rotation) was conducted on the MDS-UPDRS Parts I-IV to explore the underlying factor structure without the constraint of a pre-specified factor structure. We used a scree plot to choose the number of factors to retain for each MDS-UPDRS part [10]. Once the factors were chosen, an item was retained if the factor loading for that item was 0.40 or greater. Analysis was performed using M-plus, Version 7.4.

2.5. Ethics

The program for validation of the MDS-UPDRS Hebrew version and for the collection of human data were approved by the Ethics Committee of the Tel Aviv Sourasky Medical Center. All the patients gave their signed consent to participate after receiving the pertinent information. The data did not include the patients' names or medical record numbers, and they were transferred to the team for analysis via a secure web-site.

3. Results

3.1. Study population characteristics

The demographic characteristics of the sample are shown in

Please cite this article in press as: J. Zitser, et al., Validation of the Hebrew version of the Movement Disorder Society—Unified Parkinson's Disease Rating Scale, Parkinsonism and Related Disorders (2017), https://doi.org/10.1016/j.parkreldis.2017.09.012