



# Validation of the Polish version of the Unified Dyskinesia Rating Scale (UDysRS)

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## ABSTRACT

**Background.** In 2008, the Movement Disorders Society published the Unified Dyskinesia Rating Scale (UDysRS). This has become the established tool for assessing the severity and disability associated with dyskinesia in patients with Parkinson's Disease (PD). We translated and validated the Polish version of the UDysRS, explored its dimensionality, and compared it to the Spanish version, which is the Reference Standard for UDysRS translations.

**Materials and methods.** The UDysRS was translated into Polish by a team led by JS and GO. The back-translation, completed by colleagues fluent in both Polish and English who were not involved in the original translation, was reviewed and approved by the Executive Committee of the MDS Rating Scales Programme. Then the translated version of the UDysRS underwent cognitive pretesting, and the translation was modified based on the results. The approved version was considered to be the Official Working Document of the Polish UDysRS and was tested on 250 Polish PD patients recruited at movement disorder centres. Data was compared to the Reference Standard used for validating UDysRS translations.

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**Results.** The overall factor structure of the Polish version was consistent with that of the Reference Standard version, as evidenced by the high Confirmatory Fit Index score (CFI = 0.98). The Polish UDysRS was thus confirmed to share a common factor structure with the Reference Standard.

**Conclusions.** The Official Polish UDysRS translation is recommended for use in clinical and research settings. Worldwide use of uniform rating measures offers a common ground to study similarities and differences in disease manifestations and progression across cultures.

**Key words:** Parkinson's Disease, dyskinesia, validation, translation, rating scales, UDysRS

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## Introduction

In advanced Parkinson's Disease (PD), among many disabling symptoms (motor fluctuations, autonomic dysfunction, cognitive and psychiatric disorders), drug-induced dyskinesia (DID) is one of the most difficult to manage [1–4]. It is important to recognise and objectively assess the severity of DID in PD [5].

In this regard, the International Parkinson and Movement Disorder Society (MDS) in 2008 published a comprehensive rating tool of dyskinesia in PD: the Unified Dyskinesia Rating Scale (UDysRS). Today, the UDysRS is commonly used to assess dyskinesia severity and associated disability. UDysRS combines patient-based assessments of dyskinesia with objective evaluations of disability and impairment from dyskinesias, and it has been clinimetrically validated [6].

The UDysRS is composed of four parts:

- Part 1: *ON Dyskinesia* — measures the subjective impact of ON dyskinesia on everyday activities. The first item, on time spent with ON dyskinesia, is assessed by a trained rater (Part 1 A), whereas the remaining 10 items (Part 1 B) are self-rated by the patient and/or given from the caregiver's perspective (11 items, giving a maximum of 44 points);
- Part 2: *OFF Dystonia* — evaluates the burden caused by OFF dystonia. The first item, on time spent with OFF dystonia, is evaluated by a trained rater (Part 2 A), and the remaining three items (Part 2 B) are information from the patient and/or the caregiver's perspective (four items, giving a maximum of 16 points);
- Part 3: *Impairment* — objectively assesses dyskinesia severity, anatomical distribution over seven body regions, and type (i.e. choreic and/or dystonic) based on four activities observed during a clinical life examination or video recorded (seven items, giving a maximum of 28 points);
- Part 4: *Disability* — examines the disability associated with dyskinesia on four representative tasks, including communication, drinking, dressing, and ambulation (four items, giving a maximum of 16 points).

To enhance the uniform administration of the UDysRS, the MDS Rating Scales Programme sets a specific protocol to designate successful translation of non-English versions [7].

We aimed to translate and validate a Polish version of the UDysRS scale, and to compare it to the Spanish language version, which is the established Reference Standard for UDysRS translations [8].

Below, we present a scale translation and clinimetric testing results of the Polish version of the UDysRS.

## Materials and methods

The participants were 250 PD patients recruited from the neurology departments in ten sites across Poland (two in Katowice, two in Krakow, one in Wroclaw, three in Warsaw, one in Gdansk, and one in Lodz). At each site, experienced Polish-speaking movement disorder specialists were recruited to examine native Polish-speaking PD patients with different distributions and severities of dyskinesia. All patients participated voluntarily and gave written informed consent prior to the study. Anonymised data, without patient names or medical record numbers, was transferred to the analytic team via a secure website. The Reference Standard for UDysRS translations is the Spanish language version of the scale, validated previously on 253 native Spanish-speaking PD patients [8]. This data available from the MDS Translation Committee was used for comparative analysis of the UDysRS according to the MDS-established Protocol for official non-English language translations.

## Procedure

The MDS Rating Scales Programme has prepared a well-defined protocol, with objective criteria for translation and validation of non-English versions of the MDS-UPDRS and UDysRS in order to have an 'official' MDS translation in a foreign language [7].

There is a four-step process involved in developing an officially approved translation of these scales: (1) translation and independent back-translation; (2) cognitive pretesting to establish that the translation is clear, comfortably administered by native-speaker raters, and understood by native-speaker patients; (3) field testing in the native language using a large sample of PD patients; and (4) statistical analyses including validity testing and factor analysis. This process was previously used by our team in a successful validation of the Polish version of the MDS-UPDRS [9].

### Translation of UDysRS

This Polish version validation was performed as follows: firstly, the UDysRS was translated into Polish by a team of Polish speakers who were not only fluent in English but were also physicians and specialists in movement disorders. This team was led by Dr. Joanna Siuda and Prof. Grzegorz Opala. This was then back-translated into English by colleagues fluent in both English and Polish who had not been involved in the original translation. Finally, it was reviewed by a team of American experts led by Profs. Christopher Goetz and Glenn Stebbins (of the Executive Translation Programme Committee, ETPC) who had been involved in the development of the original English language version [6].

### Cognitive pretesting

Cognitive pretesting is a qualitative approach to assessing task difficulty for examiner and respondent, respondent interest, attention span, discomfort, and comprehension [10].

Where there were observed differences between the back-translated Polish version and the English version, items were selected for cognitive pretesting along with questions that were identified during cognitive pretesting of the English version.

The question topics included in cognitive pretesting were: Instructions to Raters and Instructions to Patients; Time Spent with Dyskinesia; Chewing and Swallowing; Exciting or Emotional Settings; Effects of Spasms or Cramps Separate from Pain on Activities; Objective Impairment Ratings; and Objective Disability Ratings.

Based on the results of the initial cognitive pretesting, other round(s) of translation and back translation and cognitive pretesting may be required. Once cognitive pretesting responses were taken into account, the version was modified into the final translation that was approved by the ETPC.

### Factor analysis

To conduct the factor analysis of the UDysRS, we omitted Questions 1 (time of ON dyskinesia) and 12 (time of OFF dystonia) and considered these items as descriptive indices rather than measures of impairment or disability. To maximise the accuracy of these time indices, we added three clarifying statements to ensure harmonisation of the time-based questions with the patient/caregiver questionnaire and interview items: In the initial instructions to the full scale, we alert the rater to review the patient questionnaire after completion to ensure that, if item scores indicate the presence of dyskinesia or dystonia over the past week, the time-based items also reflect their occurrence (rating 1, 2, 3, or 4 but not 0).

At the end of each questionnaire section (ON dyskinesia and OFF dystonia), the same alert is inserted.

M-plus Version 7.4 was used to carry out the confirmatory and exploratory factor analyses as the variables are categorical [11]. We used the weighted least squares (WLSMV) approach to factor estimation that minimises the weighted sum of squared differences between observed and estimated correlation

matrices. To assist in the interpretation of factors, we used an orthogonal VARIMAX rotation that constrains the factors to be uncorrelated.

The sample size for the translation study was based on the need for 7–10 subjects per item of the questionnaire in order to perform the tasks needed to validate the instrument [12].

Because there are 26 items on the UDysRS, a sample of at least 250 was required. The investigators obtained approval from the human subjects prior to data collection. Deidentified data (with no patient names or medical record numbers) was transferred to the analytic team via a secure website.

### Primary analysis

As the primary analysis, we conducted a confirmatory factor analysis (CFA), comparing the Polish data to the Reference Standard data [13,14]. We determined whether the factor structure for the Spanish language UDysRS, which served as the Reference Standard, could be confirmed in the data collected using the Polish translation. This was the primary question of interest. We evaluated the CFA results based on the Comparative Fit Index (CFI). To confirm a good fit between the Polish and the Reference Standard UDysRS, we required that the CFI was 0.90 or greater. Mean and variance adjusted weighted least square (WLSMV) estimator was used to confirm model fit.

We also used the root mean square error of approximation (RMSEA) to check the goodness of fit. This is a population-based index that relies on noncentral  $\chi^2$  distribution, which is the distribution of the fitting function when the fit of the model is not perfect.

### Secondary analysis

As a secondary analysis, we conducted an exploratory factor analysis (EFA) to explore the underlying factor structure for the Polish language translation, without constraint of a prespecified factor structure, using a weighted least squares (WLSMV) approach. We used a scree plot to choose the number of factors retained for UDysRS. *The subjective scree test* is a scatter plot of eigenvalues plotted against their ranks with respect to magnitude, to extract as many factors as there are eigenvalues that fall before the last large drop (i.e. an 'elbow' shape) in the plot [15]. Once the factors were chosen, an item was retained in a factor if the factor loading for the item was 0.40 or greater. To assist interpretation of the factors, an orthogonal CF-VARIMAX rotation was used which set the factors to be uncorrelated.

### Ethics

All patients gave written consent to participate. The anonymised patient data was transferred to the US team for analysis via a secure website. The programme for validation of the UDysRS Polish version was approved for all sites by the Ethics Committee of the Medical University of Silesia in Katowice (KNW/0022/KB/121/14).

## Results

### Baseline characteristics

The demographic characteristics of the Polish patients are set out in Table 1. The Polish dataset included 250 native Polish-speaking Parkinson's Disease patients with dyskinesia who were examined using the UDysRS. Table 2 sets out the distributions of answers to each question.

### Cronbach's alpha index and correlation analysis

The overall raw and standardised Cronbach's coefficient alpha was 0.938 and 0.94, respectively, indicating that the Polish UDysRS was reliable. Table 3 sets out the correlation between each question and the total score. Examination of the correlation of individual items to the total score revealed lower correlations for items 14 and 15.

### Cognitive pretesting

Three examiners and 10 patients with Parkinson's Disease were interviewed using a structured cognitive pretesting manual. On the first round of cognitive pretesting, a few minor issues were identified for the instructions for the raters and for one definition provided to the patients. Slight modifications were made to the translation based on this feedback, and a second round of cognitive pretesting was requested with a new set of five patients. No problems were identified on the second round of testing by either patients or raters, so the translated scale was approved as the Official Working Document of the Polish UDysRS for testing in a larger group of patients with PD.

### Primary analysis: Confirmatory Factor Analysis (CFA)

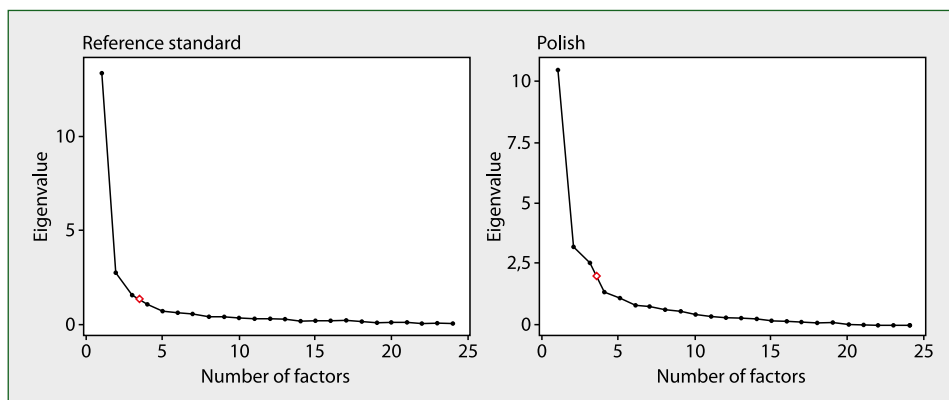
M plus performs listwise deletion of cases with any missing data. That is, any case with one or more missing data points is omitted entirely from analyses. Thus, the sample size in factor analysis is 250. The Comparative Fit Index (CFI), compared to the Reference Standard factor structure, was 0.954, and root mean square error of approximation was 0.115. Our pre-specified criterion was a CFI of 0.90 or greater.

Hence, we concluded that the pre-specified Reference Standard factor structure was confirmed in the Polish dataset.

### Secondary analysis: Exploratory Factor Analysis (EFA)

Table 4 shows the results of Exploratory Factor Analysis for all patients of the Reference Standard and Polish UDysRS without the items for *Time Spent with On Dyskinesia*, and *Time Spent with Off Dystonia*. The scree plots are given in Figure 1. From these we extracted three factors. The factor structure of Polish UDysRS is quite consistent with that of Reference Standard UDysRS.

EFA analysis for the Polish UDysRS dataset differed from the EFA of the Reference Standard dataset in some areas. Two of the 24 items loaded on different factors in the two scales. In contrast to the Reference Standard UDysRS, *Exciting situations* loaded in the Polish version on factor 3, instead of factor 1. *Dystonia pain severity* loaded on factor 2 in the Polish version, and on factor 3 in the Reference Standard. *Ambulation* did not load on any of the factors in the Polish version, but originally loaded on factor 2 in the Reference Standard. *Communication*



**Figure 1.** Scree plots for reference standard and Polish exploratory factor analyses

**Table 1.** Demographic characteristics of study population

Number of PD patients	Male*			Age** (years)		PD duration*** (years)		DID duration**** (years)	
	N	N	%	Mean	SD	Mean	SD	Mean	SD
Reference standard	253	122	48.2	69.2	10.5	12.5	6.8	4.9	4.6
Polish	250	135	59	74.6	13.9	12.1	6	4.2	3

\*Data available for 229, \*\*221, \*\*\*180, and \*\*\*\*171 subjects in Polish PD population; PD — Parkinson's Disease; DID — drug induced dyskinesia; SD — standard deviation

**Table 2.** Distribution of UDysRS responses

Time dyskinesia	Reference standard		Polish		Speech	Reference standard		Polish	
	Freq	Percent	Freq	Percent		Freq	Percent	Freq	Percent
0	45	17.79	5	2	0	92	36.36	105	42
1	56	22.13	101	40.4	1	99	39.13	81	32.4
2	55	21.74	83	33.2	2	52	20.55	52	20.8
3	37	14.62	43	17.2	3	8	3.16	9	3.6
4	60	23.72	18	7.2	4	2	0.79	3	1.2
Total	253	100	250	100	Total	253	100	250	100
Chewing /swallowing	Reference standard		Polish		Eating tasks	Reference standard		Polish	
	Freq	Percent	Freq	Percent		Freq	Percent	Freq	Percent
0	117	46.25	118	47.2	0	84	33.2	73	29.2
1	84	33.2	88	35.2	1	83	32.81	81	32.4
2	37	14.62	32	12.8	2	65	25.69	56	22.4
3	14	5.53	10	4	3	18	7.11	26	10.4
4	1	0.4	2	0.8	4	3	1.19	14	5.6
Total	253	100	250	100	Total	253	100	250	100
Dressing	Reference standard		Polish		Hygiene	Reference standard		Polish	
	Freq	Percent	Freq	Percent		Freq	Percent	Freq	Percent
0	73	28.85	52	20.8	0	86	33.99	57	22.8
1	71	28.06	88	35.2	1	81	32.02	88	35.2
2	74	29.25	67	26.8	2	59	23.32	68	27.2
3	25	9.88	32	12.8	3	20	7.91	24	9.6
4	8	3.16	11	4.4	4	7	2.77	13	5.2
Total	251	99.21	250	100	Total	253	100	250	100
Handwriting	Reference standard		Polish		Doing hobbies/ /activities	Reference standard		Polish	
	Freq	Percent	Freq	Percent		Freq	Percent	Freq	Percent
0	80	31.62	56	22.4	0	75	29.64	66	26.4
1	65	25.69	74	29.6	1	80	31.62	74	29.6
2	59	23.32	61	24.4	2	57	22.53	70	28
3	38	15.02	42	16.8	3	29	11.46	28	11.2
4	8	3.16	17	6.8	4	12	4.74	12	4.8
Total	250	98.81	250	100	Total	253	100	250	100
Walking/balance	Reference standard		Polish		Public/social	Reference standard		Polish	
	Freq	Percent	Freq	Percent		Freq	Percent	Freq	Percent
0	69	27.27	46	18.4	0	67	26.48	21	8.4
1	74	29.25	73	29.2	1	84	33.2	54	21.6
2	68	26.88	80	32	2	62	24.51	88	35.2
3	31	12.25	40	16	3	34	13.44	67	26.8
4	11	4.35	11	4.4	4	6	2.37	20	8
Total	253	100	250	100	Total	253	100	250	100
Exciting situations	Reference standard		Polish		Time off dystonia	Reference standard		Polish	
	Freq	Percent	Freq	Percent		Freq	Percent	Freq	Percent
0	72	28.46	22	8.8	0	125	49.41	78	31.2
1	83	32.81	59	23.6	1	45	17.79	67	26.8
2	59	23.32	82	32.8	2	27	10.67	55	22
3	36	14.23	64	25.6	3	15	5.93	25	10
4	2	0.79	23	9.2	4	40	15.81	25	10
Total	252	99.6	250	100	Total	252	99.6	250	100

→

**Table 2 cont.** Distribution of UDysRS responses

Dystonia effects on activities	Reference standard		Polish		Effect of pain from dystonia	Reference standard		Polish	
	Freq	Percent	Freq	Percent		Freq	Percent	Freq	Percent
0	128	50.59	92	36.8	0	151	59.68	118	47.2
1	45	17.79	60	24	1	34	13.44	51	20.4
2	31	12.25	58	23.2	2	29	11.46	39	15.6
3	29	11.46	26	10.4	3	29	11.46	32	12.8
4	20	7.91	14	5.6	4	9	3.56	10	4
Total	253	100	250	100	Total	252	99.6	250	100
Dystonia pain severity	Freq	Percent	Freq	Percent	Face	Freq	Percent	Freq	Percent
0	147	58.1	111	44.4	0	122	48.22	134	53.6
1	21	8.3	52	20.8	1	73	28.85	51	20.4
2	41	16.21	44	17.6	2	48	18.97	43	17.2
3	37	14.62	35	14	3	9	3.56	14	5.6
4	6	2.37	8	3.2	4	1	0.4	8	3.2
Total	252	99.6	250	100	Total	253	100	250	100
Neck	Freq	Percent	Freq	Percent	Right hand/ /arm/shoulder	Freq	Percent	Freq	Percent
0	109	43.08	100	40	0	90	35.57	54	21.6
1	64	25.3	58	23.2	1	58	22.92	66	26.4
2	62	24.51	65	26	2	67	26.48	79	31.6
3	17	6.72	18	7.2	3	33	13.04	37	14.8
4	1	0.4	9	3.6	4	5	1.98	14	5.6
Total	253	100	250	100	Total	253	100	250	100
Left hand/arm/ /shoulder	Freq	Percent	Freq	Percent	Trunk	Freq	Percent	Freq	Percent
0	100	39.53	56	22.4	0	92	36.36	66	26.4
1	59	23.32	61	24.4	1	55	21.74	79	31.6
2	66	26.09	78	31.2	2	65	25.69	75	30
3	25	9.88	46	18.4	3	40	15.81	25	10
4	2	0.79	9	3.6	4	1	0.4	5	2
Total	252	99.6	250	100	Total	253	100	250	100
Right foot/leg/ /hip	Freq	Percent	Freq	Percent	Left foot/leg/hip	Freq	Percent	Freq	Percent
0	88	34.78	76	30.4	0	109	43.08	68	27.2
1	67	26.48	68	27.2	1	57	22.53	60	24
2	69	27.27	65	26	2	61	24.11	83	33.2
3	25	9.88	28	11.2	3	22	8.7	21	8.4
4	4	1.58	13	5.2	4	4	1.58	18	7.2
Total	253	100	250	100	Total	253	100	250	100
Communication	Freq	Percent	Freq	Percent	Drinking	Freq	Percent	Freq	Percent
0	72	28.46	114	45.6	0	81	32.02	70	28
1	129	50.99	89	35.6	1	109	43.08	88	35.2
2	44	17.39	38	15.2	2	50	19.76	56	22.4
3	7	2.77	8	3.2	3	11	4.35	22	8.8
4	1	0.4	1	0.4	4	2	0.79	14	5.6
Total	253	100	250	100	Total	253	100	250	100

→

**Table 2 cont.** Distribution of UDysRS responses

Dressing (objective)	Reference standard		Polish		Ambulation	Reference standard		Polish	
	Freq	Percent	Freq	Percent		Freq	Percent	Freq	Percent
0	59	23.32	64	25.6	0	54	21.34	35	14
1	76	30.04	71	28.4	1	99	39.13	86	34.4
2	80	31.62	67	26.8	2	69	27.27	81	32.4
3	28	11.07	30	12	3	29	11.46	36	14.4
4	10	3.95	18	7.2	4	2	0.79	12	4.8
Total	253	100	250	100	Total	253	100	250	100

**Table 3.** Item-to-total correlations and Cronbach's alpha with deleted items

Deleted variables	Cronbach Coefficient Alpha with Deleted Variable*			
	Raw variables		Standardised variables	
	Correlation** with total	Alpha	Correlation with total	Alpha
Q1	0.560	0.940	0.563	0.941
Q2	0.565	0.940	0.575	0.941
Q3	0.623	0.940	0.630	0.941
Q4	0.724	0.938	0.731	0.939
Q5	0.752	0.938	0.756	0.939
Q6	0.760	0.938	0.761	0.939
Q7	0.743	0.938	0.746	0.939
Q8	0.770	0.938	0.774	0.938
Q9	0.650	0.939	0.652	0.940
Q10	0.618	0.940	0.620	0.941
Q11	0.585	0.940	0.590	0.941
Q12	0.493	0.941	0.483	0.942
Q13	0.550	0.940	0.536	0.942
Q14	0.373	0.943	0.360	0.944
Q15	0.396	0.943	0.383	0.944
Q16	0.481	0.941	0.487	0.942
Q17	0.478	0.941	0.479	0.942
Q18	0.608	0.940	0.609	0.941
Q19	0.567	0.940	0.569	0.941
Q20	0.540	0.940	0.541	0.942
Q21	0.618	0.940	0.619	0.941
Q22	0.546	0.941	0.547	0.942
Q23	0.550	0.940	0.551	0.942
Q24	0.736	0.938	0.738	0.939
Q25	0.754	0.938	0.756	0.939
Q26	0.698	0.939	0.696	0.940

Cronbach coefficient alpha is a measure of squared correlation between observed scores and true scores

\*What Cronbach coefficient alpha would be if that variable were deleted

\*\*Correlation between individual item and sum of remaining items

**Table 4.** Exploratory Factor Analysis (EFA)

Factor	Item	Item factor loading	
		Reference standard (n = 246)	Polish (n = 250)
Factor 1	Speech	0.698	0.555
	Chewing/swallowing	0.749	0.822
	Eating	0.800	0.825
	Dressing	0.861	0.875
	Hygiene	0.825	0.773
	Handwriting	0.780	0.862
	Doing hobbies/activities	0.728	0.798
	Walking/balance	0.731	0.827
	Public/social	0.686	0.752
	Exciting situations	0.718	NA
	Right hand/arm/shoulder	0.412	NA
	Drinking	0.441	0.479
	Dressing (objective)	0.415	0.421
	Communication	NA	0.473
	Factor 2	Chewing/swallowing	0.411
Walking/balance		0.401	NA
Public/social		0.462	NA
Face		0.717	0.638
Neck		0.752	0.785
Right hand/arm/shoulder		0.701	0.739
Left hand/arm/shoulder		0.663	0.629
Trunk		0.769	0.703
Right foot/leg/hip		0.711	0.682
Left foot/leg/hip		0.741	0.728
Communication		0.775	0.704
Drinking		0.755	0.756
Dressing (objective)		0.739	0.662
Ambulation		0.729	NA
Dystonia pain severity		NA	0.591
Factor 3	Dystonia effects on activities	0.883	0.978
	Effect of pain from dystonia	0.971	0.966
	Dystonia pain severity	0.945	NA
	Exciting situations	NA	0.663

CFI = 0.942; RMSEA = 0.109; NA — implies that listed item did not load on factor indicated

loaded in factors 1 and 2 in the Polish version, but only in factor 2 in the Spanish version. Inversely, *Right hand/arm/shoulder* objective assessment of dyskinesia severity loaded on factors 1 and 2 in the Reference Standard, but only in factor 2 in the Polish version. Three items (*Chewing/swallowing*, *Walking/balance*, *Public/social*) loaded in factors 1 and 2 in the Reference Standard, but only in factor 1 in the Polish UDysRS version. Two items (*Drinking* and *Dressing*) loaded on more than one factor in both language versions.

## Discussion

The Movement Disorders Society Rating Scales Programme leads the global translation effort of different assessment scales including the UDysRS. Currently, this programme includes 14 non-English validated editions of the UDysRS.

The original English version was clinimetrically evaluated to establish internal consistency and inter-rater reliability, but the small sample size of the English version precluded a comprehensive analysis of factor structure.

Because of this limitation, we could not compare the resultant structure from the present study with that of the original English version.

Therefore we instead compared our results to the Spanish version of the UDysRS. This was the first large-scale clinimetric analysis of this instrument, and is now recognised as the Reference Standard for UDysRS translations.

In agreement with the Reference Standard, the Polish version of the UDysRS demonstrated a clear factor structure, with three factors related to ON dyskinesia, OFF dystonia, and patient perceptions of the functional effects of dyskinesia. The overall factor structure of the Polish version was consistent with that of the Reference Standard. Exploratory factor analysis, where variability from sample to sample is expected, identified isolated, subtle item differences of factor structure between the Polish and the Reference Standard UDysRS.

We are aware that this study has some limitations related to potential sample selection bias.

The data comes from high reference neurology clinics specialising in movement disorders, and as such does not represent the general Polish PD patient population. However, this is a minor issue because neurologists at specialist centres are the most likely group to be using this scale for their research.

## Conclusions and clinical implications

The Polish UDysRS was confirmed to share a common factor structure with the Reference Standard. Therefore, this version was designated to be the Official Polish version of the UDysRS, and will be available from the MDS website (<https://www.movementdisorders.org/MDS-Files1/Education/Rating-Scales>).



In order to establish the UDysRS as the international 'gold standard' tool for the clinical assessment of dyskinesia in advanced Parkinson's Disease, fully tested non-English translations must be available for worldwide research programmes.

As such, having a validated Polish version of the scale will provide opportunities for Polish centres to contribute data from Polish-speaking individuals in large multicentre studies and clinical trials evaluating dyskinesia in PD patients.

Moreover, having the previously published validation of Polish translation of the MDS-UPDRS, plus now the validated Polish UDysRS version, allows movement disorders specialists in Poland to be fully equipped with two scales important in the objective assessment of moderate and severe Parkinson's Disease.

We believe that these tools will be useful in everyday clinical practice, especially in hospitals, where advanced treatment options (DBS surgery and infusion therapies) are available.

Worldwide use of the same rating measures (in appropriate translations) enhances international communication and offers a common ground on which to study similarities and differences in disease manifestations, progression, and disabilities across cultures.

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