ORIGINAL ARTICLE

A RELIABILITY AND VALIDITY STUDY OF THE URDU VERSION OF THE UNIFIED PARKINSON DISEASE RATING SCALE

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ABSTRACT

Introduction: In order to evaluate the severity and progression of Parkinson's disease, the Unified Parkinson Disease Rating Scale (UPDRS) is commonly used. An important aspect of any rating scale, including the UPDRS, is its reliability and validity.

Material & Methods: In this cross-sectional study, data were collected between October 2020 and January 2021. In accordance with standard guidelines for translating UPDRS into Urdu, 215 Parkinson's disease patients who met predefined inclusion criteria were administered the final Urdu version.Cronbach alpha was used to determine an inter-item correlation. A test-retest reliability analysis was conducted by comparing UPDRS-U scores at baseline and after two weeks. We also compared the scores of two observers in order to determine inter-rater reliability. Concurrent validity was established using the Spearman correlation coefficient.

Results: UPDRS-U had a Cronbach alpha score of 0.940, indicating internal consistency. The Spearman correlation coefficient for UPDRS-U composite scores at baseline and two weeks later was 0.82, suggesting excellent test-retest reliability.According to this study, UPDRS-U and BBS have good concurrent validity (rs =-.808, p=0.001) and UPDRS and ABC have good concurrent validity (rs =-.791, p=0.001). Furthermore, the two observers' UPDRS-U scores were positively correlated, with a spearman correlation coefficient of 0.97 and P< 0.001 indicating good inter-rater reliability. Correlations between individual item scores and the UPDRS total item score were found to range between 0.194 and 0.866.

Conclusion: UPDRS-U was found to be a reliable and valid tool for assessing Parkinson disease symptoms and progression among Pakistani adults.

Key Words: Outcome assessment, Parkinson's disease, Reliability, UPDRS, Validity

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INTRODUCTION

Parkinson's disease (PD) is a chronic and progressive central nervous system neurodegenerative condition marked by reduced motor function and caused by a reduction in dopamine production.[1] There is a dramatic increase in PD incidence after the age of 60. The diagnosis of PD relies primarily on motor symptoms, but non-motor symptoms are also often reported by PD patients.[2] Bradykinesia (slow movement), stiffness, resting muscle tremor, postural instability or decreased balance, and abnormalities are among them. Clinical studies have used many different Parkinson's rating scales (PDRS), with innumerable problems when interpreting or comparing them.3 In 1984, a committee was devised to develop a unanimous scale, UPDRS, keeping in mind the necessity of a common and consistent method for assessing Parkinson's disease.[4] Thus, the scale was created in 1987 by neurologists as a gold standard test for assessing the drug responses that are used to treat Parkinson's symptoms. Moreover, The UPDRS is by far the most frequently used to determine the functional status of PD. The UPDRS was developed in 1987 by combining the PD grading scale and Webster and Columbia scales.[5] Based on the history exploration, the scale given an insight of the mentation and mood and daily living activities while clinical examination is used to assess the motor function of patients with PD. The UPDRS items for tremor, postural instability/gait disturbance, stiffness, and bradykinesia were used to build subscales for these indicators.[6] For the evaluation of impairments and disabilities associated with Parkinson's disease, the UPDRS was created. Contains four sections: the first assesses mentation, attitude, and emotion; the second assesses daily activities; the third assesses motor components; and the fourth assesses therapeutic considerations.[6-8]

Pakistan is a developing country where PD is already surging and the number of patients with neurological pathologies is expected to increase until 2030.219 out of every 100,000 Pakistanis are affected by PD, or 450,000 out of 182 million.[9,10] Pakistan and India are the countries that are home to the majority of those who speak Urdu worldwide. Urdu is also the national language of Pakistan.[11, 12] It is imperative that different questionnaires be translated into Urdu in Pakistan because most people cannot read or understand English very well. The UPDRS has not been translated into Urdu, and the validity and reliability of the Urdu version of the UPDRS-U have not been investigated. Thus, the aim of this study was to translate the UPDRS in Urdu using cross-cultural adaptation and tests its psychometric properties in Urdu-speaking PD patients.

MATERIAL AND METHODS

Translating and adapting the Modified UPDRS began after the International Parkinson and Movement Disorder Society confirmed its creation. The society reported UPDRS is in the public domain and can be used and translated. In the current study, researchers followed standard guidelines to develop a reliable Urdu version of the UPDRS, which were previously published in a study by Guillemin, Bombardier, and Beaton.[13] An independent group of bilingual researchers who were not involved in the study translated the UPDRS into Urdu. In spite of not having access to the originals, three independent researchers reverse-translated the three translations back into English. A research committee composed of three consultant physiotherapists and a Research Assistant (all fluent in both languages) evaluated and compared this Urdu translation and back-translation to the original English version of UPDRS to produce a final Urdu version (UPDRS-U). The UPDRS-U was tested on ten patients with PD in a pilot study.

Following the acceptance of the final version of the UPDRS-U, a validation study was carried out at The University of Lahore in Lahore from October 2020 to January 2021. The UPDRS-U was given to 215 patients with idiopathic Parkinson's disease (PD) who had intact cognition (MMSE score >24) and transfer independence. Patients with

neurological, orthopaedic, visual, or cardiovascular disorders were excluded. Refusals to provide informed written consent for the study or inability to return for follow-up visits were considered exclusion criteria.

The sample size for validated items in an instrument should be between five and ten participants in order to proceed with confirmatory factor analysis.14 The sample size of 215 participants was sufficient for validation, even though no confirmatory factor analysis was conducted. Purposive sampling was used to select patients. The demographic information collected included age, gender, and basic demographics. The final version of the UPDRS-U was administered to 215 patients with PD. In order to assess test-retest reliability, the same patients were tested again two weeks later. By comparing UPDRS-U composite scores from two different practitioners (p 0.001), we were also able to determine inter-rater reliability. Before the study began, each participant gave written informed consent, and this study was part of a project that was reviewed and approved by the University of Lahore's Institutional Review Board. Moreover, this study was registered with ClinicalTiral.gov with number NCT04569552 available at https://clinicaltrials.gov/ct2/show/NCT045695 52

SPSS version 24 was used to enter and analyse the data in this study. We calculated frequencies and proportions for the variables of categorical nature and for the variables of continuous nature; we considered calculating means and standard deviations. Cronbach alpha was used to determine the degree of inter-item correlation. UPDRS-U scores from two practitioners were correlated using the Spearman correlation coefficient. To demonstrate concurrent validity between UPDRS-U, BBS, and ABC, a Spearman correlation coefficient was calculated. Test-retest reliability assessment was performed by the comparison of the correlation scores between at the start and after a break of two weeks. Statistical significance was determined using two-sided statistical tests with a p-value of less than or equal to 0.05.

RESULTS

Based on inclusion and exclusion criteria, 215 participants with PD in stages I to III were

selected for the study. The participants' average age was found to be 63.77±4.62 years, ranging from 55 to 73 years. The average Hoehn and Yahr stages for participants was 2.60±.657 (Table 1).

For inter-rater reliability testing, two physical therapists administered the UPDRS-U. Pearson correlation coefficient was used to calculate the composite scores of the two raters. The composite scores of the two raters were positively correlated with each other (r=.998) with a p-value of 0.01.(Table2)

After a two-week interval, there was no significant change in UPDRS-U scores, indicating good test-retest reliability. Furthermore, the analysis indicates a strong negative correlation between UPDRS and BBS (rs =-.808**, p=.000) and a moderate negative correlation between UPDRS and ABC (rs =-.791**, p0.001), indicating good concurrent validity (Table 3)

UPDRS item-5 speech and UPDRS score showed the strongest statistically significant correlation (r=.869, p.001) based on Pearson coefficients of correlation between each item score and the total item score, while UPDRS item 41- any sleep disturbances showed the weakest non-significant correlation (r=0.005, p>.05).The correlation between individual item scores and total item scores ranged from 0.194 to 0.869. (Table 4)

DISCUSSION

The evaluation of PD patients is based on specialised rating scales. In clinical practice, these are the most frequently used and practical tools to assess severity. To determine their reliability and validity, a statistical analysis is necessary due to these instruments' subjective nature. To the best of the author's knowledge, this is the first study that has examined UPDRS-U's validity and reliability after translating and cross-cultural adapting it from its Urdu original.

In the Indo-European language family, Urdu belongs to the Indo-Aryan language family. Pakistan and some Indian states speak it as their national language. Urdu is a descendant of the Indo-Aryan language family, which includes languages such as Hindi, Punjabi, Gujarati, and Bengali. It is spoken mainly in Pakistan and some Indian states, and is the national language of both countries. There are

60-70 million native Urdu speakers. Many emigrant South Asian workers speak it in the Gulf and Middle East cities. Immigrant families speak Urdu in major cities across the world, including the, Europe, and Australia Canada, UK and US. It is therefore advantageous to collect psychiatric research data in Urdu. There is also the possibility of researching South Asian expat populations living in Western countries or other areas with a large Urdu speaking population.[15]

The current study's findings supplement early findings on the psychometric characteristics of the UPDRS. Literature has confirmed the UPDRS's inter-rater reliability. Bennett et al. in their research discovered excellent test–retest reliability for the total UPDRS.[16] The UPDRS's reliability is noteworthy. Cronbach's alpha is the most frequently used statistic for determining the internal consistency of scales. Our study reported Cronbach's alpha value for .970 which indicate high internal consistency. Similarly alpha value reported in another study (0.96) indicates a very high level of internal consistency.[17] The internal consistency of the summed score increases with item number and is strongly influenced by item homogeneity along with inter-item relationships.[3]

The UPDRS has demonstrated remarkable internal consistency across several investigations and throughout different phases of PD severity as assessed by the H& Y staging system.[18] Across the entire UPDRS, as well as the Activities of Daily Living and Motor Examination sections, inter-rater reliability was found to be satisfactory.[17,19] There was a significant intraclass correlation between the following scores: overall score: 0.92; mention: 0.74; activities of daily living: 0.85; motor: 0.90.[20,21] An assessment of bradykinesia in the UPDRS motor examination was found to be valid and reliable by Buck and colleagues. The bradykinesia subscale therefore has the advantage of being administered independently of the UPDRS motor examination and retaining its predictive validity.[22] In addition, another study found high reliability for UPDRS-III, dyskinesia scales, and timed motor tests in patients with advanced PD. It is therefore recommended to conduct clinical and therapeutic intervention trials with this population at a single

baseline.[23] According to the findings of this study, it is acceptable to use the UPDRS-U. This means that clinicians and researchers can use the UPDRS-U for mentation and mood, daily living activities, and motor examinations in Urdu-speaking PD populations without fear of losing predictive value.

Our study had a limitation in that it included only subjects with H & Y stage I to III early, mild PD and patients with Stage IV and V were not added in this study.As a result, our findings do not directly address the UPDRS's reliability in patients with advanced Parkinson's disease.

CONCLUSION

A reliable, validated Urdu translation of the UPDRS was developed in this study, which has good cross-cultural validity. The UPDRS-U scores show good test-retest reliability after a two-week interval. The UPDRS-U was found to be positively correlated with the BBS and ABC scales, indicating good concurrent validity. A positive correlation between two clinicians' composite UPDRS-U scores shows that the UPDRS-U has a good interrater reliability.

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Table 1: Demographic information of participants (N: 215)

Variables	M±SD	Range
Age (years)	63.77±4.62	55-73
Height (inches)	176.64±12.57	144-205
Weight (Kg)	74.76±9.05	55-92
Duration of Parkinson's disease	3.28±1.98	1-10
Age at onset of PD	60.50±4.07	51-69
Age at diagnosis PD	61.85±3.82	54-68
Hoehn and Yahr Stage	2.60±.657	1-3

Table 2: Table 2: UPDRS-U at baseline and at two weeks interval and between two raters.

UPDRS	Mean ± SD
UPDRS test	41.30±18.56
UPDRS Retest	43.03±15.24
Correlation coefficient	0.82**
p<0.01	
Rater-1	41.30±18.56
Rater-2	41.23±18.56
Correlation coefficient	.998**
p<0.01	

Table 3: Spearman's rank correlation coefficient (rs) and p-value between UPDRS and ABC, BBS

Variable	Rs	p	Classification
Age	.247**	.000	Week correlation
Duration	.820**	.000	Strong correlation
Age onset	-.037	.586	No correlation
Age diagnosis	.042	.537	No correlation
ABC	-.791**	.000	Moderate correlation
BBS	-.808**	.000	Strong correlation

Unified Parkinson Disease Rating Scale (UPDRS), Activity-specific Balance Confidence Scale (ABCS), Berg Balance Scale (BBS)

Table 4: Correlation coefficient of each item of UPDRS-U with total points

Items	UPDRS	P	r
1	Question 1	<.01	.795**
2	Question 2	<.01	.822**
3	Question 3	<.01	.546**
4	Question 4	<.01	.726**
5	Question 5	<.01	.869**
6	Question 6	<.01	.809**
7	Question 7	<.01	.808**
8	Question 8	<.01	.823**

9	Question 9	<.01	.753**
10	Question 10	<.01	.818**
11	Question 11	<.01	.850**
12	Question 12	<.01	.739**
13	Question 13	<.01	.659**
14	Question 14	<.01	.716**
15	Question 15	<.01	.797**
16	Question 16	<.01	.768**
17	Question 17	<.01	.842**
18	Question 18	<.01	.869**
19	Question 19	<.01	.763**
20	Question 20	<.01	.707**
21	Question 21	<.01	.775**
22	Question 22	<.01	.747**
23	Question 23	<.01	.771**
24	Question 24	<.01	.793**
25	Question 25	<.01	.748**
26	Question 26	<.01	.788**
27	Question 27	<.01	.827**
28	Question 28	<.01	.684**
29	Question 29	<.01	.636**
30	Question 30	<.01	.374**
31	Question 31	<.01	.737**
32	Question 32	<.01	.833**
33	Question 33	<.01	.796**
34	Question 34	<.01	.679**
35	Question 35	<.01	.557**
36	Question 36	<.01	.430**
37	Question 37	<.01	.194**
38	Question 38	<.01	.614**
39	Question 39	<.01	.598**
40	Question 40	0.898	0.005
41	Question 41	0.899	0.005
42	Question 42	<.01	.457**