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ORIGINAL ARTICLE

Translation, cultural adaptation and validation of the Arabic version of the king's Parkinson's disease pain scale

Nesreen Alissa[a], Hanan Khalil[b], Saddam Kanaan[b], Mayis Aldughmi[c], Alham Al-Sharman[d]*
Linzette Morris[b], Mariem Sirine Latrous[b] and Khalid El-Salem[e]

[a]Department of Physical Therapy and Rehabilitation Science, University of Maryland Baltimore, School of Medicine, Baltimore, MD, USA; [b]Department of Physical Therapy and Rehabilitation Sciences, College of Health Sciences, QU Health, Qatar University, Doha, Qatar; [c]Department of Physiotherapy, The University of Jordan, School of Rehabilitation Sciences, Amman, Jordan; [d]Faculty of Applied Medical Sciences, Department of Rehabilitation Sciences, Jordan University of Science and Technology, Irbid, Jordan; [e]Faculty of Medicine, Department of Neurosciences, Jordan University of Science and Technology, Irbid, Jordan

ABSTRACT

Purpose: Pain in Parkinson's disease (PD) is a highly prevalent non-motor symptom occurring in this population. The King's PD Pain Scale (KPPS) was developed to assess pain in people with PD. This study aimed to provide a cross-cultural adaptation and translation of the KPPS into the Arabic language (A-KPPS), and to investigate the construct and convergent validity, internal consistency, and reliability of the translated scale.

Materials and Methods: The English KPPS was translated into Arabic and back-translated into English by an independent translation team. The Arabic version was tested in 103 native Arabic speaking PD patients. We assessed construct validity, convergent validity, and test-retest reliability of the A-KPPS using factor analysis method, comparison with other valid and reliable measures, and using intra-class correlations, respectively.

Results: The A-KPPS had three main factors "somatic pain", "visceral and burning pain" and "orofacial pain", rather than the original four factors scale. The A-KPPS correlated with measures of disease motor severity, depression, anxiety, quality of life and pain ($p < 0.05$). Furthermore, the A-KPPS total score had high test-retest reliability (ICC = 0.9).

Conclusions: The A-KPPS demonstrated moderate to good validity and reliability. The A-KPPS can facilitate the assessment and treatment of pain in Arabic-speaking people with PD worldwide.

IMPLICATIONS FOR REHABILITATION

- Pain is a highly prevalent non-motor symptom of Parkinson's disease (PD) that is often overlooked.
- The King's PD Pain Scale (KPPS) is specially designed to assess pain localization, intensity, and frequency in people with PD.
- The Arabic translation of the KPPS is a valid and reliable tool for the assessment of pain in Arabic speaking people with PD.

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Parkinson's disease; pain; arabic language; cross-cultural adaptation; validity

Introduction

Pain in Parkinson's disease (PD) is a highly prevalent non-motor symptom occurring in 40 – 80% of people with this disease [1,2]. Despite the fact that pain is sometimes so severe that it can overshadow the motor symptoms of the disease, pain is often overlooked in PD and remains undeclared in 40.5% of patients [2,3]. Pain often begins at the clinical onset of PD or after [4] and can precede the manifestation of motor symptoms [5–7]. Studies examining pain in PD have found that pain in this population varies greatly in origin, location, chronicity and cause [2,8]. The experience of pain is highly variable among people with PD and is difficult to characterize, which often leads to under treatment [3]. Pain in PD can be musculoskeletal (70%), dystonic (40%), neuropathic (20%), central (10%), akathitic (45%), and/or orofacial [1]. Therefore, identifying the type and degree of pain in PD is an important part of PD treatment.

Until recently, there have been no validated instruments available capable of assessing pain type and severity in PD. The King's PD Pain Scale (KPPS) is a relatively new scale specially designed to assess pain localization, intensity and frequency in people with PD [9]. The KPPS characterizes the types of pain in people with PD and rates this pain based on frequency and severity. The KPPS consists of seven domains including 14 items that assess all types of pain experienced by people with PD. Domain 1 assesses musculoskeletal pain, domain 2 assesses nociceptive pain, neuropathic pain is included in domains 2 and 6, domain 3 assesses fluctuation-related pain, domain 4 assesses nocturnal pain, domain 5 assesses orofacial pain, and domain 7 assesses radicular pain.

CONTACT Hanan Khalil hkhalil@qu.edu.qa Department of Physical Therapy and Rehabilitation Sciences, College of Health Sciences, QU Health, Qatar University, Doha, Qatar

*Present address: College of Health Sciences, Physiotherapy Department, University of Sharjah, Sharjah, UAE.

Each item in the KPPS is scored by severity and multiplied by frequency. Severity scores range from 0 (none) to 3 (very severe), which are multiplied by frequency scores ranging from 0 (never) to 4 (all the time). This results in a total sub-score of 0 to12 for each item in every domain (14 items total), and domain scores are summed to give a total KPPS score ranging from 0 to 168. This scale has been validated for the assessment of pain in people with PD. This original scale has an inter-rater reliability of 0.99, a test-retest reliability of 0.85, a moderate to high construct validity (correlation coefficients ranged from −0.56 to 0.59) and its internal consistency is acceptable (Cronbach's alpha was 0.78) [9].

A recent review evaluated the existing pain scales and questionnaires for the assessment of pain in PD and provided recommendations for their use in this population [10]. This review concluded that other commonly used pain assessment scales including the Brief Pain Inventory (BPI) and the McGill Pain Questionnaire were "recommended with caution", whereas the KPPS was "recommended" for use in PD and was the only scale with adequate clinimetric assessment in PD [10].

The KPPS was originally designed in English by Chaudhuri et al. [9]. However, a valid and reliable translation of this scale is required for the purposes of international research in diverse populations. To date, the KPPS has only been culturally adapted and translated to the Brazilian, German, Persian, Turkish, Hindi and Bulgarian languages [11–16]. These adaptations yielded internal consistency values of 0.85, 0.75 0.83, and 0.70 for the Turkish, Bulgarian, Hindi, and Persian translations, respectively. The test-retest reliability yielded values of 0.82, 0.92, and 0.70 for the Turkish, Bulgarian, and Persian translations, respectively. The construct validity correlation coefficients yielded ranges of (0.25–0.84) and (0.35 – 0.76) for the Hindi and Persian translations, respectively, and the content validity yielded ranges of (0.91–0.96) and (0.34–0.72) for the Brazilian and Turkish translations, respectively.

Approximately 467 million people across 60 countries speak Arabic as their native language [17]. Translation of assessment tools is not only essential for the appropriate assessment and treatment personalization of patients, but also for their benefit and comfort. In order to apply the KPPS in predominantly Arabic-speaking communities and countries, a validated Arabic translation is required. This study aimed to provide a cross-cultural adaptation and translation of the KPPS into the Arabic language (A-KPPS). It also aimed to investigate the construct, and convergent validity of the translated scale, and its internal consistency and reliability.

Materials and methods

Design and participants

We conducted a cross-sectional, correlational study. One hundred and three PD participants were enrolled in the study. We included participants who had: 1) a positive diagnosis of idiopathic PD as confirmed by a neurologist and 2) mental capacity to give informed consent. We excluded participants who had: 1) any other neurological conditions such as stroke, multiple sclerosis, etc., 2) formally diagnosed with dementia as confirmed by a neurologist, and 3) had been diagnosed with any condition that could cause pain unrelated to PD (e.g., severe arthritis or malignancy).

Procedure

The study was carried out in two phases: firstly, the English version of the KPPS was translated into Arabic in accordance with the cross-cultural adaptation guidelines provided by the authors and creators of the KPPS (this process is described in the Translation Procedure section) and secondly, a detailed analysis of the psychometric properties of the translated version of the KPPS was conducted. Participants were assessed in two different locations (Stem Cell Centre at Jordan University at Amman, Jordan and Department of Rehabilitation Sciences, Jordan University of Science and Technology at Irbid, Jordan) depending on the participants' residence area. In both sites, participants were assessed by the same investigator. All participants were fully informed of the testing procedures before participation and signed informed consent forms approved by the Institutional Research Board (IRB) (HK-20170012/HK-20170158).

Translation Procedure

After receiving permission to translate the KPPS from the authors and copyright holders of the original scale (Ray-Chaudhuri, C Trenkwalder, P Martinez-Martin), the KPPS was translated according to the cross-cultural adaptation guidelines provided by the authors. Two individuals fluent in Arabic and English independently conducted a forward translation of the KPPS from English to Arabic. This was followed by a comparison and reconciliation of the two translations. Next, the Arabic KPPS was independently back translated to the English language by two bilingual persons. Finally, the back-translated version in the English language was sent to the authors who developed the original KPPS and was compared with the original version in terms of the equivalence in meaning, sense, and conceptual content. To ensure accuracy of meanings and that all questions are understood by Arabic- speaking individuals, the pre-final version of the A-KPPS was piloted on five PD patients. Feedback from patients and translators were discussed by the study panel in which the final version of the A-KPPS was issued.

Clinimetric evaluation

The convergent validity of the A-KPPS was assessed by testing the assumption that if the A-KPPS is valid then it should converge (i.e., correlate) with other tests that measure similar constructs [18]. This means that in the presence of a higher score on A-KPPS (an indication of a higher level of pain), one may expect a poorer performance on health-related quality of life for example. Thus, in this study the A-KPPS was administered simultaneously with measures of health-related quality of life, disease motor severity, depression and anxiety and a previously validated measure of pain severity. The Arabic version of the BPI short form is a 9-item, self-administered, generic pain questionnaire used to evaluate the severity of pain, and impact of this pain on daily functioning (i.e., pain interference) [19]. Part III of the Movement Disorder Society Unified Parkinson's Disease Rating Scale (MDS-UPDRS) was used to assess the severity of the motor aspects of the disease [20]. The score from the pain subscale of the European Quality of Life-5 Dimensions- 5 Levels (EQ-5D-5L) and the EQ-5D-5L health state, are both used as indicators to assess health- related quality of life [21]. The Arabic version of the Hospital Anxiety and Depression Scale (HADS) was used to quantify the severity of anxiety and depression [22]. All tests were administered in a standardized manner. The order of tests for each participant was randomized (between participants) to minimize any bias due to order effects [18]. Demographic data including age, gender and duration of the disease were recorded.

To evaluate test- retest reliability of the A-KPPS, a subsample of the existing participants completed the A-KPPS in a second session which was scheduled after a week. Overall, all participants who completed the first session of assessment were invited to

participate in the re-test session which was conducted after one week. The sub-sample represents those participants who agreed and attended the second session. The same examiner was involved in both sessions. No significant differences were noted in the main characteristics such as age and the A-KPPS total score between those who participated in the reliability testing and those who did not in the reliability testing.

Statistical analysis

All data were entered into and analyzed using SPSS version 23 (IBM SPSS Statistics 23, ©IBM). The demographic and clinical characteristics of the participants were described using mean, standard deviation, and percentage.

Feasibility of the questionnaire was determined based on the percentage of the missing values. The floor and ceiling effects were determined by calculating the percentage of the lowest or highest score achieved by the participants in this study in domains and total score. Floor or ceiling effects were considered significant if 15% of the total participants scored the lowest and highest score [23].

Internal consistency for A-KPPS was assessed using Cronbach's α to measure the correlation between items; item-total correlations were used to measure the strength of the relationship between a single item and the total score. An α coefficient greater than 0.8 indicates an acceptable internal consistency value for a tool used in clinical practice [18].

We assessed the construct validity of the questionnaire using the factor analysis method. The data adequacy for structure detection and adequacy was determined by the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy test of ≥0.6, and Bartlett's test of sphericity significance level <0.05 [24]. We also used the scree plot and parallel analysis to determine the number of factors that should be retained in the analysis. We used Varimax rotation, and items with loadings of ≥0.4 were included [25].

A priori hypotheses were proposed for the convergent validity result. We hypothesized that convergent validity would be demonstrated by moderate to high correlation ($r \geq 0.30$) between KPPS and BPI: pain interference and severity, HAD anxiety, HAD depression, MDS-UPDRS motor score, and EQ-5D-5L pain and EQ-5D-5L health state. The parametric Pearson correlation coefficient (r) was used for all correlational analyses.

To evaluate test-retest reliability of the A-KPPS, intraclass correlation coefficient with a two-way random effect and absolute agreement (ICC [1,2]) was used to assess both systematic and random error that may affect relative test- retest reliability [26]. ICC [1,2] with a value of less than 0.5 was considered poor, between 0.5 and 0.75 was considered moderate, and between 0.75 and 0.90 was considered good [26].

Measures of absolute reliability were expressed as the standard error of measurement (SEM) and the minimal detectable change at the 95% confidence level (MDC_{95}) [27]. The SEM was estimated from the square root of the mean error term from a repeated measure ANOVA [27]. The MDC_{95} was calculated as $1.96*\sqrt{2}*SEM$. Thus, the MDC_{95} values provide information about the confidence limits associated with measurement error so that, for example, it can be stated with 95% confidence that an individual's change score, which exceeds the MDC, represents a true change.

Sample size

Terwee et al. [28] proposed a minimum of 100 participants for variance stability in the exploratory factor analysis, and 50 participants to give a positive rating for convergent validity. For internal consistency testing, given $\alpha = 0.05$ and power of 0.80, a minimum sample size of 51 is sufficient to detect Cronbach's α of 0.50 [29].

Results

One hundred and three participants completed the study. Table 1 shows the demographics and clinical characteristics of the participants. The average age of the participants was 61.56 (10.70) years, and disease duration was 6.54 (4.74) years. Majority of the participants were males (69.20%).

Table 2 shows the descreptive data for the KPPS-scale items and summary score. Participants completed all A-KPPS items with 0% missing values. The floor effect was present (>15%) for all the A-KPPS domains (22.6% to 60.2%), but not for the total score (11.80%). On the other hand, ceiling effect was not present (<15%) in all of the A-KPPS domains and in the A-KPPS total score.

In terms of the internal consistency, Cronbach's α was 0.84, indicating 'acceptable internal consistency'. No item deletion caused significant change in the Cronbach's α [30]. Item-total correlation ranged from 0.135 to 0.655.

The data was adequate for factor analysis as KMO was 0.77 and Bartlett's test of sphericity p-value was <0.001. Scree plot

Table 1. Demographics and clinical characteristics of participants ($n = 103$).

	n	Mean (SD)
Age (years)	103	61.56 (10.70)
Gender (Male/Female)	103	72/31
Duration of disease (years)	103	6.54 (4.74)
Levodopa equivalent daily dose (mg)	103	654.13 (369.48)
MDS-UPDRS Part III	90	35.26 (16.49)
A-KPPS total score	103	32.92 (31.08)
BPI- pain severity	81	4.14 (4.82)
BPI- pain interference	81	5.96 (9.81)
HADS-depression	93	6.65 (5.30)
HADS-anxiety	93	6.23 (4.68)
EQ-5D pain subscale	57	2.43 (1.34)
EQ-5D-5L health state (%)	57	62.75 (19.96)

MDS-UPDDRS: Movement Disorders Society - Unified Parkinson's Disease Rating Scale, A-KPPS: Arabic King's PD Pain Scale, BPI: Brief Pain Inventory, HADS: Hospital Anxiety and Depression Scale, EQ-5D: European Quality of Life-5 Dimensions- 5 Levels.

Table 2. KPPS- Scale items and domain summary ($n = 103$).

Item/Domain	Mean (SD)	Range
Item 1: Pain around joints (musculoskeletal)	5.42 (4.08)	0–12
Item 2: Pain deep within the body	2.10 (3.90)	0–12
Item 3: Pain related to internal organ	1.87 (3.57)	0–12
Item 4: Dyskinetic pain	1.76 (3.36)	0–12
Item 5: "Off" dystonia in a region	2.70 (4.11)	0–12
Item 6: Generalized "off" period pain	2.25 (3.64)	0–12
Item 7: PLM or RLS-associated pain	2.75 (4.09)	0–12
Item 8: Pain while turning in bed	3.99 (4.69)	0–12
Item 9: Pain when chewing	0.97 (2.35)	0–12
Item 10: Pain due to grinding teeth	1.05 (2.71)	0–12
Item 11: Burning mouth syndrome	0.85 (2.20)	0–12
Item12: Burning pain in the limbs	2.22 (3.48)	0–12
Item 13: Lower abdominal pain	1.28 (3.00)	0–12
Item 14: Shooting pain/pins and needles	2.86 (3.00)	0–12
Domain 1: Musculoskeletal pain	5.28 (4.14)	0–12
Domain 2: Chronic pain	3.98 (6.12)	0–24
Domain 3: Fluctuation-related Pain	6.69 (8.67)	0–33
Domain 4: Nocturnal Pain	6.90 (7.42)	0–24
Domain 5: Oro-facial Pain	2.90 (5.06)	0–27
Domain 6: Discoloration; Oedema/swelling	3.50 (5.31)	0–24
Domain 7: Radicular Pain	3.77 (8.03)	0–12
Total	32.92 (31.08)	0–123

A-KPPS: Arabic King's PD Pain Scale.

Table 3. Exploratory factor analysis of the A-KPPS ($n = 103$).

	Factor 1	Factor 2	Factor 3	
Item	Somatic pain	Visceral and burning pain	Orofacial pain	Communalities
Item 7: PLM or RLS-associated pain	**0.791**	−0.039	0.258	0.694
Item 2: Pain deep within the body	**0.764**	0.137	−0.004	0.603
Item 1: Pain around joints (musculoskeletal)	**0.726**	0.070	−0.090	0.540
Item 4: Dyskinetic pain	**0.574**	0.420	0.000	0.505
Item 6: Generalized "off" period pain	**0.528**	0.170	0.142	0.328
Item 5: "Off" dystonia in a region	**0.494**	0.350	0.291	0.451
Item12: Burning pain in the limbs	**0.449**	0.406	0.236	0.423
Item 13: Lower abdominal pain	−0.046	**0.859**	0.062	0.744
Item 3: Pain related to internal organ	0.296	**0.803**	−0.014	0.733
Item 11: Burning mouth syndrome	0.175	**0.461**	0.430	0.428
Item 10: Pain due to grinding teeth	−0.126	−0.052	**0.759**	0.594
Item 9: Pain when chewing	0.107	0.115	**0.646**	0.441
Item 14: Shooting pain/pins and needles	0.450	0.055	**0.504**	0.459
Item 8: Pain while turning in bed	0.467	0.373	**0.476**	0.584

Loading in bold represents the factors to which the items are assigned.
A-KPPS: Arabic King's PD Pain Scale.

Table 4. Correlations between A-KPPS total score and other outcomes.

	r	*p* Value
BPI-Pain interference	0.44	<0.001
BPI-Pain severity	0.33	0.002
HADS-Depression	0.49	<0.001
HADS-Anxiety	0.50	<0.001
MDS-UPDRS-Part III total score	0.32	0.002
EQ-5D-5L health state	−0.45	<0.001
EQ-5D-L5 pain subscale	0.41	0.002

MDS-UPDDRS: Movement Disorders Society - Unified Parkinson's Disease Rating Scale, A-KPPS: Arabic King's PD Pain Scale, BPI: Brief Pain Inventory, HADS: Hospital Anxiety and Depression Scale, EQ-5D: European Quality of Life-5 Dimensions- 5 Levels.

and parallel analysis showed that three factors should be retained. The three factors explained 53.76% of the A-KPPS variation and were labelled as the following: "somatic pain factor" = 33.70%, "Visceral and burning pain" =10.31%, and "Orofacial pain" = 9.75% (Table 3).

In term of the convergent validity, our results showed low to moderate correlation between A-KPPS and BPI pain interference ($r = 0.44$, $p < 0.001$), BPI pain severity ($r = 0.33$, $p = 0.002$), HADS-Depression ($r = 0.49$, $p = 0.002$), HADS-Anxiety ($r = 0.50$, $p < 0.001$), EQ-5D pain ($r = 0.412$, $p = 0.002$), and MDS-UPDRS Part III total score ($r = 32$, $p = 0.002$). The A-KPPS and EQ-5D-5L health state were negatively correlated (r=−0.45, $p < 0.001$) (Table 4).

In term of reliability, no significant differences were noted between week 1 and week 2 in the A-KPPS total score. The ICC was 0.9 and the MDC_{95} was 24.66 points (Table 5).

Discussion

The aim of this study was to provide an Arabic cross-cultural adaptation and translation of the KPPS and to investigate the clinimetric properties of the adapted KPPS. The results of the study demonstrate that the A-KPPS has moderate to good validity and reliability compared to the original English version and other translated versions. The Cronbach's α of the scale (α = 0.84) indicates an acceptable internal consistency for the A-KPPS with no significant change following the deletion of any item. This is close to the Cronbach's α calculated in the original English version (α = 0.78), Bulgarian version (α = 0.75), Turkish version (α = 0.82), and Persian version (α = 0.88) [9,11,12,15]. The A-KPPS showed good test-retest reliability, which is comparable to previous versions, including the original English version, the Bulgarian, Turkish, Indian, and the Persian versions [9,11–13,15]. In addition, there was no significant difference between the assessments across the two time points suggesting stability and low variation between the test- and re-test assessments.

In the present study, the mean scores of the A-KPPS pain domains were mostly similar to what was reported in the original English language and other versions [9,15]. However, the following domains were significantly higher in the Arabic version compared to the English and Bulgarian versions: orofacial pain, discoloration; oedema/swelling, and radicular pain [9,15]. This resulted in a higher total mean score of the A-KPPS compared to previous versions. We argue that compared to previous versions, the high incidence of these pain domains reported in this study sample might be related to the higher mean score of the UPDRS-part III reported. A recent review showed that motor complications are significant predictors of pain in the PD population [31]. In addition, as 30.8% of this study sample were females [32], this might further have resulted in a high incidence of pain reporting and specifically for orofacial pain, as it was previously found to be prevalent among female PD individuals compared to males [33]. Large scale future studies are needed to verify these conclusions.

The current study investigated the convergent validity of the A-KPPS with factors commonly associated with pain. Moderate, significant associations between A-KPPS and measures of depression ($r = 0.49$; $p < 0.001$), anxiety ($r = 0.502$; $p < 0.001$), pain interference ($r = 0.449$; $p < 0.001$) and quality of life ($r = 0.412$; $p = 0.002$) were found. Our findings were similar to those in the KPPS English version [9,34], in which significant associations were found between the KPPS and measures of quality of life, depression, anxiety, and pain. Our findings were also in agreement with previous translated versions including the Bulgarian, Persian, and Turkish [11,12,15]. However, lower correlations were found between the A-KPPS and the BPI pain severity score ($r = 0.33$, $p = 0.002$) and the EQ-5D (r=−0.45, $p < 0.001$). The weaker correlations may be explained by the fact that the KPPS, BPI, and EQ-5D assesses pain over different periods of time. The BPI enquires about pain during the previous week, and the KPPS enquires about pain during the previous month. The EQ-5D on the other hand only assesses pain on the day of data collection, not over a previous period. Also, the BPI includes a section assessing how fear of pain interferes with daily functioning, whereas the KPPS does not. It should also be mentioned that the BPI and KPPS measure different constructs of pain. The BPI evaluates the severity of pain, and impact of this pain on daily functioning [35] while the KPPS assesses pain localization, intensity and frequency in people with PD(9). The A-KPPS was also

Table 5. Analysis for test-retest reliability ($n = 35$).

	Week 1	Week 2	Differences between Week 1 and Week 2					
Outcome	Mean (SD)	Mean (SD)	Mean (SD)	*p* Value	ICC	ICC (95% CI)	SEM	MDC_{95}
A-KKPS total score	28.34 (29.59)	27.03 (28.06)	−1.31 (12.64)	0.54	0.90	0.81 to 0.95	8.90	24.66

A-KPPS: Arabic King's PD Pain Scale, ICC: Intra Class Correlation Coefficient, SEM: Standard Error of Measurement, MDC_{95}: Minimal Detectable Change.

weakly correlated with motor impairments ($r = 0.32$, $p = 0.002$) which can be compared to the results found in the Indian version [13], where no correlation was found between UPDRS part III and the KPPS. This might also be explained by the lower total mean score of the UPDRS-Part III in the Indian version (15.89 ± 13.79) [13] compared to this study.

Our results revealed the presence of a floor effect for all the individual domains in the KPPS, but not for the total score. In addition, we found no ceiling effect for either the individual domains or the total score. These results are similar to those found in the international validation of the original English and Persian versions of the KPPS [9,12]. The floor effect observed in each of the domains is likely due to a low prevalence of these individual types of pain in our sample, as shown in the results. It must be noted that data were collected during the 'on-phase', which may have interfered with the detection of pain symptoms and severity for specific items within the BPI (such as "Please rate your pain by circling the one number that tells you how much pain you have right now"). This may have resulted in the presence of floor effects. Based on these results, and on the population in question, we therefore recommend using the total KPPS score when using the Arabic version among patients with PD.

Our exploratory factor analysis revealed three factors (somatic pain, visceral and burning pain, orofacial pain) which explained 53.76% of the variation in our sample. This is less than the four factors found in the original English KPPS version, and the Persian version [9,12]. However, our three factors were similar to three factors in the previous version: factor that measure interval pain, factor that measured musculoskeletal and limb pain, and factor that measured orofacial pain. Only items associated with the pain associated with fluctuation-states in PD (4, 5, and 6) were loaded on the somatic pain factor. This classification of pain symptoms might therefore offer an alternative way of analyzing pain among the PD population using the A-KPPS. The result of the explanatory factor analysis showed that all the translated A-KPPS items were represented in factors that show the structure of the scale. However, a confirmatory factor analysis is required to confirm the structure of the A-KPPS.

There are some limitations to the current study. Our findings cannot be generalized to those with severe forms of PD, as most of the study sample had mild to moderate disease severity. The A-KPPS was completed by 103 participants, however, due to data missing from participants on the other scales, we were only able to include 50 participants in the analysis. These other scales were however used for correlation with the A-KPPS and the sample was therefore sufficient to run the correlation analysis. In addition, the lack of a comparable control group limited the interpretation of our findings. Since no previous study calculated the MDC_{95} for this scale, it was difficult to compare our data with previous studies. We do however acknowledge that the MDC_{95} is fairly large (24.66) which may indicate that the sensitivity of the A-KPPS for evaluating treatment effects can be limiting. Lastly, the fact that the data for this study were collected from participants during the 'on-phase' may have limited the detection of pain symptoms and their severity for the EQ-5D and some items in the BPI. Future studies are warranted to compare data across the 'on' and 'off' phases of PD.

Conclusions

Translating the KPPS into the Arabic language will facilitate the wide use of this measure among Arabic-speaking PD populations and hence allow for reliable information gathering regarding pain in this population. The current study translated, cross-culturally adapted, and validated the Arabic version of the KPPS. The findings showed that the A-KPPS is a valid and reliable tool for assessing pain in the PD population. However, since the A-KPPS' sensitivity to detect meaningful change is limited, we recommend the use of the A-KPPS with caution in research and clinical settings for assessment of pain and for monitoring therapeutic management interventions targeting pain among people with PD.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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ORCID

Nesreen Alissa http://orcid.org/0000-0002-7677-2694
Hanan Khalil http://orcid.org/0000-0001-7741-8892
Mayis Aldughmi http://orcid.org/0000-0002-5666-0441
Linzette Morris http://orcid.org/0000-0002-2384-9707
Khalid El-Salem http://orcid.org/0000-0002-8163-5256

Data availability statement

The data that support the findings of this study are available from the corresponding author, HK, upon reasonable request.

References

[1] Ha AD, Jankovic J. Pain in parkinson's disease. Mov Disord. 2012;27(4):485–491.
[2] Ford B. Pain in parkinson's disease. Mov Disord. 2010;25(S1): s98–S103.
[3] Antonini A, Tinazzi M, Abbruzzese G, et al. Pain in parkinson's disease: facts and uncertainties. Eur J Neurol. 2018;25(7):917–e69.

[4] Defazio G, Berardelli A, Fabbrini G, et al. Pain as a nonmotor symptom of parkinson disease: evidence from a case-control study. Arch Neurol. 2008;65(9):1191–1194.
[5] Chaudhuri KR, Healy DG, Schapira AH, National Institute for Clinical Excellence Non-motor symptoms of parkinson's disease: diagnosis and management. Lancet Neurol. 2006;5(3):235–245.
[6] Pfeiffer RF. Non-motor symptoms in parkinson's disease. Parkinsonism & Related Disorders. 2016;22:S119–S122.
[7] Silva E, Viana MA, Quagliato EMAB. Pain in parkinson's disease: analysis of 50 cases in a clinic of movement disorders. Arq Neuropsiquiatr. 2008;66(1):26–29.
[8] Martinez-Martin P, Rizos AM, Wetmore J, et al. First comprehensive tool for screening pain in parkinson's disease: the king's parkinson's disease pain questionnaire. Eur J Neurol. 2018;25(10):1255–1261.
[9] Chaudhuri KR, Rizos A, Trenkwalder C, et al. King's parkinson's disease pain scale, the first scale for pain in PD: an international validation. Mov Disord. 2015;30(12):1623–1631.
[10] Perez-Lloret S, Ciampi de Andrade D, Lyons KE, et al. Rating scales for pain in parkinson's disease: critique and recommendations. Mov Disord Clin Pract. 2016;3(6):527–537.
[11] Soyuer F, Gültekin M, Cankurtaran F, et al. Reliability and validity of the turkish version of king's parkinson's disease pain scale. Neurol Sci Neurophysiol. 2020;37(2):57.
[12] Taghizadeh G, Joghataei MT, Goudarzi S, et al. King's parkinson's disease pain scale cut-off points for detection of pain severity levels: a reliability and validity study. Neurosci Lett. 2021;745:135620.
[13] Behari M, Srivastava A, Achtani R, et al. Pain assessment in indian parkinson's disease patients using king's parkinson's disease pain scale. Ann Indian Acad Neurol. 2020;23(6):774–780.
[14] Jost W, Rizos A, Odin P, et al. King's parkinson's disease pain scale: intercultural adaptation in the german language. Nervenarzt. 2018;89(2):178–183.
[15] Stoyanova-Piroth G, Milanov I, Stambolieva K. Translation, adaptation and validation of the bulgarian version of the king's parkinson's disease pain scale. BMC Neurol. 2021;21(1):8.
[16] Coimbra MR, Almeida-Leite CM, de Faria-Fortini I, et al. King's parkinson's disease pain scale (KPPS): cross-cultural adaptation to Brazilian portuguese and content validity. Clin Neurol Neurosurg. 2021;208:106815.
[17] Noack R, Gamio L. The world's languages, in 7 maps and charts'. The Washington Post, April 23, 2015.
[18] Portney LG, Watkins MP. Foundations of clinical research: applications to practice. Pearson/Prentice Hall. Saddle River (NJ). 2009.
[19] Ballout S, Noureddine S, Huijer HA-S, et al. Psychometric evaluation of the arabic brief pain inventory in a sample of lebanese cancer patients. J Pain Symptom Manage. 2011;42(1):147–154.
[20] Goetz CG, Tilley BC, Shaftman SR, et al. Movement disorder society-sponsored revision of the unified parkinson's disease rating scale (MDS-UPDRS): scale presentation and clinimetric testing results. Mov Disord. 2008;23(15):2129–2170.
[21] Herdman M, Gudex C, Lloyd A, et al. Development and preliminary testing of the new five-level version of EQ-5D (EQ-5D-5L). Qual Life Res. 2011;20(10):1727–1736.
[22] Terkawi AS, Tsang S, AlKahtani GJ, et al. Development and validation of arabic version of the hospital anxiety and depression scale. Saudi J Anaesth. 2017;11(5):11.
[23] McHorney CA, Tarlov AR. Individual-patient monitoring in clinical practice: are available health status surveys adequate? Qual Life Res. 1995;4(4):293–307.
[24] Kaiser HF. An index of factorial simplicity. psychometrika. 1974;39(1):31–36.
[25] Stevens JP. Applied multivariate statistics for the social sciences. New York (NY): Routledge; 2012.
[26] Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med. 2016;15(2):155–163.
[27] Schuck P, Zwingmann C. The 'smallest real difference'as a measure of sensitivity to change: a critical analysis. Int J Rehabil Res. 2003;26(2):85–91.
[28] Terwee CB, Bot SD, de Boer MR, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60(1):34–42.
[29] Bujang MA, Omar ED, Baharum NA. A review on sample size determination for cronbach's alpha test: a simple guide for researchers. Malays J Med Sci. 2018;25(6):85–99.
[30] Schmitt N. Uses and abuses of coefficient alpha. Psychol Assess. 1996;8(4):350–353.
[31] Buhmann C, Ip CW, Oehlwein C, et al. Parkinson disease and pain-diagnostic and therapeutic approaches to a challenging non-motor symptom. Fortschr Neurol Psychiatr. 2018;86 (S 01):S48–S58.
[32] O'Neill F, Kobylecki C, Carrasco R, et al. Orofacial pain in 1916 patients with early or moderate parkinson disease. PR9. 2021;6(1):e923.
[33] Zella MAS, May C, Müller T, et al. Landscape of pain in parkinson's disease: impact of gender differences. Neurol Res. 2019;41(1):87–97.
[34] Rodríguez-Violante M, Alvarado-Bolaños A, Cervantes-Arriaga A, et al. Clinical determinants of parkinson's disease-associated pain using the king's parkinson's disease pain scale. Mov Disord Clin Pract. 2017;4(4):545–551.
[35] Poquet N, Lin C. The brief pain inventory (BPI). J Physiother. 2016;62(1):52.