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Rating Scales for Pain in Parkinson's Disease: Critique and Recommendations

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Abstract: **Background:** We aimed at critically appraising the clinimetric properties of existing pain scales or questionnaires and to give recommendations for their use in Parkinson's disease (PD).

Methods: Clinimetric properties of pain scales used in PD were systematically evaluated. A scale was classified as 'recommended' if was used in PD, showed adequate clinimetric properties, and had been used by investigators other than the original developers; as 'suggested' if it was used in PD and fulfilled only one other criterion; and as 'listed' if it was used in PD but did not meet the other criteria. Only scales rating pain intensity or for syndromic classification were assessed.

Results: Eleven of the 34 scales initially considered fulfilled inclusion criteria. Among the scales rating pain intensity, the "Brief Pain Inventory short form," "McGill Pain Questionnaire short and long forms," "Neuropathic Pain Symptoms Inventory," "11-point Numeric Rating Scale," "10-cm Visual Analog Scale," and "Pain-O-Meter" were "recommended with caution" because of lack of clinimetric data in PD, whereas the "King's PD Pain Scale" was "recommended." Among scales for pain syndromic classification, the "DN4" was "recommended with caution" because of lack of clinimetric data in PD; the "Leeds Assessment of Neuropathic Symptoms and Signs," "Pain-DETECT," and the "King's PD Pain Scale" were "suggested."

Conclusions: King's PD pain scale can be recommended for the assessment of pain intensity in PD. Syndromic classification of pain in PD may be achieved by the DN4, but clinimetric data in PD are needed for this scale.

Parkinson's disease (PD) has been classically predominantly regarded as a movement disorder, although many nonmotor symptoms (NMSs) were originally described by James Parkinson in the 19th century.[1] Nonetheless, our vision of the disease has considerably evolved during the last decades, and NMSs and their management are now recognized as important unmet needs in PD.[2]

Pain is a frequent NMS in PD, contributing significantly to disability and reduced health-related quality of life.[3] It affects around 67.6% (range = 40%–85%) of PD patients[4] versus 15% to 30% of the general population.[5,6] The most frequent pain syndromes in PD are musculoskeletal pain, neuropathic radicular pain, dystonia-related pain, akathitic discomfort, and primary central parkinsonian pain.[7] Other classification systems have also been proposed.[8]

Pain is a percept, with sensory-discriminative (i.e., quality, intensity, temporal pattern, and location), affective-motivational,

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and cognitive dimensions. From the temporal perspective, it can be classified into "acute" or chronic (i.e., lasting more than 3 months). Chronic pain is frequently subdivided into different pain syndromes, the two most frequent examples being "nociceptive" and "neuropathic" pain.[9] Whereas assessment of pain can be simple and straightforward in acute cases after trauma or surgery, long-lasting pain may be more challenging to assess and treat.[10] Comprehensive assessment includes complete pain history, physical examination, and possibly specific diagnostic tests. Tools such as scales and questionnaires offer inexpensive and convenient ways to characterize pain in clinical practice. Each tool has specific characteristics and can be used to screen, assess, characterize, and rate the intensity of different pain syndromes, as well as their different dimensions and interference in daily living. Given that most pain dimensions can only be assessed by means of rating scales, the importance of having well-validated tools cannot be underestimated.

The objective of this review was to appraise critically the general characteristics and clinimetric properties of pain scales or questionnaires and give recommendations for their use in PD.

Materials and Methods

Administrative Organization and Critique Process

The Internatrional Parkinson and Movement Disorder Society (MDS) Committee on Rating Scales Development Steering Committee invited the chairperson (S.P.LL.) to form a Writing Committee and review rating scales for pain in PD. The committee included specialists in movement disorders, pain, and clinimetric assessment from America and Europe (D.C.A., K.L., K.R.C., G.D., and G.C.). Committee members began by listing all available scales for pain assessment. Then, the scales for further assessment were selected based on the criteria described below. Finally, each member was charged with assessing specific scales, by using a standardized evaluation form. These forms were then re-evaluated by an expert in clinimetric assessment (C.R.B.). Finally, members reviewed results for all scales, and conclusions and recommendations were proposed. The final report was reviewed and approved by the MDS Committee on Rating Scales Development.

Literature Search Strategy and Selection of Scales

A systematic search was conducted by PubMed between 1960 and 2015 using the combined MeSH search terms "PAIN" and "PARKINSON'S DISEASE" written in English, Spanish, French, German, and Portuguese. The references of the articles retrieved were also systematically searched for other pain rating scales. A similar search strategy was then used to search for studies involving each particular scale. Only data on the original scale were considered, that is, data gathered with scales' translations to other languages were not considered.

To be selected, a scale had to have been used in PD and to either rate pain intensity or allow pain syndromic classification (i.e., nociceptive or neuropathic). Scales that assessed pain intensity or syndromic classification in the context of a multidimensional assessment were not included.

Evaluation of Clinimetric Properties

We focused on assessments of pain intensity and syndromic classification. Assessment of symptom localization, which is usually done with a body map, has never been validated. Other pain dimensions, such as cognitive, affective, or sensory, have not been assessed in PD by any of these scales and thus are not a focus of this review. The evaluation was performed according to the methodology approved by the MDS Committee on Rating Scale Development.[11]

Conclusions

A scale was rated as "recommended" if it was used in PD; reliability, validity, and sensitivity to change (responsiveness) were considered as "adequate" or "adequate but incompletely assessed"; and was used by investigators other than the original developers. In the case of lack of validation in PD, scales could only be "recommended with caution." "Adequate" reliability, validity, or responsiveness were considered when at least one well-designed study showed significant inter- and/or intrarater reliability, criterion and/or construct validity, and sensitivity to change, respectively. "Adequate but incompletely assessed" was considered when only small details were lacking in the evaluations, which did not affect the overall assessment.

Scales rated as "suggested" were used in PD and either succeeded clinimetric evaluation or were used by investigators other than the original developers. Finally, "listed" scales were those used in PD but not meeting any other criteria.

Results

Thirty-four scales were initially considered for possible inclusion in this review (Appendix SA). Only 11 scales met inclusion criteria and were thus further evaluated (Table 1). A summary of the general characteristics and clinimetric properties is presented for each scale in the following paragraphs. Detailed evaluations are available in Appendix SB.

Brief Pain Inventory Short Form

Description of the Scale

The scale allows for the evaluation of the presence of pain other than everyday pain, such as minor headaches, sprains, and toothaches; pain intensity and interference with activities of

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TABLE 1 Dimensions of pain assessed in PD by the scales included in this review

	Pain Intensity	Syndrome Type	Localization	Cognitive, Affective, and Sensory Dimensions	Other Evaluations
BPI short form	X		X		Interference with activities, pain relief from treatment
DN4		X			
King's PD Pain scale	X	X			
LANSS		X			
McGill Pain Questionnaire long form	X		X	X	Change with time
McGill Pain Questionnaire short form	X		X	X	
NPSI	X				
NRS and VAS	X				
PainDETECT	X	X	X		Time course
Pain-O-Meter	X		X		

daily living (multiple 11-point scales ranging from 0 to 10); pain localization (body map); and relief from treatments (11-point scale ranging from 0 to 10).[12] Overall pain intensity or interference subscores can be obtained by averaging the respective items. The scale is self-administered, time frame is 24 hours, and time to complete the scale is 5 to 10 minutes.

Clinimetric Properties

Assessments focused on pain intensity ratings (Table 2). They were considered as adequately reliable based on results showing good internal consistency[13,14] and test-retest reliability.[15–17] Validity was successfully established by comparing Brief Pain Inventory (BPI) scores with the Roland-Morris Disability Questionnaire, the Western Ontario and McMaster Universities Osteoarthritis Index Pain, stiffness and physical conditions scores, visual analog scale (VAS) scores, and with 36-Item Short Form Health Survey (SF-36) Bodily Pain score in cancer and noncancer patients.[14,16,18,19] Additionally, the BPI could discriminate between patients with or without improvements after analgesic therapies,[14,16] thus suggesting adequate responsiveness. The scale has been used, but not validated, in PD.[20–27] However, adequate responsiveness was observed in a trial with duloxetine.[22]

Strengths and Weaknesses

The BPI is frequently used in clinical practice and research because of its simplicity and shortness. It is available in many languages, and clinimetric properties have been adequately assessed. Interference scores may be confounded by other impairments inherent to PD.

Conclusions

The BPI short form is "recommended with caution" for the assessment of pain intensity in PD, given that it meets most criteria but has not been validated for use in PD (Table 3).

Douleur Neuropathique 4

Description of the Scale

The Douleur Neuropathique 4 (DN4) is a tool used to screen for the presence of neuropathic pain or of the neuropathic component of mixed pain syndromes.[28] It consists of a scale with 10 items divided into four sections. Two sections rely on an interview with the patient (pain characteristics and related symptoms), and two are based on clinical examination (presence of hypoesthesia and painful response to brushing). Four or more positive answers suggest neuropathic pain. It has been used to evaluate pain at the moment of evaluation or retrospectively. The questionnaire can be completed in a few minutes and is available in many languages.

Clinimetric Properties

Inter-rater and test-retest reliability were found to be adequate (Table 2).[28] Results from the scale could correctly discriminate between patients with nociceptive or neuropathic pain, suggesting its validity.[28,29] Responsiveness evaluation is not applicable to this questionnaire, given that it does not reflect a magnitude susceptible to change. The scale has been used in PD,[21] but clinimetric properties have not been assessed in this population.

Strengths and Weaknesses

This questionnaire is easy to use and understand, fast, objective, shows good sensitivity and specificity, and is internationally recommended as an optimal tool for differentiating neuropathic from nociceptive pain.[30] Its main disadvantage is that a clinician is needed to complete assessment.

Conclusions

The DN4 is "Recommended with caution" for the syndromic classification of pain in PD, given that it meets most of criteria, except validation in PD (Table 3).

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King's PD Pain Scale

Description of the Scale

This scale was specifically designed for pain assessment in PD.[31] The scale is composed of 14 questions exploring the frequency and severity of different pain syndromes that are frequently observed in PD patients, which can be summed to form an overall pain intensity score. Each item is scored by severity (0–3) multiplied by frequency (0–4), resulting in a subscore of 0 to 12, with a total possible score range from 0 to 168. Pain domains are: musculoskeletal, chronic, fluctuation-related, nocturnal, oro-facial, discolouration/swelling, and radicular. Time frame is the previous month, and the scale must be completed by a trained health care professional. Completion time is around 10 minutes.

Clinimetric Properties

Clinimetric data are available in PD patients only for overall pain intensity ratings (Table 2). Internal consistency and inter-rater and test-retest reliability are adequate.[31] Validity has been suggested by the findings of moderate correlations with pain items from the EuroQol–5 dimensions (EQ-5D), 8-Item Parkinson's Disease Questionnaire, and Non-motor Symptoms Scale.[31] Moderate-to-strong correlations were also found with measures of PD severity, quality of life, and mood disorders. King's PD pain scale has been recently used in two international multicenter, randomized, controlled trials that assessed the efficacy for pain of rotigotine transdermal patch (DOLORES study)[32] or Prolonged-release oxycodone-naloxone (PANDA study).[33] In the DOLORES trial, 68 patients with PD on levodopa and at least moderate PD-associated chronic pain were recruited and followed up for up to 12 weeks. Patients received either placebo (n = 30) or rotigotine transdermal patch up to 16 mg/day. King's PD pain scale was a secondary outcome. A 2-fold numerical improvement in domain "fluctuation-related pain" favoring rotigotine was observed. The PANDA study enrolled 202 PD patients with H & Y stage II to IV and at least one type of severe pain, 93 of whom were assigned to oxycodone-naloxone and 109 to placebo. Follow-up was 16 weeks. King's PD pain scale was also used a secondary outcome. Post-hoc analyses showed that the percentage of patients with severe pain decreased from baseline to

TABLE 2 Assessment of clinimetric parameters of pain rating scales

	Feasibility	Acceptability	Item Scaling	Internal Consistency	Reproducibility	Validity	Responsiveness	Interpretability
Scales rating pain intensity								
BPI short form	+	+	+	+	+	+	+	N/E
King's PD Pain scale	+	+	N/E	+	+	+	+	N/E
McGill long form	+	+	+	N/E	+	+	+	N/E
McGill short form	+	+	+	+	+	+	+	+/–
NPSI	+	+/–	+	N/A	+	+	+	N/E
NRS	+	+	N/A	N/A	+	+	+	+
Pain-O-Meter	+	+/–	+/–	N/A	+	+	+	N/E
VAS	+	+	N/A	N/A	+	+	+	+
Scales for syndromic classification								
DN4	+	N/E	N/E	N/E	+	+	N/A	N/A
King's PD Pain Scale	+	+	N/E	+	+	N/E	N/A	N/A
LANSS	+	N/E	+/–	+	N/E	+/–	N/A	N/A
PainDETECT	+	N/E	N/E	+	N/E	+/–	N/A	N/A

+ = adequate; – = inadequate; +/– = adequate but incomplete evaluation.
N/E, not evaluated; N/A, not applicable.

TABLE 3 Recommendation for pain rating scales in PD

	Use in PD	Use by Multiple Investigators	Adequate Clinimetric Assessment	Validated in PD	Conclusion
Scales rating pain intensity					
BPI short form	X	X	X	—	Recommended with caution
King's PD Pain Scale	X	X	X	X	Recommended for pain intensity rating
McGill Pain Questionnaire long form	X	X	X	—	Recommended with caution
McGill Pain Questionnaire short form	X	X	X	—	Recommended with caution
NPSI	X	X	X	—	Recommended with caution
NRS	X	X	X	—	Recommended with caution
Pain-O-Meter	X	X	X	—	Recommended with caution
VAS	X	X	X	—	Recommended with caution
Scales for syndromic classification					
DN4	X	X	X	—	Recommended with caution
King's PD Pain Scale	X	X	—	—	Suggested for syndromic aspects
LANSS	X	X	—	—	Suggested
PainDETECT	X	X	—	—	Suggested

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16 weeks for all pain types in both treatment groups. Significant improvements with active treatments were registered for "musculoskeletal" or "nocturnal" pains.

Strengths and Weaknesses

This PD-specific scale offers a simple and convenient way of assessing the frequency and intensity of the most commonly observed pain syndromes in the disease. It is the only scale with adequate clinimetric assessment in PD. Its main weakness is that some nosological entities may not be accurately represented. For example, the characterization of visceral body pain by the body location where it hurts may not be adequate. Additionally, raters need to be trained to recognize nosological categories covered by the scale given that they are only succinctly described in the scoring sheet.

Conclusions

The King's PD Pain Scale is "recommended" for the assessment of pain intensity in PD, given that it fulfills all criteria (Table 3). On the other hand, it is "suggested" for the syndromic classification of pain in PD because it has not been adequately validated.

Leeds Assessment of Neuropathic Symptoms and Signs

Description of the Scale

The Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) scale was designed to evaluate pain syndrome type.[34] It is comprised of two parts, the first one being a pain questionnaire with five self-administered questions (unpleasant sensations, skin appearance, sensitivity to touch, pain feelings, and skin temperature) and the second one a sensory testing consisting of two items (allodynia, altered pinprick threshold) to be conducted by a physician. Positive answers give a certain quantity of points depending on the question, totaling 24 points. Pain of a predominantly neuropathic origin is diagnosed with values ≥12. Time frame is the previous week, and it takes 5 to 10 minutes to complete the scale. There are some translations into other languages. Although a self-administered LANSS has been validated, it has not been used in PD patients.

Clinimetric Properties

Internal consistency was shown to be good, but reliability has not been assessed (Tables 2).[34] The LANSS scale was able to discriminate between groups of patients with a clinical diagnosis of nociceptive or neuropathic pain.[34] Evaluation of responsiveness is not applicable to this scale, given that it does not reflect a magnitude susceptible to change. The LANSS has been used, but not validated, in PD.[35]

Strengths and Weaknesses

The LANSS is short and easy to use. Its principal weakness is the need of a clinician for a physical exam.

Conclusions

The LANSS is "suggested" for the syndromic classification of pain in PD because of scarce clinimetric data (Table 3).

McGill Pain Questionnaire Long Form

Description of the Scale

The questionnaire can be used to characterize the different dimensions of pain and is comprised of four parts.[36] The first part is a body map used for localizing pain. In the second part, patients are asked to disclose pain-related feelings by selecting the appropriate words. The list has 20 items, each containing two to six descriptors, dealing with sensory (1–10), affective (11–15), evaluative (16), and miscellaneous (17–20) aspects of pain. The third part evaluates changes over time; and finally the fourth part characterizes pain intensity. The scale was intended to measure pain at the time of the assessment, but various studies have amended this for retrospective assessment. Completion can take up to 30 minutes. The questionnaire is available in a great number of languages and is self-administered.

Clinimetric Properties

Test-retest reliability has been shown to be acceptable (Table 2).[37] Internal consistency has also been demonstrated.[38] McGill subscores correlated with VAS measures of pain,[39,40] thus supporting its validity. It has also been shown that the McGill scale can differentiate between type and cause of pain.[38,41] The scale subscores were also found to be sensitive to change.[36,38] The McGill Pain Questionnaire has been used in PD only for pain intensity assessment.[42–44] No clinimetric data in this population are available.

Strengths and Weaknesses

The McGill Pain Questionnaire provides a qualitative measure of pain as well as a measure of pain intensity. It is widely used and translated and often referred to as the gold standard for pain measurement. On the other hand, it is a time-consuming scale, and all patients may not understand some words or may have difficulty qualifying pain with the words provided.

Conclusions

The McGill Pain Questionnaire long form is "recommended with caution" for the assessment of pain intensity in PD, given

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that it meets most of the criteria, except validation in PD (Table 3).

McGill Pain Questionnaire Short Form

Description of the Scale

This is a shortened version of the McGill Pain Questionnaire.[45] It is comprised of 15 words describing different aspects of pain (the first 11 words represent the sensory dimension and the four remaining ones the affective dimension). Patients are asked to rate whether the word describes their pain, and if it does, then they indicate the intensity on a scale of 0 to 3. Present pain intensity is rated from 0 to 5, and a VAS is also available. The time frame is the previous 24 hours, and the scale can be completed in 5 to 10 minutes. The scale is available in a great number of languages.

Clinimetric Properties

Internal consistency of affective and sensory components was found to be from moderate to good in different studies (Table 2).[46,47] Test-retest reliability was reported to be high.[48] The sensory, affective, and total scores of the short and long forms were highly correlated before and after an intervention for postsurgical, labor, and musculoskeletal pain,[45] thus suggesting its validity. As observed with the long form, the short form was able to differentiate pain profiles. Finally, the McGill short form was sensitive to change.[45] The McGill short form has been used in PD[38,49,50] and was partially validated. One study found that the pain score was different between PD patients and controls.[51] Sensitivity to change after an analgesic treatment course was shown in another study.[22]

Strengths and Weaknesses

The short form is easier and quicker than the long form. It has the same disadvantages as the long form regarding the comprehensibility of words.

Conclusions

The McGill Pain Questionnaire short form is "recommended with caution" for the assessment of pain intensity in PD, given that it meets most criteria but has not been fully validated for use in PD (Table 3).

Neuropathic Pain Symptom Inventory

Description of the Scale

The Neuropathic Pain Symptom Inventory (NPSI) aims at characterizing the severity of the different types of neuropathic pain.[52] The scale is comprised of 10 items forming five subscores (burning pain, pressing pain, paroxysmal pain, evoked pain, and paresthesias/dysesthesias) that can be added to form a total score. Two extra items provide temporal pattern of the symptoms. All items are rated on an 11-point scale ranging from 0 to 10. Time frame is 24 hours, the scale is self-administered, and it can be completed in less than 10 minutes. There are validated translations into different languages.

Clinimetric Properties

The scale has adequate short- and long-term test-retest reliability (Table 2).[52] Validity for the three items related to evoked pain was established by comparing answers with physical examination.[52] Additionally, intensity of brush, pressure, and cold-induced pain, as assessed by VAS scores during quantitative sensory testing correlated significantly with the scores of the corresponding questions.[53] Convergent validity was suggested by the findings of a strong correlation between the total score of the questionnaire with the rating of global pain intensity measured by a numerical scale.[52] Responsiveness was demonstrated by correlating the global impression of change of the patient and examiner after 1 month of treatment with changes of NPSI total score.[52] The NPSI has been used in PD, but only responsiveness to change has been tested.[21]

Strengths and Weaknesses

The NPSI provides the evaluation of intensity of symptoms of neuropathic pain.

Conclusions

The NPSI is "recommended with caution" for the assessment of neuropathic pain intensity in PD, given that it meets most of the criteria, except validation in PD (Table 3).

11-Point Numeric Rating Scale and 100-mm VAS

Description of the Scales

Both scales are measures of pain intensity.[10] The VAS is a 100-mm line with an anchor at each extremity: "no pain" and "worst pain." The patient is then asked to mark their pain level and the score is calculated as its distance from "no pain" (in mm). The Numeric Rating Scale (NRS) consists of 11 points (0 = "no pain" to 10 = "maximal pain"). Patients are asked to indicate which number best describes his or her pain intensity. Verbal description is also possible for the NRS, in which case is called "verbal numerical rating scale." Time frame is variable, ranging from the present time to the previous week. Both scales are widely used, take usually less than 30 seconds to be completed, and can be found as part of other questionnaires, such as the BPI or McGill short form. VAS scores might not be suitable

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for PD because some patients may have difficulties in drawing crosses because of motor symptoms of PD, but this remains to be formally tested.[54]

Clinimetric Properties

Test-retest reliability for both scales has been shown to be moderate, yet acceptable (Table 2).[55,56] A strong correlation was observed between VAS scores and verbal descriptions of pain, suggesting convergent validity.[55,57,58] Similarly, NRS scores correlated significantly with the West Haven–Yale Multidimensional Pain Inventory and SF-36 Bodily Pain.[59] NRS and VAS scores strongly correlated to one another.[55,60] Finally, NRS and VAS scores increased as temperature was reduced during a series of 20-second cold pressor trials.[61] In clinical trials, reports of pain relief were related to higher changes in NRS and VAS scores after treatment, thus suggesting adequate responsiveness.[57] These scales have been extensively used in PD and some clinimetric data are available.[3,26,54,62–69] VAS scores were higher in PD patients with pain related to the disease versus those with pain from other sources.[3] In one study, VAS back pain scores were higher in PD compared to controls,[62] but no differences were found in another study.[66] Mean, worst, and minimal pain during the month preceding the evaluation were related to EQ-5D quality-of-life score.[64] Both NRS and VAS were responsive to analgesic interventions.[54,65,67]

Strengths and Weaknesses

The VAS and NRS are simple, easy to use, well-validated measures of pain intensity. The NRS can be scored verbally, which is not possible with the VAS. Moreover, the NRS is more practical than a VAS, generally easier to understand, and does not need clear vision or dexterity, which may be particularly relevant for PD patients. The NRS is the recommended tool for assessing pain intensity in the general population.[70]

Conclusions

The NRS and VAS are "recommended with caution" for the assessment of pain intensity in PD, given that they meet most criteria, but have not been sufficiently validated for use in PD (Table 3).

Pain Detect

Description of the Scale

This scale was originally designed as a simple screening tool for neuropathic pain components in chronic low-back-pain patients.[71] It aims at assessing the intensity of the sensory components of pain (seven questions), localization of pain and radiation, pain intensity (three 11-point scales ranging from 0 to 10), and pain course pattern (four options). The questions about the sensory component can be summed and integrated with pain radiation and course to obtain a total score. The following cut-off points have been found to be the most appropriate for screening purposes: score ≤12, a neuropathic component is unlikely (< 15%); score ≥19, a neuropathic component is likely (>90%); and values in between reflecting uncertainty. Time frame is the present time, and the scale can be completed in a few minutes. The scale can be self-administered or administered by a health care professional. There are some translations to other languages, and a computerized version is also available.[72]

Clinimetric Properties

Internal consistency has been demonstrated, but reliability has not been assessed (Table 2). The scale discriminates between patients with neuropathic or nociceptive pain.[71] Responsiveness has not been evaluated. The scale has been used, but not validated, in PD.[73] The items rating pain intensity have not been used in PD.

Strengths and Weaknesses

The painDETECT is an easy to use and understand questionnaire, fast, objective, and has good sensitivity and specificity. Its main weakness is the lack of clinimetric data.

Conclusions

The painDETECT questionnaire is "suggested" for the syndromic classification of pain in PD because of scarce clinimetric data (Table 3).

Pain-O-Meter

Description of the Scale

The Pain-O-Meter aims primarily at assessing the intensity of the sensory or affective components of pain.[74] It is built on a plastic support. On one side, patients have to indicate the affective and sensory characteristics of their pain by selecting the most appropriate words (15 sensory, 11 affective) by pressing a key, and to rate pain intensity on a 100-mm line. A weighted score (range, 1–5) is assigned to each of the 26 available words and then added to obtain a total intensity score. On the other side, a body map is available and patients can indicate the time course of their pain. Time frame was not indicated in the original publication, but it has been used to evaluate pain at the moment of the evaluation or retrospectively. It is a self-administered scale and it takes around 5 minutes. There are no validated translations.

Clinimetric Properties

Both the 100-mm line pain intensity measure and sensory/affective components have shown acceptable test-retest reliability (Table 2).[74] Validity is suggested by the significant correlations between the sensory/affective score with the corresponding McGill pain intensity score and with the 100-mm line pain intensity scores.[74] Both scores decreased after analgesic

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treatments,[74,75] suggesting adequate responsiveness. It has been used, but not validated, in PD.[76]

Strengths and Weaknesses

The Pain-O-Meter is easy to use and fast to administer. It may help distinguishing pain types, but it has not been validated for this purpose. It is not frequently used in clinical practice. Its main weakness is that it is impossible to know if a word was left unmarked because it did not describe pain adequately or for another reason (i.e., missing data). Furthermore, the list of words may not represent all feelings regarding pain experience in all patients.

Conclusions

The Pain-O-Meter is "recommended with caution" for the assessment of pain intensity in PD, given that it meets most criteria, but has not been sufficiently validated for use in PD (Table 3).

Discussion

Pain in PD is a complex phenomenon, given that a wide range of painful syndromes might coexist in the same patient.[3,7,23] Therefore, clinical assessment must be exhaustive, and only appropriate tools should be used. Evaluations should establish the localization of each source of pain, assess duration and symptom profile, and evaluate intensity. In this review, we evaluated the general characteristics and clinimetric properties of pain scales and questionnaires by a standardized method, which allowed us to make recommendations regarding their use in PD.[11]

We focused on two aspects of chronic pain, namely, intensity and syndromic classification. Other characteristics, such as duration and localization, can be easily evaluated by means of direct questioning or by body maps. The tools evaluated were very heterogeneous, and thus each one had its own advantages and disadvantages. Pain scales developed for use in the general population will be discussed first, followed by PD-specific scales.

Among "recommended with caution" pain intensity scales, the NRS or VAS, and BPI, might be easier to use than those employing words for assessing intensity of the affective and sensory dimensions of chronic pain (i.e., the McGill Pain Questionnaire and Pain-O-Meter). As mentioned earlier, the NRS has been endorsed for use in the general population.[70] Therefore, among "recommended with caution" pain intensity scales, use of NRS may be preferable, given that it is more practical than a VAS, generally easier to understand, does not need clear vision or dexterity, and can be scored verbally. The only scale for the symptomatic classification of pain that was considered as "recommended with caution" was the DN4. It must be mentioned that no clinimetric data are available for this scale in the PD population. Such data are needed before their use can be more strongly endorsed.

Pain scales originally developed for use in the general population suffer from some common limitations. First of all, they do not allow for the assessment of multiple pain syndromes at the same time, which is common in PD.[3,7,23] Furthermore, they cannot differentiate pain syndromes connected directly to PD from those indirectly related or unrelated to the disease.[23] In addition, some pain syndromes observed in PD, such as central pain or pain related to motor fluctuations, might be difficult to assess with generic scales. Finally, these scales do not help differentiating pain syndromes that respond to motor treatment (either dopamine replacement therapy or DBS) from those that do not. This is an unmet need and is insufficiently addressed by existing scales.

The use of PD-specific scales might help to overcome these limitations. The King's PD Pain Scale has been recently developed to assess the frequency and severity of seven well-characterized pain syndromes frequently found in PD and can be "recommended" for the assessment of pain intensity in PD because it has been adequately validated and used by investigators other than the original developers.[31] The scale is easy to use and can be completed in 10 minutes. The King's PD Pain Scale has not been validated for the assessment of symptom profile and is thus "suggested" for this evaluation. This validation will permit the assessment of individual pain syndromes in PD. It should also be mentioned that a new PD-specific pain scale has been recently proposed[77] and is currently undergoing validation.

Our work suffered from some limitations. Only scales used in PD were reviewed, thus omitting useful scales that have not been used in PD.

In summary, recommendations were issued regarding the use of pain scales in PD, after the standardized assessment of their general characteristics and clinimetric properties. King's PD Pain Scale is the only "recommended" scale for the assessment of pain intensity in PD. Further data are needed to validate this scale for syndromic classification of pain in PD. Assessment of pain intensity might also be achieved by the NRS and syndromic classification by the DN4, but clinimetric data in PD are lacking, thus warranting further exploration.

Author Roles

(1) Research Project: A. Conception, B. Organization, C. Execution; (2) Statistical Analysis: A. Design, B. Execution, C. Review and Critique; (3) Manuscript Preparation: A. Writing of the First Draft, B. Review and Critique.

SPLL: 1B, 1C, 3A, 3B
DCA: 1C, 1B, 3B
KEL: 1C, 1B, 3B
CRB: 1C, 1B, 3B
KRC: 1C, 1B, 3B
GD: 1C, 1B, 3B
GC: 1C, 1B, 3B
CS: 1A, 1B, 3B
CG: 1A, 1B, 3B
AS: 1A, 1B, 3B
PMM: 1A, 1B, 3B
GS: 1A, 1B, 3B

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References

1. Parkinson J. An essay on the shaking palsy. 1817. *J Neuropsychiatry Clin Neurosci* 2002;14:223–236; discussion, 222.
2. Chaudhuri KR, Schapira AH. Non-motor symptoms of Parkinson's disease: dopaminergic pathophysiology and treatment. *Lancet Neurol* 2009;8:464–474.
3. Negre-Pages L, Regragui W, Bouhassira D, Grandjean H, Rascol O. Chronic pain in Parkinson's disease: the cross-sectional French DoPaMiP survey. *Mov Disord* 2008;23:1361–1369.
4. Broen MP, Braaksma MM, Patijn J, Weber WE. Prevalence of pain in Parkinson's disease: a systematic review using the modified QUADAS tool. *Mov Disord* 2012;27:480–484.
5. Juniper M, Le TK, Mladsi D. The epidemiology, economic burden, and pharmacological treatment of chronic low back pain in France, Germany, Italy, Spain and the UK: a literature-based review. *Expert Opin Pharmacother* 2009;10:2581–2592.
6. Sa KN, Baptista AF, Matos MA, Lessa I. Chronic pain and gender in Salvador population, Brazil. *Pain* 2008;139:498–506.
7. Ford B. Pain in Parkinson's disease. *Mov Disord* 2010;25(Suppl 1):S98–S103.
8. Wasner G, Deuschl G. Pains in Parkinson disease—many syndromes under one umbrella. *Nat Rev Neurol* 2012;8:284–294.
9. International Association for the Study of Pain Subcommittee on Taxonomy. Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms. *Pain* 1986;24 Suppl 1:S1–S226.
10. Breivik H, Borchgrevink PC, Allen SM, et al. Assessment of pain. *Br J Anaesth* 2008;101:17–24.
11. Sampaio C, Goetz C, Schrag A, eds. *Rating Scales in Parkinson's Disease: clinical Practice and Research*. New York: Oxford University Press; 2012.
12. Cleeland C. Measurement of pain by subjective report. In: Chapman CR, Loeser JD, eds. *Issues in Pain Measurement*, 1st ed. New York: Raven; 1989:391–403.
13. Cleeland CS, Ryan KM. Pain assessment: global use of the Brief Pain Inventory. *Ann Acad Med Singapore* 1994;23:129–138.
14. Tan G, Jensen MP, Thornby JI, Shanti BF. Validation of the Brief Pain Inventory for chronic nonmalignant pain. *J Pain* 2004;5:133–137.
15. Daut RL, Cleeland CS, Flanery RC. Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. *Pain* 1983;17:197–210.
16. Mendoza T, Mayne T, Rublee D, Cleeland C. Reliability and validity of a modified Brief Pain Inventory short form in patients with osteoarthritis. *Eur J Pain* 2006;10:353–361.
17. Mendoza TR, Chen C, Brugger A, et al. The utility and validity of the modified brief pain inventory in a multiple-dose postoperative analgesic trial. *Clin J Pain* 2004;20:357–362.
18. Keller S, Bann CM, Dodd SL, Schein J, Mendoza TR, Cleeland CS. Validity of the brief pain inventory for use in documenting the outcomes of patients with noncancer pain. *Clin J Pain* 2004;20:309–318.
19. Tittle MB, McMillan SC, Hagan S. Validating the brief pain inventory for use with surgical patients with cancer. *Oncol Nurs Forum* 2003;30:325–330.
20. Beiske AG, Loge JH, Ronningen A, Svensson E. Pain in Parkinson's disease: Prevalence and characteristics. *Pain* 2009;141:173–177.
21. Ciampi de Andrade D, Lefaucheur JP, Galhardoni R, et al. Subthalamic deep brain stimulation modulates small fiber-dependent sensory thresholds in Parkinson's disease. *Pain* 2012;153:1107–1113.
22. Djaldetti R, Yust-Katz S, Kolianov V, Melamed E, Dabby R. The effect of duloxetine on primary pain symptoms in Parkinson disease. *Clin Neuropharmacol* 2007;30:201–205.
23. Lee MA, Walker RW, Hildreth TJ, Prentice WM. A survey of pain in idiopathic Parkinson's disease. *J Pain Symptom Manage* 2006;32:462–469.
24. Rana AQ, Siddiqui I, Mosabbir A, et al. Association of pain, Parkinson's disease, and restless legs syndrome. *J Neurol Sci* 2013;327:32–34.
25. Lin XJ, Yu N, Lin XG, et al. A clinical survey of pain in Parkinson's disease in Eastern China. *Int Psychogeriatr* 2016;28:283–289.
26. Madeo G, Schirinzi T, Natoli S, et al. Efficacy and safety profile of prolonged release oxycodone in combination with naloxone (OXN PR) in Parkinson's disease patients with chronic pain. *J Neurol* 2015;262:2164–2170.
27. Rana AQ, Qureshi AR, Mumtaz A, et al. Associations of pain and depression with marital status in patients diagnosed with Parkinson's disease. *Acta Neurol Scand* 2016;133:276–280.
28. Bouhassira D, Attal N, Alchaar H, et al. Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (DN4). *Pain* 2005;114:29–36.

doi:10.1002/mdc3.12384

29. Attal N, Perrot S, Fermanian J, Bouhassira D. The neuropathic components of chronic low back pain: a prospective multicenter study using the DN4 Questionnaire. *J Pain* 2011;12:1080–1087.

30. Haanpaa M, Attal N, Backonja M, et al. NeuPSIG guidelines on neuropathic pain assessment. *Pain* 2011;152:14–27.

31. Chaudhuri RK, Rizos A, Trenkwalder C, et al. EUROPAR and the IPMDS Non Motor PD Study Group. King's Parkinson's Disease Pain Scale, the first scale for pain in PD: an international validation. *Mov Disord* 2015;30:1623–1631.

32. Rascol O, Zesiewicz T, Chaudhuri KR, et al. A randomized controlled exploratory pilot study to evaluate the effect of rotigotine transdermal patch on Parkinson's disease-associated chronic pain. *J Clin Pharmacol* 2015. doi: 10.1002/jcph.678. [Epub ahead of print]

33. Trenkwalder C, Chaudhuri KR, Martinez-Martin P, et al. Prolonged-release oxycodone-naloxone for treatment of severe pain in patients with Parkinson's disease (PANDA): a double-blind, randomised, placebo-controlled trial. *Lancet Neurol* 2015;14:1161–1170.

34. Bennett M. The LANSS Pain Scale: the Leeds assessment of neuropathic symptoms and signs. *Pain* 2001;92:147–157.

35. Hanagasi HA, Akat S, Gurvit H, Yazici J, Emre M. Pain is common in Parkinson's disease. *Clin Neurol Neurosurg* 2011;113:11–13.

36. Melzack R. The McGill Pain Questionnaire: major properties and scoring methods. *Pain* 1975;1:277–299.

37. Graham C, Bond SS, Gerkovich MM, Cook MR. Use of the McGill pain questionnaire in the assessment of cancer pain: replicability and consistency. *Pain* 1980;8:377–387.

38. Katz J, Melzack R. The McGill Pain Questionnaire: development, psychometric properties and usefulness of the long form, short form and short form-2. In: Turk DC, Melzack R, eds. *Handbook of Pain Assessment*, 3rd ed. New York: Guilford; 2011:45–67.

39. Ahles TA, Ruckdeschel JC, Blanchard EB. Cancer-related pain—II. Assessment with visual analogue scales. *J Psychosom Res* 1984;28:121–124.

40. Elton D, Burrows GD, Stanley GV. Clinical measurement of pain. *Med J Aust* 1979;1:109–111.

41. Dubuisson D, Melzack R. Classification of clinical pain descriptions by multiple group discriminant analysis. *Exp Neurol* 1976;51:480–487.

42. Lim SY, Farrell MJ, Evans AH. Parkinson's disease and pain—non-dopaminergic mechanisms are likely to be important too. *Mov Disord* 2011;26:1353–1354.

43. Lim SY, Farrell MJ, Gibson SJ, Helme RD, Lang AE, Evans AH. Do dyskinesia and pain share common pathophysiological mechanisms in Parkinson's disease? *Mov Disord* 2008;23:1689–1695.

44. Page DB, Weaver F, Wilkie DJ, Simuni T. A computerized survey of pain in Parkinson's disease patients: a pilot feasibility study. *Parkinsonism Relat Disord* 2010;16:139–141.

45. Melzack R. The short-form McGill Pain Questionnaire. *Pain* 1987;30:191–197.

46. Wright KD, Asmundson GJ, McCreary DR. Factorial validity of the short-form McGill pain questionnaire (SF-MPQ). *Eur J Pain* 2001;5:279–284.

47. Zalon ML. Comparison of pain measures in surgical patients. *J Nurs Meas* 1999;7:135–152.

48. Grafton KV, Foster NE, Wright CC. Test-retest reliability of the Short-Form McGill Pain Questionnaire: assessment of intraclass correlation coefficients and limits of agreement in patients with osteoarthritis. *Clin J Pain* 2005;21:73–82.

49. Kass-Iliyya L, Kobylecki C, McDonald KR, Gerhard A, Silverdale MA. Pain in multiple system atrophy and progressive supranuclear palsy compared to Parkinson's disease. *Brain Behav* 2015;5:e00320.

50. Pellaprat J, Ory-Magne F, Canivet C, et al. Deep brain stimulation of the subthalamic nucleus improves pain in Parkinson's disease. *Parkinsonism Relat Disord* 2014;20:662–664.

51. McNamara P, Stavitsky K, Harris E, Szent-Imrey O, Durso R. Mood, side of motor symptom onset and pain complaints in Parkinson's disease. *Int J Geriatr Psychiatry* 2010;25:519–524.

52. Bouhassira D, Attal N, Fermanian J, et al. Development and validation of the Neuropathic Pain Symptom Inventory. *Pain* 2004;108:248–257.

53. Attal N, Fermanian C, Fermanian J, Lanteri-Minet M, Alchaar H, Bouhassira D. Neuropathic pain: are there distinct subtypes depending on the aetiology or anatomical lesion? *Pain* 2008;138:343–353.

54. Kim HJ, Paek SH, Kim JY, et al. Chronic subthalamic deep brain stimulation improves pain in Parkinson disease. *J Neurol* 2008;255:1889–1894.

55. DeLoach LJ, Higgins MS, Caplan AB, Stiff JL. The visual analog scale in the immediate postoperative period: intrasubject variability and correlation with a numeric scale. *Anesth Analg* 1998;86:102–106.

56. Gallagher EJ, Bijur PE, Latimer C, Silver W. Reliability and validity of a visual analog scale for acute abdominal pain in the ED. *Am J Emerg Med* 2002;20:287–290.

57. Jensen MP, Chen C, Brugger AM. Interpretation of visual analog scale ratings and change scores: a reanalysis of two clinical trials of postoperative pain. *J Pain* 2003;4:407–414.

58. Jones KR, Vojir CP, Hutt E, Fink R. Determining mild, moderate, and severe pain equivalency across pain-intensity tools in nursing home residents. *J Rehabil Res Dev* 2007;44:305–314.

59. Wood BM, Nicholas MK, Blyth F, Asghari A, Gibson S. Assessing pain in older people with persistent pain: the NRS is valid but only provides part of the picture. *J Pain* 2010;11:1259–1266.

60. Bijur PE, Latimer CT, Gallagher EJ. Validation of a verbally administered numerical rating scale of acute pain for use in the emergency department. *Acad Emerg Med* 2003;10:390–392.

61. Ferreira-Valente MA, Pais-Ribeiro JL, Jensen MP. Validity of four pain intensity rating scales. *Pain* 2011;152:2399–2404.

62. Broetz D, Eichner M, Gasser T, Weller M, Steinbach JP. Radicular and nonradicular back pain in Parkinson's disease: a controlled study. *Mov Disord* 2007;22:853–856.

63. Granovsky Y, Schlesinger I, Fadel S, Erikh I, Sprecher E, Yarnitsky D. Asymmetric pain processing in Parkinson's disease. *Eur J Neurol* 2013;20:1375–1382.

64. Muller T, Muhlack S, Woitalla D. Pain perception, pain drug therapy and health status in patients with Parkinson's disease. *Neuroepidemiology* 2011;37:183–187.

65. Oshima H, Katayama Y, Morishita T, et al. Subthalamic nucleus stimulation for attenuation of pain related to Parkinson disease. *J Neurosurg* 2012;116:99–106.

66. Quittenbaum BH, Grahn B. Quality of life and pain in Parkinson's disease: a controlled cross-sectional study. *Parkinsonism Relat Disord* 2004;10:129–136.

67. Rintala DH, Tan G, Willson P, Bryant MS, Lai EC. Feasibility of using cranial electrotherapy stimulation for pain in persons with Parkinson's disease. *Parkinsons Dis* 2010;2010:569154.

68. Tinazzi M, Del VC, Fincati E, et al. Pain and motor complications in Parkinson's disease. *J Neurol Neurosurg Psychiatry* 2006;77:822–825.

69. Vallderiola F, Compta Y, Aparicio J, et al. Effects of night-time use of rotigotine on nocturnal symptoms in Parkinson's disease. *Parkinsons Dis* 2015;2015:475630.

70. Dworkin RH, Turk DC, Farrar JT, et al. Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. *Pain* 2005;113:9–19.

71. Freynhagen R, Baron R, Gockel U, Tolle TR. painDETECT: a new screening questionnaire to identify neuropathic components in patients with back pain. *Curr Med Res Opin* 2006;22:1911–1920.

72. Gudbergsen H, Bartels EM, Krusager P, et al. Test-retest of computerized health status questionnaires frequently used in the monitoring of knee osteoarthritis: a randomized crossover trial. *BMC Musculoskelet Disord* 2011;12:190.

73. Gierthmuhlen J, Arning P, Binder A, et al. Influence of deep brain stimulation and levodopa on sensory signs in Parkinson's disease. *Mov Disord* 2010;25:1195–1202.

74. Gaston-Johansson F. Measurement of pain: the psychometric properties of the Pain-O-Meter, a simple, inexpensive pain assessment tool that could change health care practices. *J Pain Symptom Manage* 1996;12:172–181.

75. Ekdahl L, Petersson K. Acupuncture treatment of pregnant women with low back and pelvic pain—an intervention study. *Scand J Caring Sci* 2010;24:175–182.

76. Skogar O, Fall PA, Hallgren G, et al. Parkinson's disease patients' subjective descriptions of characteristics of chronic pain, sleeping patterns and health-related quality of life. *Neuropsychiatr Dis Treat* 2012;8:435–442.

doi:10.1002/mdc3.12384

77. Mylius V, Ciampi de Andrade D, Cury RG, et al. Pain in Parkinson's disease: current concepts and a new diagnostic algorithm. *Mov Disord Clin Pract* 2015;2:357–364.

Supporting Information

Additional Supporting Information may be found online in the supporting information tab for this article:

This file contains supplemental appendices and analyses of pain scales.

Appendix SA. Pain Scales reviewed.

Appendix SB. Full evaluation sheets of Pain Rating Scales used in PD

Appendix

Members of the MDS Committee on Rating Scales Development: Esther Cubo, Deborah Hall, Sheng Luo, Johann Marinus, Laura Marsh, Matej Skorvanek

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