Can We Improve The Holistic Assessment of Parkinson's Disease?

The development of a non-motor symptom questionnaire and scale for Parkinson's disease

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It is nearly 200 years since James Parkinson described the key motor symptoms of Parkinson's disease (PD) in his classic Essay on the Shaking Palsy.[1] He also drew attention to the non-motor symptoms experienced by his patients which, in contrast to the motor features, still remain under-recognised and under-treated.

The importance of non-motor symptoms in PD

In people with PD, progressive degeneration of the dopamine-producing cells in the brain combines with loss in the noradrenergic, cholinergic and serotoninergic systems to produce a wide range of clinical features. Motor symptoms (Table 1) are well recognised in PD, but numerous studies have also identified a wide range of non-motor symptoms.

The non-motor symptoms in PD range from cognitive and psychiatric problems such as apathy, depression, anxiety disorders and hallucinations to sleep disorders, sexual dysfunction, bowel problems and dribbling of saliva. In a recent survey of 163 consecutive patients attending a PD clinic, problems with balance, sleep disturbance, memory failure or confusional episodes, and dribbling of saliva were rated as the most disabling symptoms ahead of the motor features of PD such as bradykinesia and tremor.[2] Importantly, most of the non-motor symptom complex of PD is more likely to be seen at the primary care level, as patients and hospital specialists more often confine discussion to the management of motor symptoms and motor complications such as dyskinesias.

It is increasingly clear that non-motor symptoms have a dramatic effect on the lives of both PD patients and caregivers.[3] Depression and daytime somnolence are common in PD and have been shown to have an adverse effect on health-related quality of life.[3-6] Although the economic implications in relation to hospital and societal cost of treating PD have not been comprehensively evaluated, individual non-motor symptoms such as falls, dementia and hallucinations are now recognised as some of the major reasons for admission to institutional care. In the UK, total annual direct costs for patients living in full-time institutional care were recently estimated at £19,338 compared with £4189 for those being cared for at home.[7]

Non-motor symptoms of PD also contribute to the burden of hidden costs, in the form of informal care and lost productivity.[8] These costs may be substantial, particularly when we consider that PD patients frequently live on a fixed income from pension or benefits, and that the family caregiver is often an elderly spouse. Early and accurate identification and appropriate management of the nature and severity of non-motor symptoms in PD will aid the holistic care of this progressive neurodegenerative illness, improve the quality of life of patient and carer, and contribute to limiting the financial impact of PD. Precedents for the success of such a strategy are available from other chronic, progressive neurological disorders.[9]

Lack of awareness of non-motor symptoms in PD

Non-motor symptoms of PD are not well recognised in clinical practice, either in primary and secondary care. Depression, anxiety, fatigue and sleep disturbance are among the most troubling symptoms for PD patients, but during routine consultations, Shulman *et al* reported that patients with these symptoms are not identified by neurologists in over 50% of consultations and sleep disturbance in particular is not recognised in over 40% of patients.[10] There is also lack of awareness of the considerable disability associated with non-motor symptoms among general practitioners who refer few of their PD patients for speech, occupational or physio-therapy[11]. In clinical trial studies, PD patients generally report satisfaction with their hospital and general practice care, and this likely reflects their and their family caregivers' own lack of awareness that PD was responsible for many of their symptoms. As a result, patients are unlikely to report non-motor symptoms unless health professionals ask specifically. In a recent pilot questionnaire study (L Kelly 2004, Personal Observation), members of the UK Parkinson's Disease Society were asked to describe symptoms experienced during the previous 24 hours. Pain, tremor, and fatigue were most often mentioned spontaneously, but when specific enquiry was made patients were more likely to report non-motor symptoms such as depression, anxiety and sleep disturbance.

The assessment of non-motor symptoms of PD

Interest is growing in the evidence-based treatment of non-motor symptoms, but in part its success will depend not just on the identification but also on the quantification of the effects of treatment on patients' baseline disability. This must involve the use of validated assessment, but symptom-specific instruments may not be relevant to people with PD. For example, the prevalence of depression in PD varies depending on whether diagnostic criteria such as Diagnostic & Statistical Manual (DSM)-IV, rating scales or clinical diagnosis are used in the evaluation.[11]

Existing PD-specific rating scales largely concentrate on motor symptoms. Recently, this issue has been recognised by the Movement Disorder Society, and a revised version of the Unified Parkinson's Disease Rating Scale (UPDRS)—the most frequently used instrument in

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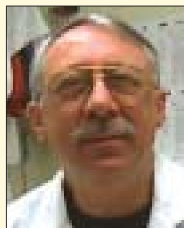
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clinical research and practice—will include some screening questions on non-motor symptoms. There will also be an official appendix that includes other, more detailed, and optionally used scales to determine severity of these impairments (Movement Disorder Society Task Force 2003).[12] Individual aspects of non-motor disability in PD are included in some other current initiatives, most notably the Scales for Outcomes in Parkinson's disease (SCOPA) project.[13,14] There is, however, no single scale that enables a comprehensive assessment of the range of non-motor symptoms that occur in PD. Although ambitious, the development of such an instrument would undoubtedly improve our assessment of PD patients, facilitate research into non-motor symptoms and help to improve individualised delivery of care.

Against this background, an international, multidisciplinary group of experts including nursing and patient group representatives have developed the first non-motor symptom assessment questionnaire and scale. The group was conscious that such an assessment tool should be able to quantify symptoms ranging from anxiety to bowel problems and at the same time be practical, reliable, validated, responsive to treatment or interventions, and interpretable in different languages.

As the awareness for the range of non-motor symptoms is low, the group developed a 30-item screening questionnaire to be used by the patient/caregiver while waiting to be seen in clinic (Fig 1). This instrument will not provide an overall score of disability; instead, it is designed to draw attention to the presence of non-motor symptoms, and to prompt health professionals to initiate further investigation and suitable treatment. A pilot study using the screening questionnaire has been completed in the UK, USA, Germany and Italy. The initial results show a wide range of non-motor symptoms in people with PD from all disease stages compared to healthy controls.[13] Interestingly many such symptoms had never been revealed to their clinicians by patients and were only declared when the questionnaire was administered.

In contrast to the questionnaire, the PD non-motor scale is divided into nine major domains containing 33 questions (Fig 2). The questions were devised after detailed literature review, expert experience and evaluation of the screening questionnaire pilot study. The scale is aimed to be a practical and quantitative scale that encompasses the non-motor symptoms experienced by people with PD. It is envisaged that health professionals will administer the scale, and patients' responses will enable quantification of symptoms based on a multiple of severity (from zero to three) and frequency scores (from one to four). The scale is simple to administer and is intended for use in both primary and secondary care.

Following completion of this pilot, a major international study is now planned for validation of the scale . We hope that this will become an integral part of the assessment of patients and contribute to the comprehensive, modern management of patients with PD.

Table 1. Motor symptoms in Parkinson's disease
Primary motor symptoms
Tremor at rest
Rigidity
Bradykinesia
Loss of postural reflexes
Additional motor symptoms/signs
Dysphagia
'Freezing' (inability to initiate movement)
Gait disturbances (slow, shuffling gait; difficulty turning)
Hypomimia (mask-like face)
Hypophonia (decrease in volume and clarity of speech)
Micrographia (small, illegible handwriting)
Sialorrhea (drooling)
Stooped axial posture

Conclusion

Effective alleviation of symptoms is especially important for patients with a chronic, progressive, incurable illness such as PD, but non-motor symptoms have been comparatively neglected. Once validated, the non-motor symptoms questionnaire and scale should help to raise awareness of these issues among both health professionals and patients, and promote the holistic assessment and treatment of these disabling and distressing symptoms.

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Figure 1: The Non motor symptoms screening questionnaire:

NMS SCREENING QUESTIONNAIRE

Name . . . . Date . . . .

NON-MOVEMENT PROBLEMS IN PARKINSON'S

The movement symptoms of Parkinson's are well known. However, other problems can also occur as part of the condition or its treatment. It is important that the doctor knows about these, particularly if they are troublesome for you.

A range of problems are listed below. Please tick the box 'Yes' if you have experienced it during the past month. If you are uncertain tick the box marked 'Not sure'. The doctor or nurse may ask you some questions to help decide. If you have not experienced the problem in the past month tick the 'No' box. You should tick 'No' even if you have had the problem in the past but not in the past month.

Have you experienced any of the following in the last month?	***Yes***	***Not sure***	***No***
1. Dribbling saliva during the daytime	❒	❒	❒
2. Loss or change in your ability to taste or smell	❒	❒	❒
3. Difficulty swallowing food or drink or problems with choking	❒	❒	❒
4. Vomiting or feelings of sickness (nausea)	❒	❒	❒
5. Constipation (less than 3 bowel movements a week) or having to strain to pass a stool (feces)	❒	❒	❒
6. Bowel (fecal) incontinence	❒	❒	❒
7. Feeling that your bowel emptying is incomplete after having been to the toilet	❒	❒	❒
8. A sense of urgency to pass urine that makes you rush to the toilet	❒	❒	❒
9. Getting up regularly at night to pass urine	❒	❒	❒
10. Unexplained pains (not due to known conditions such as arthritis)	❒	❒	❒
11. Unexplained change in weight (not due to change in diet)	❒	❒	❒
12. Problems remembering things that have happened recently, or forgetting to do things	❒	❒	❒
13. Loss of interest in what is happening around you or in doing things	❒	❒	❒
14. Seeing or hearing things that you know or are told are not there	❒	❒	❒
15. Difficulty concentrating or staying focussed	❒	❒	❒
16. Feeling sad, 'low' or 'blue'	❒	❒	❒
17. Feeling anxious, frightened or panicky	❒	❒	❒
18. Feeling less interested in sex or more interested in sex	❒	❒	❒
19. Finding it difficult to have sex when you try	❒	❒	❒
20. Feeling lightheaded, dizzy or weak when standing from sitting or lying	❒	❒	❒
21. Falling	❒	❒	❒
22. Finding it difficult to stay awake during activities such as working, driving or eating	❒	❒	❒
23. Difficulty getting to sleep at night or staying asleep at night	❒	❒	❒
24. Intense, vivid dreams or frightening dreams	❒	❒	❒
25. Talking or moving about in your sleep as if you are 'acting out' a dream	❒	❒	❒
26. Unpleasant sensations in your legs at night or while resting, and a feeling that you need to move	❒	❒	❒
27. Swelling of your legs	❒	❒	❒
28. Excessive sweating	❒	❒	❒
29. Double vision	❒	❒	❒
30. Believing things are happening to you that other people say are not true	❒	❒	❒

Fig 2: NON-MOTOR SYMPTOM ASSESSMENT SCALE FOR PARKINSON'S DISEASE

Symptoms assessed over the last month.
Each symptom scored with respect to:

Severity:
0 = None
1 = Mild: symptoms present but causes little distress or disturbance to patient
2 = Moderate: some distress or disturbance to patient
3 = Severe: major source of distress or disturbance to patient

Frequency:
1 = Rarely < 1/wk
2 = Often 1/wk
3 = Frequent, several times
4 = Very frequent, daily or all the time

Total score expressed as multiplication of severity and frequency.
Domains will be weighted differentially.
Yes/No answers are not included in final frequency x severity calculation.
(Bracketed text in questions within the scale is included as an explanatory aid).

Domain 1: Gastrointestinal tract
1. Does the patient dribble saliva during the day?
2. Does the patient have difficulty in swallowing?
3. Does the patient ever have a sensation of nausea or does he or she vomit (Do you ever feel that you may be sick? Do you ever vomit?)
4. Does the patient suffer from constipation? (Bowel action less than three times weekly)
5. Does the patient have to strain to pass a stool? (Do you need to take laxatives of any sort other than healthy diet)?
6. Does the patient have altered sensation in the lower bowel? (Unsatisfactory voiding)
7. Does the patient suffer from faecal incontinence? (Leaking, involuntary defecation)

Domain 2: Pain
8. Does the patient suffer from pain not explained by other known conditions?
9. Is it related to intake of drugs and is it relieved by antiparkinson drugs? Yes/No

Domain 3: Urinary
10. Does the patient have difficulty holding urine? (Urgency)
11. Does the patient have to void within 2 hrs of last voiding? (Frequency)
12. Does the patient have to get up regularly at night to pass urine? (Nocturia)

Domain 4: Cardiovascular including falls
13. Does the patient experience lightheadedness, dizziness, weakness or pain in shoulders on standing from sitting or lying position?
14. Does the patient fall because of fainting or blacking out?

Domain 5: Sexual function
15. Does the patient have altered interest in sex? (Very much increased or decreased)
16. Does the patient have problems in becoming sexually aroused?

Domain 6: Sleep/fatigue
17. Does the patient doze off or fall asleep unintentionally during daytime activities? (For example, during conversation, during mealtimes, or while watching television or reading?)
18. Does fatigue (tiredness) or lack of energy (not slowness) limit the patient's daytime activities?
19. Does the patient have difficulties falling or staying asleep?
20. Is the patient aware or has he or she been told about talking during sleep or moving about as if acting out a dream?
21. Does the patient experience an urge to move the legs or restlessness in the legs that improves with movement when he or she is sitting or lying down inactive?

Domain 7: Hallucinations/delusions
22. Does the patient indicate that he or she sees things that are not there?
23. Does the patient have beliefs that you know are not true? (For example, about being harmed, being robbed or being unfaithful?)

Domain 8: Apathy/attention/memory
24. Has the patient lost interest in his or her surroundings?
25. Has the patient lost interest in doing things or lack motivation to start new activities?
26. Does the patient look dazed or unaware of what is going on? (Not just when drowsy or falling asleep)
27. Does the patient have problems sustaining concentration during activities? (For example, reading or having a conversation)
28. Does the patient forget things that he or she has been told a short time ago or events that happened in the last few days?
29. Does the patient forget to do things? (For example, take tablets or turn off domestic appliances)

Domain 9: Depression/anxiety/anhedonia
30. Does the patient feel nervous, worried or frightened for no apparent reason?
31. Does the patient seem sad or depressed or has he or she reported such feelings?
32. Does the patient have flat mood without the normal 'highs' and 'lows'?
33. Does the patient have difficulty in experiencing pleasure from usual activities or report that they lack pleasure?

More Information

We welcome centres that would like to pilot the screening questionnaire and take part in the validation study of the NMS scale in the UK.

Please contact:
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Doug MacMahon is Consultant Physician with special responsibility for the elderly, Royal Cornwall Hospital NHS Trust. He has particular interests in PD, community care and rehabilitation. He has written extensively on PD, its management and on health care policy for older people.

William C. Koller is a professor in the Department of Neurology at the Mount Sinai School of Medicine in New York City. Dr Koller's main research interests involve the etiology and treatment of Parkinson's disease as well as essential tremor. He has recently been investigating deep brain stimulation as a treatment modality in Parkinson's disease.

Pablo Martinez-Martin is Head of the Neuroepidemiology Unit, National Centre for Epidemiology, Madrid. He has special interest in assessment measures and Parkinson's disease, with additional activity in Dementia, Prion diseases, and Multiple Sclerosis. He has written extensively and has received 9 Spanish awards in Neuroscience.

K Ray Chaudhuri trained as a medical student in Calcutta, and subsequently as a neurologist in Leicester and London, including experience in Movement Disorders and particularly PD in internationally renowned centres. He is widely published and has contributed extensively to educational media. His major research interests are drug treatment of PD and Restless Legs Syndrome, Parkinsonism in minority ethnic groups, non motor symptoms, and sleep disorders of PD.

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Kapil D Sethi is Professor of Neurology at the Medical College of Georgia in Augusta. He also serves as Director of the Movement Disorders Clinic and the National Parkinson Foundation Center of Excellence. Dr. Sethi is also staff physician at the Veterans Affairs Medical Center (Augusta). Research interests are in PD, restless legs syndrome, and cervical dystonia.

Richard Brown is a Reader in Cognitive Neuroscience at the Institute of Psychiatry, King's College London, and Honorary Consultant Clinical Psychologist at the South London and Maudsley NHS Trust. He has been actively involved in Parkinson's disease research for the past 23 years. He serves on the scientific advisory panel of the Parkinson's Disease Society UK, and has bee a member of a number of working groups, research networks and task forces related to Parkinson's disease and related disorders.

Table 2. The PD Non-Motor Symptom Scale Development Group

Group member	*Country*	*Discipline*	*Special interest*
Dr K Ray Chaudhuri (Chair)	UK	Neurologist	Sleep and autonomic function
Professor Paulo Barone	Italy	Neurologist	Non motor symptoms
Mrs A Bowron	UK	PD Nurse Specialist	Sexual function, bowel dysfunction
Dr Richard Brown	UK	Psychologist	Apathy, depression
A Forbes	UK	PD Nurse Specialist	Non motor symptons and quality of life of people with Parkinsons'
Professor Chris Goetz	USA	Neurologist	Neuropsychiatric complications
Ms Linda Kelly	UK	Chief Executive, Parkinson's Disease Society	Patient representative
Dr William Koller	USA	Neurologist	Therapeutics of motor & non-motor symptoms
Dr Doug MacMahon	UK	Geriatrician	Parkinsonism in elderly
Dr Graeme Macphee	UK	Geriatrician	Non-motor symptoms, neuropsychiatric problems
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Dr Per Odin	Germany	Neurologist	Dysautonomia, RLS
Dr Warren Olanow	USA	Neurologist	Parkinsonism and therapeutics
Dr William Ondo	USA	Neurologist	Non-motor symptoms
Dr David Rye	USA	Neurologist/Sleep Physician	Sleep , RLS
Professor Anthony Schapira	UK	Neurologist	Genetics, non-motor symptoms
Dr Kapil Sethi	USA	Neurologist	Non-motor symptoms
Professor Fabrizio Stocchi	Italy	Neurologist	Non-motor symptoms Bowel/bladder problems
Ms Sue Thomas	UK	Specialist Nurse	Non-motor symptoms, bladder dysfunction
Dr Adrian Williams	UK	Sleep Physician/Respiratory	Sleep, rapid eye movement behaviour disorder