Research Article

Non-motor Symptoms in Parkinsonism – A Study from a Tertiary Care Center in India

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Abstract

Background- *Patients with Parkinsonism suffer from both motor and non-motor symptoms. Non-motor symptoms are difficult to recognize. Cognitive impairment, sleep and mood disorders are found to be associated with Parkinsonism. This study was conducted to assess the non-motor symptoms in patients with Parkinson's disease and Parkinson plus syndromes.*

Material and methods- *Patients with Parkinson's disease and Parkinson's plus syndrome were selected. The different scores for non-motor symptoms were assessed for all patients. These scores were compared between Parkinson's disease and Parkinson's plus syndromes.*

Results *– A total of 60 patients were recruited, including 40 patients with Parkinson's disease and 20 patients with Parkinson's plus syndrome. The pain was more significantly present in Parkinson's disease whereas, autonomic symptoms were more significantly seen in Parkinson plus patients.*

Conclusion – *Non-motor symptoms are present in Parkinsonian syndromes. Timely identification and management are important for improving the quality of life.*

Keywords: *Non-motor dysfunction; Parkinson's disease, Parkinson plus syndromes***.**

Introduction

Parkinson's disease (PD) is the second most common neurodegenerative disorder, after Alzheimer's disease. **(**1**)** PD was described by James Parkinson in his classic 'Essay on the Shaking Palsy', in 1817. **(**2**)** The cardinal clinical features of PD include the asymmetric onset of bradykinesia, rigidity, and resting tremor. **(**3**)** In India alone, approximately 700 million people are above the age of 65 years, of which about 7 million suffer from PD. **(**4**)** James Parkinson also recognized the non-motor symptoms of PD, which referred to sleep disturbance, constipation, dysarthria, dysphonia, dysphagia, sialorrhea, and urinary incontinence in his 'Essay on the shaking palsy' in 1817. **(**2**)** Non-motor symptoms (NMS) in PD have been systematically described for the first time in 2006 by Chaudhuri et al. **(**5**)** The frequency of NMS increases along with the disease duration. **(**6**)** Disorders of mood and affect, though receiving less attention than motor aspects of the disease, have long been recognized as a part of PD. PD Dementia (PDD) is thus, increasingly more recognized and it has been revealed that PD is associated with characteristic dementia. Depression is common in PD, occurring in up to one-half of the patients.

Anxiety disorders may be as common as depression and the two are frequently co-existent. **(**7,8**)** Apathy, may overlap but is usually distinct from depression. Also, suicidal ideations, hallucinations, and delusions may occur. **(**9,10**)** Fatigue, sleepiness, and sleep disturbances are major problems, independent of any medication and motor disability. Autonomic dysfunction occurs prominently in PD. This can manifest as dysphagia, constipation, urinary urgency, incontinence, erectile dysfunction, orthostatic hypotension, dyshidrosis, and impaired thermoregulation. There are only a few reports about the frequency of non-motor symptoms in patients with PD from India and no such Indian report in

patients with Parkinson plus syndrome. The present study aims to investigate the non-motor dysfunction of PD and Parkinson plus syndrome in Indian patients.

Methodology

The present cross-sectional study was conducted to assess the non-motor dysfunction in 60 patients with idiopathic PD and Parkinson plus syndrome attending the Movement disorder clinic at Dr RML Hospital, New Delhi, India. Adult patients with a diagnosis of Parkinsonism were included in the study.

Exclusion criteria included:

1.Systemic conditions known to be associated with autonomic dysfunction including diabetes, chronic alcoholism, chronic renal failure, chronic liver disease.

2. Patients with essential tremor

3.Patients with secondary Parkinsonism

4.Severe cognitive dysfunction such that the relevant questionnaires for assessment cannot be undertaken by the patient

5. Refusal to give consent for the study

The study was conducted after getting approval by the medical ethics committee at Dr. RML Hospital, New Delhi, India and written informed consent from all patients. Diagnosis of PD was made as per the UK Brain Bank criteria. **(**11**)** Demographic data were collected, history and examination were done for all recruited patients. Patients were divided into 2 categories, PD and Parkinson plus syndrome. Patients with Parkinson plus syndrome were further sub-classified into Progressive Supranuclear Palsy (PSP), Corticobasal Degeneration (CBD), Multiple System Atrophy (MSA) and Dementia with Lewy Body (DLB) as per NINDS-SPSP clinical criteria for the diagnosis of PSP, Proposed research criteria for CBD, Consensus criteria for the diagnosis of MSA and latest consensus diagnostic criteria for DLB respectively. **(**12-15**)** Unified Parkinson's Disease Rating Scale UPDRS Part-III and Modified Hoehn & Yahr staging were used for severity assessment of PD. Evaluation of cognition was done by using SCOPA-COG (Scales for Outcomes in Parkinson's Disease-Cognition). The psychiatric and behavioral disorder was assessed by BDI (Beck Depression Inventory) and NPI (Neuropsychiatric Inventory). **(**16**)** Sleep problems were assessed by the Parkinson's disease Sleep Scale (PDSS). For autonomic dysfunction,

SCOPA-AUT (Scales for Outcomes in Parkinson's Disease- Autonomic) was used. From all these score composite scores was calculated and based on the score NMS were categorized from no symptoms to severe symptoms. Pain assessment was done by a visual analog scale.

Statistical Analysis

Statistical analysis was done using SPSS software for the variables under study. The correlation of the presence of NMS with severity and duration of disease was done by using appropriate statistical tests. Statistical significance level was considered at a p-value <0.05.

Results

A total of 60 patients with Parkinson's disease and Parkinson's plus syndrome were recruited in the study. Out of which 40 were Parkinson's disease (PD) and 20 were Parkinson plus syndrome. In 20 patients of Parkinson plus syndrome, 9 were multiple system atrophy (MSA), 8 were progressive supranuclear palsy (PSP), 3 dementia with Lewy bodies (DLB) and no patient of corticobasal degeneration (CBD) was present.

	PD	**MSA**	**DLB**	**PSP**
TOTAL NO.	40	9	3	8
MEAN AGE	55.02±13.56	62.0±11.38	65.33±12.34	62.37±10.25
GENDER(M/F)	25/15	6/3	3/0	4/4
MEAN DURATION (years)	2.09±1.82	2.67±1.52	3.17±0.29	1.90±1.11
MEAN UPDRS	22.10±5.83	22.38±9.78	27±3.00	24.25±7.20

Table-1: Baseline characteristics of patients

SCORE	PD	MSA	DLB	PSP
SCOPA-COG				
NORMAL	31	8	0	5
IMPAIRED	9	1	3	3
BDI				
MINIMAL	19	9	0	3
MILD	12	0	3	2
MODERATE	7	0	0	3
SEVERE	2	0	0	0
PDSS				
NORMAL	20	3	2	4
IMPAIRED	20	6	1	4
SCOPA-AUT				
NORMAL	5	0	2	1
IMPAIRED	35	9	1	7
VAS				
PAIN- PRESENT	12	5	2	4
PAIN-ABSENT	28	4	1	4

Table 2: Different NMS Scores of patients

Different scores were obtained and compared between PD and Parkinson plus syndrome. There was no statistically significant correlation between cognition, depression, and sleep in between PD and

Parkinson plus Syndrome. The pain was more common in PD than Parkinson plus Syndrome (p=0.006), whereas autonomic dysfunction was more common in Parkinson plus Syndrome than PD (p=0.041).

Non-Motor Symptom	**PD (n=40)**	**PD Plus**				**P value**
		Total (n=20)	**DLB (n=3)**	**MSA (n=9)**	**PSP (n=8)**	**PD Vs PD Plus**
MMSE	24.95 ± 4.55	22.05 ± 6.29	17.67 ± 7.51	23.56 ± 5.17	22.00 ± 7.03	0.082
SCOPA-COG	23.65 ± 5.42	23.70 ± 5.45	17.33 ± 1.53	26.67 ± 5.29	22.75 ± 4.27	0.795
BDI	11.75 ± 9.52	9.40 ± 8.51	13.33 ± 4.04	3.56 ± 3.32	14.50 ± 9.96	0.401
PDSS	126.40 ± 28.17	134.30 ± 11.47	131.00 ± 117.35	125.56 ± 10.36	134.13 ± 11.90	0.555
PAIN	4.43 ± 2.65	2.45 ± 1.96	2.00 ± 1.73	2.78 ± 2.44	2.25 ± 1.58	**0.006**
SCOPA-AUT	13.40 ± 6.10	16.35 ± 5.91	14.33 ± 4.62	19.88 ± 3.88	13.13 ± 6.49	**0.041**

Table 3 Comparison of different score among Parkinsonian disorders.

Based on this data, depression, pain, sleep, autonomic dysfunction were found to be significantly related to the duration of PD whereas no significant relation was found with Parkinson plus syndromes. Depression, pain, sleep and autonomic symptoms were significantly associated with the severity of PD.

Discussion

NMS is common in Parkinson's disease (PD), but often under-recognized in clinical practice because of the lack of spontaneous complaints by the patients, and also the absence of systematic questioning by health care professionals. They can even precede the motor symptoms or signs by several years and then herald the onset of PD. A previous Indian study found a correlation between non-motor and motor

symptoms in the disease progression, particularly cognitive impairment, autonomic dysfunction and anosmia. **(**17**)** Fatigue, pain, sleep-related problems, autonomic dysfunction and cognitive impairment are common NMS in PD as per recent Indian studies. **(**18,19**)**

In our study, cognitive impairment was observed in 9 (22.5%) patients based on the SCOPA-COG scale. In our study, no correlation was found between cognitive impairment with duration and severity of disease in PD. Earlier estimates of the prevalence of dementia in Parkinson's disease have been highly variable, ranging from 20% to 81%. **(**20**)** This might be due to different assessment techniques and different study populations. Aarsland D et al. (2010) reported cognitive impairment in over 25% of PD patients and Emre M. (2003) reported dementia in up to 40%. **(**21,22**)** In patients with Parkinson plus syndrome cognitive impairment was reported in 40–62% of patients with progressive supranuclear palsy and 11–32% of patients with multiple system atrophy by Brown RG et al. (2010). **(**23**)** Another study on PSP reported a similar percentage of cognitive impairment as in our study. Brusa et al. reported that about 52% of progressive supranuclear palsy patients experience cognitive symptoms. **(**24**)** Joseph and Dickson (2003) reported dementia in 10% and 'cognitive complaints' in 32% progressive supranuclear palsy cases. **(**25**)** Mood disorders in PD consist primarily of depression and anxiety, but can also include psychosis and apathy. **(**26**)** Anxiety disorders, including generalized anxiety disorder, agoraphobia, panic disorder, and social phobia, have all been reported in PD, with a prevalence of 20% - 40%. **(**27,28**)** We also noted 40% of our PD patients suffer from moderate to severe depression, and around 10% of these patients had delusion similar to a previous study by Aarsland et al. who reported 10% of Parkinson's disease patients had hallucination with insight retained and another 6% had a more severe hallucination or delusion. **(**21**)** In our study, 20 (50%) PD patients had disturbed sleep on PDSS; sleep problems had a significant correlation with duration and severity of disease in PD. Previous studies have reported similar findings related to sleep problems in PD. **(**29,30**)** Sleep-related problems were present in 11 (55%) patients of Parkinson Plus Syndrome in our study, with sleep fragmentation, and insomnia being commonly reported. In our study 35 (87.50%)

PD patients had autonomic dysfunction, mostly in the form of sialorrhea, constipation, and abdominal fullness. Visser et al. (2004) reported autonomic disturbance in 14%-80%, and these symptoms are better evaluated with the SCOPA-AUT Scale. **(**31**)** Martignoni E et al. (1995) reported that the autonomic features vary considerably from 2% for urinary incontinence to 72% for constipation. **(**32**)** In our study, the prevalence of autonomic dysfunction in Parkinson Plus syndrome patients was found to be high but there was no significant correlation of autonomic dysfunction with duration (p=0.190) and severity of the disease. Wolters et al. (2008) reported that autonomic dysfunction is closely associated with MSA, but nearly all Parkinsonian patients experience some degree of autonomic disturbances during their illness. **(**33**)**

Conclusion

NMS has a great impact on the quality of life, but nonrecognition of NMS is a common problem, requiring a systematic approach to both diagnosis and treatment. Many useful questionnaires might be used to detect and guide the management of NMS. Non-motor symptoms in PD are usually more complicated and difficult to manage than typical PD motor symptoms. We also noted a variety of NMS in patients with Parkinsonism and their progression with duration and severity of the disease. Timely assessment and management of these symptoms along with motor symptoms may improve the quality of life, thus bringing satisfaction in life.

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