Paper

# Patient characteristics and drug prescribing pattern in Parkinson disease: A hospital based study in Sri Lanka

**S B Gunatilake[1], G N D Perera[1], A U Pathirana[1], A G S Asiri[2], K M Bandara[1], M T M Riffsy[2]**

*Sri Lanka Journal of Neurology,* 2018, **5**, 16-19

## Abstract

***Purpose of the study:*** To describe the demographic factors, pattern of anti-Parkinsonism drugs used and to identify factors influencing treatment in PD patients attending Colombo South Teaching Hospital (CSTH) in Sri Lanka.

***Methods:*** A descriptive cross sectional study was conducted at CSTH during March 2012 - September 2012, recruiting patients with PD (according to diagnostic criteria of the United Kingdom Parkinson's Disease Society Brain Bank) attending neurology and medical clinics.

***Results:*** There were 103 PD patients, with a mean age of 64 yrs (SD 9.6, range 43-86) and 58 (56.3%) were males. Duration of illness ranged from 1 month to 15 yrs (median 2 yrs) and average age of onset was 61yrs (SD 9.6, range 41 - 82). 13 patients (12.6%) had onset of PD before 50yrs. Majority (n=57, 55.3%) had at least one co-morbidity. Levodopa alone was the treatment in 100 (97.1%) patients, Ropinirole alone in one, and 10 (9.7%) on Levodopa and Ropinirole combination with 2 (2%) drug-naïve patients. Benzhexol was used in 82 (79.6%) patients. Sex, disease severity, duration of illness, education level or employment status did not differ between treatment groups.

***Conclusion:*** PD is a commonly seen neurodegenerative disorder in hospital outpatient clinics and majority had other co-morbidities. Levodopa and Benzhexol are the commonly used drugs in Sri Lanka. Use of dopa agonists are much less common when compared to other countries. Age, the age of onset of PD, cost, and availability are major determinants of treatment.

## Introduction

Parkinson disease (PD) is the second commonest neurodegenerative disorder in the world. It is a disease of the elderly and the prevalence is likely to rise in with the increase in elderly population. Sri Lanka has a fast ageing population with a predicted increase in elderly (over age 60) from 13% in 2011 to 22% in 2030. Therefore, PD and related disorders will emerge as important health problems in our country. Studies reveal that PD patients with other co-morbidities suffer from frequent hospitalization and the risk increases with the number of illnesses[1]. Cardiovascular diseases, general medical problems, infections contribute to hospital admissions in this group[2]. Identification of other co-morbid illnesses and prompt intervention would improve overall quality of life in patients with PD. Epidemiological data on PD is lacking in Sri Lanka and our study aimed to describe the demographic factors and identify the presence of co-morbidities to address this issue.

Drug treatment in PD has advanced over the years with more drugs and novel therapies introduced. Use of these medication in developing countries such as Sri Lanka is influenced by the availability, cost and patient preference. Our study was conducted to provide more data on the medication profile of PD patients in an urban setting in Sri Lanka.

We conducted this study to describe the demographic factors, associated co-morbidities and the drug treatment pattern in PD patients attending neurology and medical clinics. In addition, we evaluated the demographic factors influencing treatment in this group of PD patients.

## Methods

This was a descriptive cross sectional study conducted at Colombo South Teaching Hospital, a tertiary care hospital in Colombo. Hospital is situated in the Western province and has 3 medical clinics and one neurology clinic. Study was conducted during March 2012 – September 2012. We recruited 103 patients diagnosed as PD (according to diagnostic criteria of the United Kingdom Parkinson's Disease Society Brain Bank) attending neurology and medical clinics. Exclusion criteria were employed to exclude patients with an alternative explanation as the cause for Parkinsonism (Table 1). All patients were interviewed to obtain data on demographic factors (age, sex, age of onset of PD, disease duration, co-morbidities, smoking) and Parkinsons disease medication by a trained medical professional. Patients were

[1] *Department of Medicine, Faculty of Medical Sciences, University of Sri Jayewardenepura,* [2] *Colombo South Teaching Hospital, Kalubowila, Sri Lanka.* Correspondence: SB Gunatilake E-mail: saman.gunatilake@hotmail.com

examined to identify motor symptoms of Parkinsons disease and the disease severity using Hoehn and Yahr staging system (3). An interviewer administered questionnaire was used for data collection.

Data was entered using MS-EXCEL and analyzed using SPSS 19.0 version. Descriptive statistics were used to describe demographic factors, presence of co-morbidities. Chi-square test and t-test were used to find the associations.

**Ethical approval**

Informed consent was obtained from all participants. Ethical approval was obtained from the Ethics Review Committee of Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

## Results

There were 103 PD patients, with a mean age of 64 yrs (SD 9.6, range 43-86) and 58 (56.3%) were males. Duration of illness ranged from 1 month to 15 yrs (median 2 yrs). Average age of onset was 61yrs (SD 9.6, range 41-82). 13 patients (12.6%) had an onset of PD before 50yrs of age. One patient had a family history of PD. These characteristics are summarized in Table 1.

Majority (n=57, 55.3%) had at least one co-morbidity. 59 (57.3%) patients had mild PD (HY stage 1 & 2), 32 (31.1%) moderate (HY stage 3) and 12 (11.7%) severe PD (HY stage 4 & 5). Out of the four motor symptoms of PD, 102 (99%) had resting tremor, 96 (93.2%) muscular rigidity, 53 (51.5%) bradykinesia and 41 (39.8%) had postural instability.

**Medication profile**

Ninety (87.3%) patients were on Co-careldopa alone, 1 on Ropinirole alone, 10 (9.7%) on Co-careldopa and Ropinirole combination with 2 (2%) drug-naïve patients. 82 (79.6%) patients were treated with benzhexol (Table 2).

Co-careldopa dose ranged from Carbidopa/Levodopa 6.25/62.5mg bd to 25/250mg tds. Most patients (n=50, 48.6%) were on twice daily Co-careldopa dosing with 45 (42.6%) on three times dosing and 6 (5.8%) given 6hrly treatment. Co-careldopa duration of treatment ranged from 1 month to 11 years. Ropinirole dose ranged from 0.5mg daily to 1.5mg in divided doses and duration of treatment ranged from 3 months to 4 years.

Nine out of 10 patients on Levodopa-Ropinirole combination had a disease onset at less than 60 yrs of age with 5 patients having young onset (<50 yrs) PD. Chi square test revealed a significant association between young onset of PD and treatment with combination therapy compared to use of Co-careldopa alone *($\chi^2$= 14.0, df=1, p<0.001)*. Eight patients on combination therapy were less than 60 yrs of age. Age <60 years was significantly associated with the use of combination therapy compared to treatment with co-careldopa alone *($\chi^2$2=13.9, df=1, p<0.001)*. Sex, disease severity, duration of illness, education level or employment status did not differ between treatment groups.

Table 2 summarizes the available medication for PD, average cost of a tablet and the use of individual medication.

## Discussion

Our study showed similar patient characteristics to studies conducted in the West. PD was more common in men with 1.3: 1 ratio similar to available data.[5,6] Mean age, age at onset of PD and duration of illness is comparable to published literature.[4,8] There was no gender difference in these features except that more females were unemployed and widowed compared to males, requiring more financial and social support.

More than half of the patients had other illnesses. Commonest were diabetes, hypertension, and dyslipidaemia and ischaemic heart disease. Our results are similar to studies in Asia and developed countries[1,2]. These disorders and PD are common in the elderly. Presence of other diseases result in a higher risk of hospital admissions[1]. These findings show the importance of a multidisciplinary approach in managing PD patients. Risk factor modification and proper management of other medical illnesses would have an impact on the quality of life.

Medication profile of the patients revealed interesting results. Majority were treated with L-dopa preparations and only 10.7% were given dopamine agonist, ropinirole. None were on other available dopamine agonists, MAO-B inhibitors or other newer drugs. This was surprising since the study was conducted in an urban setting in the city of Colombo. Unavailability of the drugs in the state sector would have influenced the treatment decision. Most patients attending clinics cannot afford to buy the drug despite being available in the private sector. Neighboring countries such as India face the same challenge[9,10]. Therefore, our drug prescribing pattern is different from developed countries. Published data in the West reveal a higher use of dopamine agonists (30-40%) and MAO-B inhibitors (25-50%)[2,4,8].

Patients who were prescribed Ropinirole were younger (<60 yrs of age) and had an early disease onset. This association was demonstrated in other studies[5]. Older patients were more likely to be on L-dopa and on a higher dose. Reason given was the increased severity of PD in this group requiring L-dopa therapy. We assume it could be due to the patient preference and the affordability of the drug.

**Table 1. Characteristics of the study population**

| *Population characteristic* | *Males 58 (56.3%)* | *Females 45 (43.7%)* | *Total (N=103)* | *Significance* |
|---|---|---|---|---|
| Age, Mean (SD) | 64 (10.5) | 65.27 (8.3) | 64.55 (9.62) | *p=0.51* |
| **Age at onset of PD in years, N (%)** | | | | |
| Mean (SD) | 60.47 (10.4) | 62.45 (8.5) | 61 (9.6) | *p=0.30* |
| <50 | 11 (10.7) | 2 (1.9) | 13 (12.6) | |
| 50-59 | 17 (16.5) | 13 (12.6) | 30 (29.1) | |
| 60-69 | 17 (16.5) | 17 (16.5) | 34 (33.0) | |
| ≥70 | 13 (12.6) | 13 (12.6) | 26 (25.2) | |
| **Disease duration in months, N (%)** | | | | |
| Mean (SE) | 42.4 (5.6) | 33.78 (5.0) | 38.63 (3.82) | *p=0.26* |
| <24 | 21 (20.4) | 17 (16.5) | 38 (36.9) | |
| 24-59 | 24 (23.3) | 19 (18.4) | 43 (41.7) | |
| 60-119 | 6 (5.8) | 7 (6.8) | 13 (12.6) | |
| 120-179 | 6 (5.8) | 2 (1.9) | 8 (7.8) | |
| 180 or more | 1 (1.0) | 0 | 1 (1.0) | |
| | 24 (23.3) | 0 | 24 (23.3) | *$\chi^2$2 = 21.1, df=3 p<0.001* |
| **Smoking, N (%)** | | | | |
| **Marital status** | | | | |
| Unmarried | 4 (3.9) | 5 (4.8) | 9 (8.7) | |
| Married | 51 (49.5) | 22 (21.4) | 73 (70.9) | *$\chi^2$2 = 21.1, df=3 p<0.001* |
| Divorced | 0 | 1 (1.0) | 1 (1.0) | |
| Widowed | 3 (2.9) | 17 (16.5) | 20 (19.4) | |
| **Employment** | | | | |
| Unemployed | 42 (40.8) | 42 (40.8) | 84 (81.6) | *$\chi^2$ = 7.4, df=1 p=0.007* |
| Employed | 16 (15.5) | 3 (2.9) | 19 (18.4) | |
| **Co morbidities, N (%)** | 29 (28.2) | 28 (27.2) | 57 (55.3) | *$\chi^2$ = 1.53, df=1 p=0.22* |
| Diabetes Mellitus | 11 (10.7) | 13 (12.6) | 24 (23.3) | *p=0.24* |
| Hypertension | 22 (21.4) | 16 (15.5) | 36 (38.9) | p=0.80 |
| Dyslipidaemia | 9 (8.7) | 13 (12.6) | 22 (21.4) | *p=0.10* |
| Ischaemic heart disease | 7 (6.8) | 6 (5.8) | 13 (12.6) | *p=0.85* |
| Other illnesses in combination* | 12 (11.6) | 14 (13.6) | 26 (25.2) | *p=0.43* |
| **Hoehn and Yahr staging N (%)** | | | | |
| Stage 1 | 14 (13.6) | 8 (7.8) | 22 (21.4) | |
| Stage 2 | 19 (18.4) | 18 (17.5) | 37 (35.9) | |
| Stage 3 | 19 (18.4) | 13 (12.6) | 32 (31.1) | |
| Stage 4 | 6 (5.8) | 5 (4.8) | 11 (10.7) | |
| Stage 5 | 0 | 1 (1.0) | 1 (1.0) | |

* Other illnesses include bronchial asthma/ COPD, stroke, epilepsy, hypothyroidism, psychiatric illness

**Table 2. Available drugs and the prescribing pattern in Sri Lanka**

| *Available drugs for treatment of PD* | *Available drugs for PD in Sri Lanka* | *Available drugs for PD in CSTH** | *Number (%) of patients using the drug* |
|---|---|---|---|
| Levodopa preparations | + | + | 100 (97.0) |
| Ropinirole | + | N/A | 11 (10.7) |
| Cabergoline | + | N/A | - |
| Entacapone | + | N/A | - |
| Selegiline | + | N/A | - |
| Pramipexole | N/A | N/A | - |
| Apomorphine | + | N/A | - |
| Pergolide | N/A | N/A | - |
| Rotigotine | N/A | N/A | - |
| Rasagiline | N/A | N/A | - |
| STALEVO (L-dopa+ Carbidopa+ Entacapone) | N/A | N/A | - |
| Benzhexol | + | + | 82 (79.6) |

* CSTH; Colombo South Teaching Hospital, N/A; not available

Our study had few limitations. There was no control group to compare demographic factors such as co-morbidities, smoking. Sample size was small because PD is not common and due to the unavailability of disease registries in Sri Lanka. But our sample size was adequate to give inferences. A further larger study including private sector and other regions of the country would give more useful data.

## Conclusion

PD patients in Sri Lanka have similar demographic characteristics to patients in other countries. Medication profile of PD patients in our country is determined by the cost, availability of the drugs and patient preference. Levodopa and Benzhexol are the commonly used drugs in Sri Lanka. Use of dopa agonists are much less common when compared to other countries.

### Conflicts of interest

None.

### References

1. Hassan A, Samuel SW, Schmidt P, Dai Y, Simuni T, Giladi N, et al. High rates and the risk factors for emergency room visits and hospitalization in Parkinson's disease. *Parkinsonism Relat Disord* 2013; **19** (11): 949-54.
2. Tan LCS, Tan AKY, Tjia HTL. The Profile of Hospitalised patients with Parkinson's disease. *Ann Acad Med Singapore* 1998; **27**: 808-12.
3. Hoehn MM, Yahr M D. Parkinsonism: onset, progression, and mortality. *Neurology* 1967; **17**: 427-4.
4. Szewczyk-Krolikowski K, Tomlinson P, Nithi K, Wade-Martins R, Talbot K, Ben-Shlomo Y, et al. The influence of age and gender on motor and non-motor features of early Parkinson's disease: Initial findings from the Oxford Parkinson Disease Center (OPDC) discovery cohort. Parkinsonism and Related Disorders (2013) http://dx.doi.org/10.1016/j.parkreldis.2013.09.025
5. Mayeux R, Marder K, Cote LJ, et al. The frequency of idiopathic Parkinson's disease by age, ethnic group, and sex in northern Manhattan, 1988-1993. *Am J Epidemiol* 1995; **142**: 820-7.
6. Hofman A, Collette HJ, Bartelds AI. Incidence and risk factors of Parkinson's disease in the Netherlands. *Neuroepidemiology* 1989; **8**: 296-9.
7. Willis AW, Schootman M, Kung N, Racette BA. Epidemiology and neuropsychiatric manifestations of Young Onset Parkinson's disease in the United States. *Parkinsonism and Related Disorders* 2013; **19**: 202-6.
8. Khoo TK, Yamall AJ, Duncan GW, Coleman S, O'Brien JT, Brooks DJ, et al. The spectrum of non-motor symptoms in early Parkinson disease. *Neurology* 2013; **80**: 276-81.
9. Behari M. Experiences of Parkinson's disease in India. *Lancet Neurol* 2002; **1**: 258-9.
10. Singhal B, Lalkaka J, Sankhla C. Epidemiology and treatment of Parkinson's disease in India. *Parkinsonism and Related Disorders* 2003; **9**: 105-9.