

The Impact of COVID-19 Pandemic on Disease Severity and Quality of Life in Parkinson's Disease

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Abstract

Background: The challenges being faced during the lockdown period may worsen motor or non-motor symptoms in Parkinson's disease (PD). **Objective:** This study was undertaken to investigate the impact of lockdown on the disease activity, caregiver perceptions and the quality of life of patients with PD. **Materials and Methods:** This cross-sectional study was conducted from June till September 2020. Sixty-four patients with PD and caregivers were interviewed telephonically after obtaining consent. The responses were recorded by means of a structured questionnaire. Non-motor symptoms scale (NMSS) and the Parkinson Disease Questionnaire-8 (PDQ-8) were applied. PDQ-8 severity index (PDQ-8 SI) scores were expressed as percentage of the raw PDQ-8 score of the total score. Data were analysed by using SPSS version 20.0. **Results:** Of 64 patients, 39 (60.9%) were men and 25 (39.1%) were women. The overall median age of the patients was 65 (55.25–69.75) years. The median duration was 48 (30–84) months. Twenty-six (40.6%) patients reported symptomatic worsening during the lockdown period. Slowness in activities of daily living and walking worsened in 15 (57.7%) and 14 (53.8%) patients, respectively, while tremors increased in 12 (46.2%) patients. Mood and sleep disturbances were the most common non-motor symptoms to worsen. Increase in non-motor symptoms and the NMSS total score were independent predictors of PDQ-8 scores. Increase in non-motor symptoms during the lockdown was an independent predictor of the highest quartile of PDQ-8 SI scores. **Conclusions:** Motor and non-motor symptoms have worsened in patients with PD during the lockdown. The increase in non-motor symptoms was independently associated with poorer quality of life among patients with PD during the lockdown.

Keywords: COVID-19, lockdown, non-motor symptoms, Parkinson's disease, quality of life

INTRODUCTION

The coronavirus disease-2019 (COVID-19) caused by the novel coronavirus (SARS-CoV-2) has spread around the world in the last 8 months. The deadly virus has infected 37.7 million people and resulted in 1.08 million deaths worldwide. India is one of the worst-hit countries (next only to the United States in terms of cases) with a total of 7.18 million cases and 110,000 deaths so far. In an attempt to reduce viral transmission and flatten the meteorically rising curve, many countries have been forced to enter into a “lockdown modus”. It is well known that the elderly, especially those harboring co-morbidities, are at a greater risk of contracting the disease and have a higher mortality risk as well.^[1] Thus, the lockdown led to restrictions on movement and social interaction, especially among the elderly.

In terms of prevalence, Parkinson's disease (PD) is the second most common neurodegenerative disorder worldwide.^[2] The multitude of challenges being faced due to COVID-19 act as stressors that negatively impact mental and emotional health.^[3] Studies have shown that stress (mental or emotional) can lead to worsening of tremors, bradykinesia, rigidity, freezing, gait disturbances, anxiety and depression among patients with PD.^[4-7] Since it is the elderly who bear the maximum brunt of both COVID-19 and neurodegenerative diseases, understanding the relationship between COVID-19 and its impact on diseases like PD is of utmost importance.

There are only a few studies that have studied the impact of the COVID-19 lockdown period on the motor and non-motor

manifestations of PD. In a series of 100 PD patients and 100 caregivers from India, questions were posed regarding any symptomatic worsening noted after 3 weeks of lockdown. In this study, 11% of patients and 10% of caregivers noted symptomatic worsening of their symptoms, with tremors being the most frequent complaint.^[8] However, the study was conducted only three weeks after lockdown initiation. For a more precise idea regarding the impact of COVID-19 on PD symptomatology, a longer duration of stress would be required. Thus, the relationship between PD worsening due to the impact of COVID-19 is still uncertain. Hence, the present study was undertaken to further investigate the impact of lockdown on the disease activity, caregiver perceptions and the quality of life of patients with PD.

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Submitted: 08-Dec-2020 **Revised:** 29-Dec-2020 **Accepted:** 13-Jan-2021

Published: 05-Apr-2021

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DOI: 10.4103/aian.AIAN_1240_20

METHODS

This study was a single-centre cross-sectional study conducted from June 2020 till September 2020. The study was started after the completion of the lockdown period in India (from 24 March 2020 till 31 May 2020). All participants were subjected to a telephonic interview according to a structured questionnaire after obtaining a telephonically recorded consent from the participants or their legally authorized representatives. The study was approved by the Institutional Ethics Committee prior to starting patient recruitment.

All patients with Idiopathic PD according to the UKPDS Brain Bank Criteria and greater than 18 years of age were included in the study. Patients unable to participate in the study due to advanced PD (due to bed-bound state, dementia, psychosis), atypical Parkinsonism patients (Multiple System Atrophy, Progressive Supranuclear Palsy), active COVID-19 infection and critically ill patients with PD (defined as those with co-existing cardiac/pulmonary co-morbidities such as myocardial infarction, heart failure, pneumonia, chronic obstructive pulmonary disease, Deep vein thrombosis and sepsis due to bedsores) were excluded from the study.

A total of 125 patients with a provisional diagnosis of idiopathic PD and registered under the movement disorder OPD clinic were screened by making telephonic calls. Of these 64 patients with idiopathic PD were finally included in the study. The major reasons for the exclusion of 61 patients were- inability to contact the patient (wrong number registered/number being out of service or switched off/phone not answered/number of a distant relative provided who is not in contact with the patient), expiry of the patient prior to or during the lockdown period, and refusing to consent for the study. The study flow diagram along with reasons for exclusion is provided [Figure 1]. Caregiver perceptions regarding symptom worsening and difficulties faced in taking care of their patients were recorded using the same structured questionnaire. In addition to this, severity

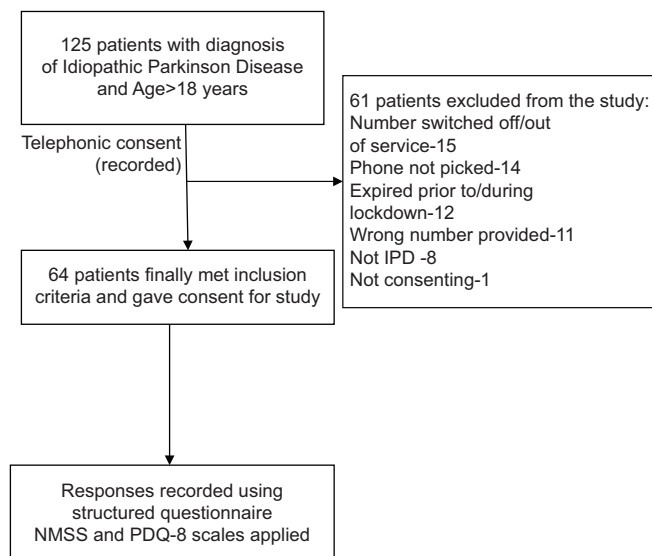


Figure 1: Study Flow Diagram

of non-motor symptoms and the quality of life during the lockdown period were assessed using validated questionnaires like the non-motor symptoms scale (NMSS) and the Parkinson's Disease Questionnaire-8 (PDQ-8), respectively.

Statistical analysis

Categorical variables were represented in terms of proportion and percentages where applicable. Quantitative data was represented in terms of median with interquartile range (IQR) and mean with standard deviations wherever applicable. Statistical analysis was done using Microsoft Excel spreadsheets and SPSS software version 20.0. The responses obtained for the PDQ-8 questionnaire were expressed in terms of percentage of the total score possible.

RESULTS

1. Demographic and Motor Symptom profile of patients with PD during the lockdown period [Table 1]

Of a total 64 patients with PD, 39 (60.9%) were men and 25 (39.1%) were women. The overall median age of the patients in the study was 65 (55.25–69.75) years with the median age among men and women being 66 (57–72) and 63 (52–65) years, respectively. The median disease duration was 48 (30–84) months.

A total of 26 (40.6%) patients reported symptomatic worsening during the lockdown period. Twelve patients (46.1%) reported worsening of rest tremors in upper or lower limbs after the start of the lockdown period. The median time (post lockdown initiation) after which tremors worsened was eight weeks. Ten (38.5%) of 26 patients complained of increase in limb tightness after a median time of 8 weeks post lockdown initiation. A total of 15 (57.7%) patients complained of increased slowness during activities of daily living while 14 (53.8%) patients complained of increased slowness while walking after a median period of 8 weeks. Worsening in various motor symptoms among patients with PD is highlighted in Table 1.

2. Status of non-motor symptoms among patients with PD during the lockdown period [Table 1]

Eleven (42.3%) patients complained of worsening of low mood, anxiety and/or sadness after being in lockdown for a median period of 8 weeks. Insomnia (increased sleep latency) worsened in nine (34.6%) patients while two (7.7%) patients complained of increased sleepiness during the lockdown period. Nine patients (34.6%) complained of increased body pain during the lockdown. The status of other non-motor symptoms is shown in Table 1. In order to assess an association between those reporting worsening of motor symptoms versus those reporting worsening in non-motor symptoms, a Fisher exact analysis was done. However, no significant association was found and *P* value was 0.85.

3. Caregiver perceptions regarding their patient's symptoms during the lockdown period [Table 1]

A total of 64 caregivers were interviewed telephonically and their perceptions regarding their patient's symptoms during the

Table 1: Demographic, motor and non-motor symptom profile among Patients and Caregivers

Parameter	Absolute value/ numbers	Proportion (%) of patients reporting increase in symptoms	Proportion (%) of caregivers reporting increase in symptoms
Median Age in years (IQR)	65 (55.25-69.75)		
Male (%) / Females (%)	39 (60.9) / 25 (39.1)		
Median duration in months (IQR)	48 (30-84)		
Tremors		12/26 (46.2)	10/26 (38.5)
Slowness in ADL		15/26 (57.7)	16/26 (61.5)
Slowness in walking		14/26 (53.8)	14/26 (53.8)
Tightness in limbs		10/26 (38.5)	7/26 (26.9)
Falls		1/26 (3.8)	1/26 (3.8)
Freezing		4/26 (15.4)	4/26 (15.4)
Sadness/anxiety/low mood/hopelessness		11/26 (42.3)	11/26 (42.3)
Insomnia		9/26 (34.6)	8/26 (30.8)
Hypersomnolence		2/26 (7.7)	1/26 (3.8)
Pain		9/26 (34.6)	8/26 (30.8)
Bladder/bowel complaints		0/26 (0)	0/26 (0)

lockdown period were recorded. Twenty-six (40.6%) of the 64 caregivers interviewed reported symptomatic worsening in their patients. Of these, ten (38.5%) reported worsening of tremors, 16 (61.5%) reported slowness in ADL's, 14 (53.8%) felt an increased slowness in walking. Caregiver perceptions regarding motor and non-motor symptoms are highlighted in Table 1.

Ten (15.6%) caregivers felt that caring for their patients had become more difficult during the lockdown period. The difficulties being faced by the caregivers were enquired and eight of ten caregivers felt that symptomatic worsening in their patients was the cause of this difficulty. Seven caregivers felt that inability in getting a doctor's appointment during the lockdown period was affecting their patient's care. Four caregivers felt difficulty in refilling medications during the lockdown period.

Only two (3.13%) patients had discontinued their anti-parkinsonian medications while one (1.56%) patient decreased the dose of levodopa/carbidopa during the lockdown period (motor symptom worsened in only one of these while two patients did not report subjective worsening). These three patients had discontinued or decreased treatment for 15–20 days at the beginning of the lockdown period and cited difficulty in procuring medications due to financial issues as the reason. They subsequently restarted their anti-parkinsonian drugs at the prescribed doses. A total of four patients were already receiving anxiolytic/antidepressants or antipsychotics and of these four only one patient worsened due to increased hallucinations during the lockdown period. The other three patients who were on antidepressants did not report any worsening in mood during the lockdown period and two of the three reported increased slowness in ADLs though during the lockdown.

4. Predictors of Quality of life among patients with PD during the lockdown period [Tables 2 and 3]

The median NMSS score among patients with PD in the study was 12.5 (3–24.75). PDQ-8 severity index (PDQ-8 SI)

score was calculated for each patient by dividing the patient's raw score by the maximum possible score possible and multiplying the result by 100 to yield a percentage score for each patient. The median PDQ-8 SI score in the study was 12.5 (6.25–39.07).

Patients reporting sadness, hopelessness or low mood were combined to assess depression. Anxiety was enquired separately. Since, individual responses for these symptoms were quite small, these symptoms were cumulatively analysed as mood changes representing a major NMSS domain. As some of the responses for various motor and non-motor symptoms were very small numbers, in order to better assess their impact on quality of life, worsening reported in various motor and non-motor symptom domains as a whole were taken as two independent variables. Multivariate linear regression analysis was done in order to ascertain whether increase in the motor or non-motor symptoms during the lockdown period was independently associated with quality of life scores (PDQ-8 SI) among patients with PD. It was found that increase in non-motor symptoms (mood changes, sleep disturbances, pain, bladder/bowel complaints) during the lockdown period as well as the total NMSS score (in the last 4 weeks) were independent predictors of PDQ-8 SI scores among patients with PD with the *P* values for these variables being 0.004 and < 0.0001, respectively.

Logistic regression analysis was done keeping the highest quartile scores of PDQ-8 SI (denoting poor quality of life) as a dependent variable and using age, sex, disease duration, any increase in motor symptoms, any increase in non-motor symptoms during the lockdown as independent variables. The analysis revealed that increase in non-motor symptoms reported during the lockdown period was independently associated with the highest quartile of PDQ-8 SI scores denoting poorer quality of life [p-value-0.0005, OR-29.52, 95% CI- 4.45-195.88].

Table 2: Predictors of quality of life (PDQ-8 SI scores) among patients with PD during the lockdown period

Independent variables	Co-efficient	Standard error	t	P
Age	-0.06698	0.1888	-0.355	0.7242
Sex	2.2076	4.0396	0.546	0.5872
Disease duration	0.05730	0.04253	1.347	0.1840
Increase in any motor symptoms	5.6395	4.6800	1.205	0.2339
Increase in any non-motor symptoms	16.3928	5.3413	3.069	0.004*
NMSS total score	0.3805	0.06780	5.611	<0.0001*

*Significant

Table 3: Logistic regression analysis to determine independent predictors of highest quartile of PDQ-8 SI scores during the lockdown period

Independent variable	Co-efficient	Standard error	Odd's Ratio	P	Confidence interval
Age	-0.012389	0.043219	0.9877	0.7744	0.9075 to 1.0750
Sex	-0.40284	0.91194	0.6684	0.6587	0.1119 to 3.9931
Disease duration	0.00072440	0.0094279	1.0007	0.9388	0.9824 to 1.0194
Increase in any motor symptoms	0.66714	0.93167	1.9487	0.4740	0.3138 to 12.1001
Increase in any non-motor symptoms	3.38528	0.96541	29.5262*	0.0005*	4.4508 to 195.8758

*Significant

DISCUSSION

This study was a single-centre cross-sectional study which aimed at assessing the disease activity status, caregiver difficulties and predictors of quality of life among patients with PD during the lockdown period in India. The study showed that both motor as well non-motor symptoms worsened among patients with PD in India over a 4-month lockdown period. The most common motor symptom to worsen was slowness (both in ADL's and in walking) which was seen in 69.2% cases followed by tremors, rigidity and gait freezing. The unnatural restriction on travel, physical activity, social interaction along with financial constraints and lack of job security which occurred over a short time span acted as a tremendous life stressor. Patients with PD are more vulnerable to recent stressors as a dopamine depleted brain leads to reduced coping mechanism to stress.^[9] Chronic stress may lead to increased striatonigral dopaminergic neuron loss via oxidative damage to cell membrane, inflammatory and regulatory T-cell dysfunction, thus leading to worsening of motor symptoms.^[10-12] Moreover, cognitive stress leads to greater activation of locus coeruleus-noradrenergic pathways and may worsen resting tremors in PD.^[13] Fronto-Limbic system activation due to stress may lead to worsening in freezing as well.^[14] All these mechanisms may explain the worsening of motor symptoms among patients with PD during the lockdown period. Our findings of worsening in motor symptoms among patients with PD during the lockdown period is in line with other studies.^[8,15]

Non-motor symptoms such as anxiety and depression are quite common and are found in upto 40-50% of patients with PD. Fifty percent of patients with PD also experience fatigue and it is thus important to pay attention to non-motor symptoms as they portend a greater morbidity among patients with PD^[16,17] Regarding non-motor symptoms, the most

common symptoms to worsen during the lockdown were mood changes, insomnia and pain which were seen in 42.3%, 34.6% and 34.6% of the patients, respectively. Prolonged home confinement due to the lockdown has resulted in an air of uncertainty, anxiety, stress, hopelessness.^[18] There are studies that have shown that quarantine and short-term lockdowns can lead to increased incidence of anxiety, mood disturbances particularly depression, insomnia and posttraumatic stress symptoms.^[19,20] In India, the elderly are used to living in a cohesive family system and their selective isolation from other family members has been shown to have deleterious impact on their psychological health.^[21-23] The impact of the lockdown on the non-motor symptom burden may be greater among patients with PD as dopamine depletion already predisposes to cognitive inflexibility, inability to adapt and an impaired ability to handle stress.^[24-26] A large multi-centric Indian study based on 832 recorded responses from patients with PD found that fatigue, sleep disturbances and mood changes were the most common non-motor symptoms to worsen during home confinement.^[15] These symptoms comprised 20-25% of the total responses. In our study, we found that mood changes, increased sleep latency and pain were the most common non-motor symptoms to worsen during the lockdown period which is in line with prior studies.

Thirty-eight (59.4%) patients did not report any worsening during the lockdown period. All of these patients had continued their anti-parkinsonism drugs. None of the patients who had been interviewed in this study were living alone and had one or more caregivers looking after them. Good drug adherence and presence of family support may be some of the reasons of no worsening being reported among the majority of the patients in this study.

About 40.6% of caregivers reported worsening in motor as well non-motor symptoms in their patients and majority of these

felt that this led to difficulty in providing patient care. Lack of medication availability leading to difficulty in patient care was complained by 6.25% of the total 64 caregivers interviewed. This small percentage might be due to pharmacies remaining open as part of essential services despite the lockdown. A study recording the perceptions of 100 caregivers and 100 patients with PD was conducted during the lockdown from the Southern part of India which found that only 11% of patients and 10% of caregivers perceived symptom worsening.^[8] However, this study was conducted only 3 weeks after the lockdown came into effect which is a very short period for the effects of the lockdown on motor and non-motor symptoms to be apparent. Thus, the low numbers in this study might be an underestimation of the lockdown effect.

We sought to find an association between increase in symptoms reported by patients on the quality of life during the lockdown. Increase in non-motor symptoms and the total NMSS score were found to be independently associated with PDQ-8 SI scores in the study. The increase in non-motor symptoms was found to be independently associated with the highest quartile of PDQ-8 SI scores. Thus, worsening of non-motor symptoms during the lockdown was found to be an independent predictor of poor quality of life in the last 1 month. This finding is along expected lines as it is known that presence of non-motor symptoms is frequently associated with a poorer quality of life among patients with PD.^[27]

Our study found that patients as well as their caregivers reported worsening of both motor and non-motor symptoms during the lockdown period. Our findings are in line with two prior studies from India. However, the patients in our study were exposed to a longer duration of lockdown (4 months) compared to these two studies. In addition, we assessed the quality of life as well as the non-motor symptoms burden (NMSS) among patients with PD and attempted to find any association between symptom worsening and quality of life during the lockdown period. The limitations of our study include a small sample size from a single centre, inability to carry out in-person UPDRS assessment for confirming worsening from baseline, possibility of recall bias associated with cross-sectional telephonic interviews. To the best of our knowledge this is the first study from India which has attempted to find independent predictors of quality of life among patients with PD during the lockdown period. However, larger studies with in person follow-up at different time periods would be required to confirm these results.

CONCLUSIONS

This study showed that the nationwide lockdown imposed in India has led to an increased reporting of motor as well as non-motor symptoms among patients with PD as well as by their caregivers. It also concluded that many caregivers were perceiving difficulties in taking care of their patients due to the lockdown. The increase in non-motor symptoms among patients with PD during the lockdown period was an

independent predictor of higher PDQ-8 SI scores which is a measure of poorer life quality during the lockdown period.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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QUESTIONNAIRE

PROJECT PROFORMA- PART A

Patient Particulars:

1. Name:
2. Age/Sex:
3. Father's Name:
4. Marital Status:
5. Residence:
6. Phone Number:
7. Handedness:
8. Educational status
9. Occupation:
10. Date of Enrollment:
11. Hospital UHID:
12. Project Reference Number:
13. Disease duration:

Questionnaire on disease activity status during the time of COVID-19:

Q.1 Have you noted any increase in tremors (rest/postural) in the upper or lower limbs during the lockdown?

- i) Yes
- ii) No

Q 1a) If yes, after how much time of being in lockdown did you notice the increase in limb tremors?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q2. Have you noted any increase in slowness in activities of daily living (like dressing, bathing, eating food, household chores) in the upper or lower limbs during the lockdown?

- i) Yes
- ii) No

Q 2a) If yes, after how much time of being in lockdown did you notice the slowness in activities of daily living?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q3. Do you feel that your arms or legs feel tighter (compared from before), after the COVID-19 lockdown period started?

- i) Yes
- ii) No

Q 3a) If yes, after how much time of being in lockdown did you notice the increase in limb tightness?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q4. Do you feel your speed of walking has reduced (compared from before) after the COVID-19 lockdown period started?

- i) Yes
- ii) No

Q 4a) If yes, how much extra time (compared from before) do you now take for walking a fixed distance (say till the washroom)?

- i) Double the time
- ii) More than double the time
- iii) Can't walk at all without assistance

Q 4b) If answer to Q4 is yes, after how much time of being in lockdown did you notice slowness in walking?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q5. Are you having a greater number of unprovoked falls, especially while turning & maneuvering narrow spaces, since the lockdown was imposed?

- i) Yes
- ii) No

Q 5a) If yes, how many times have you fell after the beginning of the lockdown till date?

- i) Once or twice
- ii) 2-3 times
- iii) 3-4 times
- iv) 4-5 times
- v) >5 times

Q 5b) If answer to Q5 is yes, after how much time of being in lockdown did you notice this increased tendency to fall?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q6. Are you freezing while walking (more than usual), after the lockdown due to COVID-19 started?

- i) Yes
- ii) No

Q 6a) If yes, after how much time of being in lockdown did you notice this increased tendency to freeze?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q7. Have you or the caregivers noted increase in any of the following symptoms during the COVID-19 lockdown period: feelings of hopelessness, worthlessness, persistent sadness, inappropriate crying, preference for staying aloof, anxiety and talking less with family members?

- i) Yes
- ii) No

Q 7a) If yes, after how much time of being in lockdown did you notice increase in these symptoms?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q8. Have you noted an increased latency to sleep, decreased ability to maintain sleep at night or worsening of dream enactment behaviors since being in lockdown?

- i) Yes
- ii) No

Q 8a) Are you sleeping more than usual since being in lockdown?

- i) Yes
- ii) No

Q 8b) If answer to any of the above questions is yes, after how much time of being in lockdown did you notice these changes?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q9. Have you noticed any increase in the following symptoms during this period: urinary frequency, urgency, urge incontinence, nocturia, constipation or postural dizziness?

- i) Yes
- ii) No

Q 9a) If yes, after how much time of being in lockdown did you notice increase in these symptoms?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q10. Do you experience body pain more frequently than usual, after the COVID-19 lockdown?

- i) Yes
- ii) No

Q 10a) If yes, after how much time of being in lockdown did you notice increase in pain?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more

Q11. Do you as a caregiver feel any increase in symptoms of your patient from the baseline since the start of the COVID-19 lockdown period?

- i) Yes
- ii) No

Q 11a) If yes, according to you which symptom has increased in your patients post COVID-19 lockdown?

- i) Tremors
- ii) Slowness in Activities of daily living
- iii) Tightness in limbs
- iv) Slowness while walking
- v) Falls while walking, turning or maneuvering narrow passages
- vi) Freezing while walking
- vii) Change in Handwriting
- viii) Loss of facial expressions
- ix) Mood changes (Anxiety/low mood)
- x) Sleep disturbances (Insomnia/Hypersomnolence/RBD)
- xi) Dizziness on standing
- xii) Constipation/Urinary Complaints
- xiii) Generalized Body Pain

Q11b) Do you feel that taking care for your patient has become more difficult because of the lockdown imposed?

- i) Yes
- ii) No

Q 11c) If answer to 11b) is yes, then why do you think so?

- i) Worsening of symptoms
- ii) Difficulty in procuring/refilling of medications
- iii) Difficulty in getting doctor appointment and advice
- iv) Feeling helpless, anxious, having a low mood due to the lockdown and due to patient's needs

Q12. Do you require a larger dose or greater frequency of Levodopa during the COVID-19 lockdown period?

- i) Yes
- ii) No

Q 12a) Do you feel that you are having greater frequency of levodopa induced involuntary movements during the COVID-19 lockdown period?

- i) Yes
- ii) No

Q12b) Have you been recently prescribed or require a greater amount of the anti-depressant/anxiolytic/antipsychotic medication?

- i) Yes
- ii) No

Q12 c) If the answers to any of the above questions is yes, then after how much time of being in lockdown did you notice this?

- i) 1 week
- ii) 2 weeks
- iii) 3 weeks
- iv) 4 weeks or more