

## Effect of COVID-19 Related Lockdown on Nonmotor Symptoms of Parkinson's Disease

Sir,

The coronavirus disease 2019 (COVID-19) pandemic, which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has led to a worldwide crisis. To limit the spread of the disease, social distancing has been advocated strongly, and several countries including India have imposed lockdown with suspension of daily outdoor activities. This lockdown situation would appear to be especially difficult for Parkinson's disease (PD) patients to cope with. It is challenging for the PD patients to adjust to these changes owing to their cognitive and motor inflexibility.<sup>[1]</sup> There is an increase in anxiety and stress, as well as worsening of motor symptoms.<sup>[2]</sup> Another important concern was the reduced access to health services and procurement of medications during the lockdown,<sup>[2]</sup> which could aggravate both motor and nonmotor symptoms (NMS) in PD. We undertook this study to evaluate the changes of NMS of PD patients during the COVID-19 lockdown situation.

This study recruited PD patients under regular follow-up at the Movement Disorders clinic of Bangur Institute of Neurosciences, Kolkata, India, who were enrolled in an ongoing study approved by the institutional ethics committee. According to institute protocol, we contacted the patients/caregivers over telephone for routine follow-up. We included patients who had visited our institute at least once during the 3 months preceding the beginning of lockdown, and were on a stable dosing of anti-Parkinsonian medications not requiring any change on their last visit. We compared this baseline data with that obtained from our telephonic interview (done in May–June 2020). We collected demographic details, enquired regarding COVID-19 and difficulties faced during the lockdown, and asked about any change in the motor and nonmotor symptoms of PD. For NMS, we used the 30-item NMS Questionnaire (NMSQuest),<sup>[3]</sup> and additionally enquired for fatigue. Duration of disease was noted and the pre-lockdown modified Hoehn and Yahr (HY) staging was utilized.

Out of total 55 patients, 78.2% were male. Every responder had some knowledge about COVID-19. 52.7% had an

overall perception of deterioration during lockdown, and 9.1% said that their condition improved. None of the patients had COVID-19 or a known history of close contact with a patient of COVID-19. All the patients were continuing their medications, although, 10.9% had some difficulty procuring medicines in the initial stages of lockdown. Patients reported deterioration of motor symptoms such as an increase in slowness (41.8%), stiffness (25.5%), or tremor (30.9%). There was significant increase in prevalence of total NMS per patient ( $P = <0.001$ ), as well as several individual NMS such as, anxiety, impaired concentration, loss of interest, weight loss, and pain [Table 1]. Other NMS also showed increased prevalence during lockdown except, vomiting, bowel incontinence, hyposmia, sexual problems, double vision, and delusion. NMS which were already present pre-lockdown, showed an increase in severity except double vision and bowel incontinence. Taking together the appearance of new symptoms and increase in severity of pre-existing symptoms, the NMS could be grouped as follows-  $\geq 40\%$  increase- impaired concentration, weight loss, anxiety, loss of interest, fatigue, and pain; 20–39% increase- depression, daytime somnolence, restless legs, forgetfulness, constipation, insomnia, dizziness, and urinary urgency;  $<20\%$  increase- rest of the NMS. Younger patients experienced greater overall worsening of NMS ( $r_s = -0.293$ ,  $P = 0.03$ ), and of loss of interest in particular ( $P = 0.003$ ). Worsening of impaired concentration was associated with longer duration of disease ( $P = 0.025$ ). There was no significant difference in increase of NMS regarding gender and HY staging of the patients. There was also no association between worsening of the motor symptoms and increase in NMS.

52.7% of patients deteriorated during lockdown. An Indian study has documented worsening in 28% of PD patients,<sup>[2]</sup> whereas a Spanish study reported deterioration in 65.7% patients.<sup>[4]</sup> The limitations imposed by lockdown including social isolation, restriction of physical activity, and sudden change in lifestyle, along with the anxiety and uncertainty regarding COVID-19, contribute to the aggravation of symptoms in PD patients.<sup>[1]</sup> A study showed that worsening of

**Table 1: Increase of Nonmotor Symptoms during Lockdown**

Part A Individual Nonmotor Symptoms <sup>#</sup>								
NMS	Frequency of NMS			Increase of NMS during lockdown				
	Pre-lockdown (N)	Post-lockdown (N)	P	n (%)	P			
					Age	Sex	HY	Duration
Impaired concentration	32	43	0.024*	27 (49.1)	0.051	0.469	0.466	0.025*
Weight loss	38	47	0.041*	25 (45.5)	0.283	0.721	0.204	0.435
Anxiety	35	46	0.017*	23 (41.8)	0.398	0.990	0.417	0.350
Loss of interest	25	37	0.021*	23 (41.8)	0.003*	0.190	0.643	0.554
Fatigue	47	50	0.376	22 (40)	0.449	0.143	0.252	0.856
Unexplained pain	21	36	0.004*	22 (40)	0.169	0.424	0.055	0.309
Depression	34	41	0.152	20 (36.4)	0.096	0.267	0.598	0.150
Daytime somnolence	35	42	0.145	20 (36.4)	0.234	0.355	0.132	0.264
Restless legs	40	47	0.101	20 (36.4)	0.096	0.355	0.708	0.232
Forgetfulness	33	38	0.319	16 (29.1)	0.303	0.714	0.739	0.268
Constipation	37	41	0.401	15 (27.3)	0.307	0.594	0.253	0.494
Insomnia	25	33	0.127	14 (25.5)	0.985	0.429	0.651	0.194
Dizziness	23	31	0.127	14 (25.5)	0.816	0.429	0.713	0.184
Urinary urgency	32	37	0.324	12 (21.8)	0.071	0.275	0.751	0.532

  

Part B Total Nonmotor Symptoms Per Patient								
Total NMS per patient	Frequency of total NMS		P	Increase of total NMS during lockdown				
	Pre-lockdown (Mean±SD)	Post-lockdown (Mean±SD)		Mean±SD	P			
			Age		Sex	HY	Duration	
	13.04±3.89	15.55±3.18	<0.001*	6.6±3.30	0.03*	0.402	0.857	0.523

\*Significance level at P<0.05, #Showing NMS with ≥20% increase during lockdown

**Table 2: Frequencies of increase in nonmotor and motor symptoms in patients of Parkinson’s disease and comparison with other studies**

	Present study n=55	Turkey <sup>[9]</sup> n=86	Nine centers of India <sup>[10]</sup> n=832	Tuscany, Italy <sup>[11]</sup> n=740	USA <sup>[12]</sup> n=5429 (people with PD)
<b>Nonmotor</b>					
Impaired concentration	27 (49.1)	Orthostatic hypotension 26 (30.2)	Easy fatiguability 209 (25.1)	Anxiety 183 (25.0)	Mood 36.5%
Weight loss	25 (45.5)	Fatigue 21 (24.4)	Sleep disturbances 199 (23.9)	Mood 181 (24.7)	Sleep 36.5%
Anxiety	23 (41.8)	Pain 18 (20.9)	Pain 181 (21.8)	Insomnia 163 (22.2)	Autonomic 20.6%
Loss of interest	23 (41.8)	Daytime sleepiness 18 (20.9)	Anxiety 179 (21.5)		Cognitive 18.5%
Fatigue	22 (40)	Anxiety 13 (15.1)	Depressive symptoms 168 (20.2)		
Unexplained pain	22 (40)	Cognitive impairment 12 (14)	Constipation 163 (19.6)		
Depression	20 (36.4)	Constipation 9 (10.5)	Forgetfulness 149 (17.9)		
Daytime somnolence	20 (36.4)	Apathy 7 (8.1)	Urinary problems 111 (13.3)		
Restless legs	20 (36.4)	Urinary disorder 5 (5.8)	Postural dizziness 108 (12.9)		
Forgetfulness	16 (29.1)	Hallucination 5 (5.8)	Aggressive or impulsive behavior 96 (11.5)		
Constipation	15 (27.3)	Sleep disorder 4 (4.7)	Obsessive thoughts 79 (9.5)		
Insomnia	14 (25.5)	Depression 2 (2.3)	Visual hallucinations 50 (6.01)		
Dizziness	14 (25.5)	Dopamine dysregulation syndrome 1 (1.2)	Auditory hallucinations 35 (4.2)		
Urinary urgency	12 (21.8)				
<b>Motor</b>					
Slowness	23 (41.8)	Bradykinesia 40 (46.5)	Slowness 259 (31.1)	Motor 217 (29.6)	Motor 47.2%
Tremor	17 (30.9)	Tremor 18 (20.9)	Tremor 173 (20.8)		
Stiffness	14 (25.5)	Postural instability 19 (22.1)	Stiffness 203 (24.4)		

\*Numbers in parentheses are percentage

PD patients was dependent on the reduction of physical activity during lockdown.<sup>[5]</sup> 15 NMS showed  $\geq 20\%$  increase, and none of the NMS had an overall decrement. Previous studies have described an increase in some of these NMS during the COVID-19 pandemic, such as anxiety, stress, depression, and cognitive impairment.<sup>[6-8]</sup> However, in addition to these symptoms, our study documented change in the wide spectrum of NMS. Other studies from around the world have also showed worsening of NMS [Table 2]. A Turkish study found maximum worsening in orthostatic hypotension,<sup>[9]</sup> whereas an Indian multicenter study reported the highest increase in easy fatigability followed by sleep disturbances.<sup>[10]</sup> An Italian report showed worsening of anxiety, mood, and sleep,<sup>[11]</sup> and an American study also documented significant involvement of these NMS domains along with autonomic and cognitive impairment.<sup>[12]</sup> We found comparable worsening of these symptoms; however, the greatest increase was for impaired concentration, weight loss, anxiety, and loss of interest. Hence, although there were some differences regarding the magnitude of worsening of the various NMS, there was a similar trend in most of these studies.

Worsening of NMS was greater in younger patients. The younger patients were likely to be more active prior to the lockdown and probably engaged in jobs which were restricted because of the lockdown. This might lead to an increase in NMS, especially anxiety and depression, and explain the loss of interest. Impaired concentration, loss of interest, and forgetfulness might be linked to increased depression and anxiety, although, disruption of daily routine and difficulty of coping with the sudden change of lifestyle may cause cognitive stress that exacerbates or unmasks cognitive impairment. Lack of regular exercise and physical activity possibly aggravated pain and fatigue. However, fatigue may be a manifestation of viral infections including COVID-19, although none of them tested positive for COVID-19 in our study. None of our patients developed new onset hyposmia, and both patients with increased severity of pre-existing hyposmia had tested negative for COVID-19.

To conclude, this study documented worsening of motor and several nonmotor symptoms in PD patients during the COVID-19 pandemic related lockdown in India.

### Financial support and sponsorship

This work was supported by Indian Council for Medical Research under Grant No. BMS/TF/TRANS-NEURO/2014-3454/SEP-15/36/WB/GOVT.

### Conflicts of interest

There are no conflicts of interest.

**Sourav Banerjee, Adreesh Mukherjee, Kochupurackal P. Mohanakumar<sup>1</sup>, Atanu Biswas**

Department of Neurology, Bangur Institute of Neurosciences, Institute of Post Graduate Medical Education and Research (IPGME&R), Kolkata, West Bengal,

<sup>1</sup>Director and Professor of Biological Sciences, Inter University Centre for Biomedical Research and Super Speciality Hospital Mahatma Gandhi University Campus at Thalappady, P.O. Rubber Board, Kottayam, Kerala, India.

**Address for correspondence:** Prof. (Dr.) Atanu Biswas, Department of Neurology, Bangur Institute of Neurosciences, Institute of Post Graduate Medical Education and Research (IPGME&R), 52/1A, S.N. Pandit Street, Kolkata - 700 025, West Bengal, India.  
E-mail: atabis@gmail.com

### REFERENCES

- Helmich RC, Bloem BR. The impact of the COVID-19 pandemic on Parkinson's disease: Hidden sorrows and emerging opportunities. *J Parkinsons Dis* 2020;10:351-4.
- Prasad S, Holla VV, Neeraja K, Suriseti BK, Kamble N, Yadav R, *et al.* Impact of prolonged lockdown due to COVID-19 in patients with Parkinson's disease. *Neurol India* 2020;68:792-5.
- Chaudhuri KR, Martinez-Martin P, Schapira AH, Stocchi F, Sethi K, Odin P, *et al.* International multicenter pilot study of the first comprehensive self-completed nonmotor symptoms questionnaire for Parkinson's disease: The NMSQuest study. *Mov Disord* 2006;21:916-23.
- Santos-García D, Oreiro M, Pérez P, Fanjul G, Paz González JM, Feal Paineiras MJ, *et al.* Impact of Coronavirus disease 2019 pandemic on Parkinson's disease: A cross-sectional survey of 568 Spanish patients. *Mov Disord* 2020;35:1712-6.
- Schirinzi T, Di Lazzaro G, Salimei C, Cerroni R, Liguori C, Scalise S, *et al.* Physical activity changes and correlate effects in patients with Parkinson's disease during COVID-19 lockdown. *Mov Disord Clin Pract* 2020;7:797-802. doi: 10.1002/mdc3.13026. Online ahead of print.
- Shalash A, Roushdy T, Essam M, Fathy M, Dawood NL, Abushady EM, *et al.* Mental health, physical activity, and quality of life in Parkinson's disease during COVID-19 pandemic. *Mov Disord* 2020;35:1097-9.
- Salari M, Zali A, Ashrafi F, Etemadifar M, Sharma S, Hajizadeh N, *et al.* Incidence of anxiety in Parkinson's disease during the Coronavirus disease (COVID-19) pandemic. *Mov Disord* 2020;35:1095-6.
- Palermo G, Tommasini L, Baldacci F, Del Prete E, Siciliano G, Ceravolo R. Impact of COVID-19 pandemic on cognition in Parkinson's disease. *Mov Disord* 2020;35:1717-8.
- Say B, Özenc B, Ergün U. Covid-19 perception and self reported impact of pandemic on Parkinson's disease symptoms of patients with physically independent Parkinson's disease. *Neurol Asia* 2020;25:485-91.
- Kumar N, Gupta A, Kumar H, Gupta R, Kumar H, Mehta S, *et al.* Impact of home confinement during COVID-19 pandemic on Parkinson's disease. *Parkinsonism Relat Disord* 2020;80:32-4.
- Del Prete E, Francesconi A, Palermo G, Mazzucchi S, Frosini D, Morganti R, *et al.* Prevalence and impact of COVID-19 in Parkinson's disease: Evidence from a multi-center survey in Tuscany region. *J Neurol* 2020. <https://doi.org/10.1007/s00415-020-10002-6>.
- Brown EG, Chahine LM, Goldman SM, Korell M, Mann E, Kinel DR, *et al.* The effect of the COVID-19 pandemic on people with Parkinson's disease. *J Parkinsons Dis* 2020;10:1365-77.

**Submitted:** 21-Jan-2021 **Revised:** 26-Jan-2021 **Accepted:** 16-Feb-2021

**Published:** 21-Apr-2021

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**DOI:** 10.4103/aian.AIAN\_65\_21