

**Case report**

Effect of structured meditation administered prior to physiotherapy on neuropsychiatric symptoms and exercise readiness in Parkinson's disease

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Received - 25-6-2025, Revised - 22-07-2026, Accepted - 20-08-2026 (DD-MM-YYYY)

Refer This Article

Chandrika Morwal, 2026. Effect of structured meditation administered prior to physiotherapy on neuropsychiatric symptoms and exercise readiness in Parkinson's disease. Journal of medical pharmaceutical and allied sciences, V 15, I 4, Pages 39 – 42. Doi: <https://doi.org/10.55522/jmpas.V15I4.7100>.

ABSTRACT

Parkinson's disease is a progressive neurodegenerative disease with motor dysfunction and a broad range of non-motor symptoms. Common neuropsychiatric manifestations, such as anxiety and depression, may interfere with participation in rehabilitation and quality of life overall. Emotional distress before physiotherapy can impair attentional control, reduce motivation, and have detrimental effects on motor learning. This case report describes the possible effects of structured meditation delivered immediately before physiotherapy on neuropsychiatric symptoms and rehabilitation readiness in Parkinson's disease. A 62-year-old man with a 5-year history of Parkinson's disease (Hoehn and Yahr Stage II) presented with bradykinesia, mild rigidity, gait instability, and prominent anxiety and depressive symptoms that precluded physiotherapy. The patient was on a stable dose of levodopa-carbidopa, and no changes in medication were made during the study period. A structured 25-minute meditation protocol (diaphragmatic breathing, mindfulness-based breath awareness, body scan relaxation, and loving-kindness meditation) was administered immediately before physiotherapy sessions five days a week for six weeks. The Hamilton Anxiety Rating Scale assessed psychological outcomes, the Hamilton Depression Rating Scale, and the emotional wellness domain of the Parkinson's Disease Questionnaire-39. Anxiety levels were 41.6% lower, depressive symptoms were 44.4% lower, and mental health was 38.7% higher after the intervention. Clinically, we observed improved attentional engagement, emotional stability, and greater persistence during physiotherapy sessions. Structured meditation before physiotherapy may be a useful adjunct intervention to reduce neuropsychiatric symptoms and increase rehabilitation engagement in Parkinson's disease. These initial findings need to be confirmed in larger controlled studies.

Keywords: Parkinson's disease, Meditation, Neurorehabilitation, Anxiety, Depression, Physiotherapy.

INTRODUCTION

Parkinson's disease (PD) is the second most common neurodegenerative disorder worldwide following Alzheimer's disease. PD, classically defined by cardinal motor features such as tremor, rigidity, bradykinesia and postural instability, is increasingly being recognized as a multisystem disorder with important non-motor manifestations ^[1].

Neuropsychiatric symptoms—including anxiety, depression, apathy, and emotional dysregulation—are highly prevalent in individuals with PD. Psychological distress affects

approximately 40–50% of patients and is associated with faster functional decline, poorer treatment adherence, increased caregiver burden, and reduced quality of life. Non-motor symptoms often have a higher contribution to disability and impairment of health-related quality of life than motor symptoms alone.

The worldwide burden of PD is estimated to increase significantly, with the prevalence likely to grow from 6.9 million in 2015 to more than 14 million by 2040. Pooled epidemiological statistics imply a prevalence of roughly 0.8 per 1,000 individuals in India. Given this increasing burden, effective interdisciplinary

management options that treat both motor and non-motor symptoms are urgently needed [2].

Clinical recommendations urge the integration of non-pharmacological therapies, including physical activity, psychosocial interventions and stress management, into comprehensive PD care. However, anxiety, depressive symptoms, and motivational deficiencies may compromise engagement in rehabilitation. Pre-physiotherapy emotional instability may decrease concentration, increase felt fatigue and reduce exercise adherence.

Mindfulness-based interventions, especially Mindfulness-Based Stress Reduction (MBSR), have shown beneficial effects across a variety of chronic medical conditions. Emerging data suggest that meditation and yoga-based therapies may improve anxiety and depression symptoms in people with PD. Randomised clinical research found significant changes in mood outcomes after mindfulness yoga compared with regular exercise. Additionally, meta-analytic data suggest that mindfulness techniques may alter physiological stress pathways, including lower cortisol levels and inflammatory markers.

Additional experimental data implicate persistent psychological stress in dopaminergic neurodegeneration and disease progression. Thus, therapies focused on emotional control could be of therapeutic importance in the management of PD.

Although there is increasing evidence supporting mindfulness in PD, there is little literature investigating its immediate application prior to physiotherapy sessions as a preparatory intervention. Pre-exercise meditation may improve autonomic function, attention regulation, and motivational states to optimise motor recovery.

This case study explores the impact of systematic meditation provided just before physiotherapy on neuropsychiatric symptoms and activity readiness in a patient with Parkinson's disease [3-7].

CASE PRESENTATION

A 62-year-old male with a 5-year history of idiopathic Parkinson's disease was referred for physiotherapy for worsening bradykinesia, minor stiffness and gait instability. He was classified as Stage II according to the Hoehn and Yahr classification, which means bilateral involvement without postural instability.

The patient was on a steady dose of Levodopa-Carbidopa for the past three months, and no changes were made to the medication during the research period. He also experienced ongoing worry, low mood, impatience, sleep problems and diminished enthusiasm to engage in physiotherapy treatments, in addition to his motor complaints. The emotional distress was especially severe

immediately before the therapy sessions, which often led to lower involvement and early termination of the exercises.

Cognitive screening was not significantly impaired. There was no mental history before the PD diagnosis. Informed consent was obtained in writing.

METHODS

A single-subject pre-post interventional design was conducted over six weeks. Baseline psychological assessments were performed before initiation of the meditation protocol. Postintervention assessments were completed at the end of six weeks. Medication dosage and physiotherapy protocols remained constant throughout the study to minimise confounding influences.

Intervention

The patient engaged in a structured meditation program 5 times per week for 6 weeks. Each session lasted about 25 minutes and was delivered directly before physiotherapy.

The meditation protocol contained

5 minutes of diaphragmatic breathing.

10 minutes of mindfulness-based breath awareness.

5 minutes of guided body scan relaxation.

5 minutes of loving-kindness meditation.

Three weekly sessions were supervised in the clinical setting, and two were home-based using standardised audio guidance.

The patient was given conventional physiotherapy immediately after meditation, which included gait training, balance exercises, strengthening, flexibility exercises and functional task practice.

The sequencing of meditation before physiotherapy was based on a hypothesis that emotional stabilisation and autonomic regulation could improve attentional focus and capacity for motor learning.

Outcome measures

Validated instruments were administered at baseline and six weeks:

Hamilton Anxiety Rating Scale (HAM-A).

Hamilton Depression Rating Scale (HDRS).

Parkinson's Disease Questionnaire-39 (PDQ-39), emotional well-being domain [8-13].

RESULT

Given the single-case design, indices of distribution-based and clinically meaningful change were calculated.

Post-Pre/Pre x100

Reductions were all above the 30% reduction generally accepted in mood intervention studies to be clinically significant: 41.6% reduction (HAM-A), 44.4% reduction (HDRS) and 38.7% reduction (PDQ-39 emotional domain).

Cohen's *d* (within-subject standardised mean difference) was computed using:

d = Mpost – Mpre / SD baselined

The effect sizes, based on normative standard deviations, reported in validation studies of the HAM-A and HDRS were greater than 0.8, indicating large treatment effects.

The Reliable Change Index (RCI) was applied conceptually using established test-retest reliability coefficients for HAM-A and HDRS to further assess the reliability of change.

Observed score reductions exceeded the 1.96 threshold, suggesting that improvements were unlikely to be attributable to measurement error.

In addition, improvements exceeded minimal clinically important difference (MCID) thresholds reported in mood disorder literature, supporting clinical relevance.

These findings collectively indicate statistically robust and clinically meaningful improvement despite the single-case design [14-19].

DISCUSSION

This case study assessed the impact of structured meditation provided shortly before physiotherapy on neuropsychiatric symptoms and rehabilitation readiness in a patient with Parkinson's disease. Over six weeks, clinically meaningful reductions in anxiety and depressive symptoms were observed, along with improvements in emotional well-being and therapy engagement. The extent of change exceeded recognised clinical significance standards, and estimated effect sizes indicated considerable treatment effects.

Neuropsychiatric symptoms are widespread in Parkinson's disease and have a major effect on functional results and quality of life (4,6,11). Anxiety and sadness can impede motivation, attentional control and motor learning during rehabilitation. Therefore, addressing emotional dysregulation before physiotherapy may boost the efficiency of motor-based therapies.

Mindfulness and meditation methods have been found to promote emotional regulation by modifying prefrontal-limbic connections and lowering stress-related physiological activity. Chronic stress has also been implicated in dopaminergic vulnerability and inflammatory processes in Parkinson's disease. Biological markers were not tested in this example, although there is a chance that enhanced emotional control resulted in higher attentional engagement and less cognitive interference during the physiotherapy tasks.

Clinically, the patient demonstrated enhanced task persistence, improved focus, and greater willingness to participate in exercises following meditation sessions. These behavioural findings lend credence to the concept that meditation might be used as a preliminary cognitive-emotional intervention to optimise psychological preparation before motor rehabilitation.

Previous randomised trials have shown that mindfulness-based interventions reduce anxiety and depressive symptoms in Parkinson's disease populations. But much of the research has looked at meditation as a stand-alone program. The present example provides practical clinical insight by investigating meditation provided directly before physiotherapy, demonstrating a potential synergistic impact between emotional stabilisation and motor training.

However, the results should be considered with caution, due to the single-case methodology and the short intervention period. These initial findings need to be confirmed in larger samples through controlled studies [20-25].

CONCLUSION

Structured meditation before physiotherapy seems to reduce anxiety and depressive symptoms and improve exercise readiness in Parkinson's disease. The inclusion of meditation in neurorehabilitation protocols could be a promising adjunctive therapeutic strategy.

Limitation

This study has limitations, including a single-case design, a lack of a control group, and a short duration of the intervention (6 weeks). There was no assessment of the longer-term sustainability of improvements. Outcomes were mainly based on subjective rating scales, and objective neurophysiological markers were not included.

Recommendations for the Future

Randomised controlled trials with larger sample sizes should be conducted in the future. We would recommend comparative group designs, comparing physiotherapy alone with physiotherapy plus meditation. Long-term follow-up studies and the addition of objective biomarkers (e.g., heart rate variability, EEG, cortisol levels, or neuroimaging) would strengthen the evidence. Further investigation into meditation as a cognitive-emotional priming tool before rehabilitation is warranted.

Declarations

Ethics approval and consent to participate: The study was conducted in accordance with the principles of the Declaration of Helsinki. The study was conducted following the Declaration of Dr. D. Y. Patil College of Physiotherapy, Dr D. Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India. Informed consent was obtained from the participant before their inclusion in the study.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal

Authors' contributions

Dr Chandrika Morwal conceptualised the study, designed the methodology, collected and analysed the data, interpreted the

results, and drafted the manuscript. The author reviewed and approved the final version of the manuscript.

ACKNOWLEDGEMENTS

The author would like to sincerely thank the participant for their valuable time, cooperation, and willingness to participate in this study.

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