

THE EFFECT OF BRAIN GYM EXERCISES VS CONVENTIONAL PROTOCOL ON MOTOR FUNCTION IN PATIENTS WITH PARKINSON'S DISEASE USING THE UNIFIED PARKINSON'S DISEASE RATING SCALE (UPDRS)

Akash Desai

Undergraduate Student, Bachelor of Physiotherapy
LSFPEF's College of Physiotherapy, Pune, Maharashtra, India

Dr.Varsha A Kulkarni

Principle and Head of Neuro Department (HOD)
LSFPEF's College of Physiotherapy, Pune, Maharashtra, India

ABSTRACT

Background: Parkinson's disease (PD) is a progressive neurodegenerative disorder that significantly affects motor function and activities of daily living. **Aim:** The present study aimed to compare the effect of Brain Gym exercises combined with conventional physiotherapy and conventional physiotherapy alone on motor function in individuals with Parkinson's disease using the Unified Parkinson's Disease Rating Scale (UPDRS). **Methodology:** An experimental study was conducted on 30 Parkinson's patients divided into two groups of 15. Group A received Brain Gym exercises with conventional physiotherapy, while Group B received conventional physiotherapy alone for 4 weeks. **Results:** Group A showed a mean improvement of 2.26 points (3.15%), while Group B showed a mean improvement of 2.86 points (3.67%). The difference between groups was not statistically significant ($U = 106.50$, $p = 0.816$). **Conclusion:** Both interventions improved motor function; however, Brain Gym exercises did not demonstrate additional benefit over conventional physiotherapy.

Keywords

Parkinson's Disease, Brain Gym Exercises, Conventional Physiotherapy, Motor Function, Unified Parkinson's Disease Rating Scale, UPDRS

INTRODUCTION

Parkinson's disease (PD) is a progressive neurodegenerative disorder and the second most common neurodegenerative condition after Alzheimer's disease. It is also the fastest-growing neurological disorder globally.[1] PD is characterized by the progressive degeneration of dopaminergic neurons within the substantia nigra, resulting in impaired basal ganglia function and deficits in movement initiation and execution. [2,5] The hallmark symptoms of Parkinson's disease include bradykinesia, rigidity, tremor, gait impairment, and postural instability, all of which significantly impair motor function and activities of daily living. [2,3,4,5]

Motor function refers to the ability to perform voluntary movements efficiently.[3] In Parkinson's disease, degeneration of dopaminergic neurons leads to bradykinesia, rigidity, tremor, postural instability, and gait impairment, resulting in significant limitations in functional mobility and activities of daily living.[5]

Consequently, physiotherapy has become an integral component of Parkinson's disease management. Physiotherapy interventions aim to improve motor performance, functional mobility, balance, gait, muscle strength, and independence in activities of daily living through task-specific training, strengthening exercises, balance training, and functional exercises.[6]

One such emerging rehabilitation approach is Brain Gym, an educational kinesiology program developed by Paul and Gail Dennison during the 1970s and later promoted widely in the 1980s.[4,7,8] Brain Gym consists of 26 basic movement exercises designed to enhance cognitive functioning, improve motor skills, and facilitate whole-brain learning through neural remodelling.[4] The intervention is believed to influence the neural mechanisms and white matter connectivity of the brain, thereby enhancing communication between different brain regions.[7]

The unified Parkinson's disease rating scale (UPDRS) is one of the most widely accepted tools for assessing disease severity and progression in individuals with Parkinson's disease.[8] Although conventional physiotherapy has demonstrated effectiveness in improving motor performance and functional independence, evidence regarding the effectiveness of Brain Gym exercises in improving motor function in individuals with Parkinson's disease remains limited. Therefore, the present study aims to investigate the effect of Brain Gym exercises on motor function in individuals with Parkinson's disease using the unified Parkinson's disease rating scale as the primary outcome measure.

METHODOLOGY

An experimental study was conducted on 30 Parkinson's patients using convenient sampling. The study was conducted in an urban area for a duration of 4 weeks.

Participants were divided into two groups of 15 individuals each. Group A received conventional physiotherapy along with Brain Gym exercises, while Group B received conventional physiotherapy alone. The intervention was conducted 6 times a week for 4 weeks.

Inclusion Criteria

1. Individual with diagnosis of Parkinson's as confirmed by reports from Neurologist or Neuro physician.
2. Age group – 40 to 60 yrs.
3. Person with stage 2, 2.5 or 3 Parkinson's disease according to Hoehn and Yahr staging.
4. Ability to Understand and Follow Instructions.
5. Willingness to Participate in the Study.

Exclusion Criteria

1. Severe Cognitive Impairment.
2. Current participation in other trials.
3. Recent Surgeries.
4. Significant visual or auditory impairment.

Outcome Measure

The Unified Parkinson's Disease Rating Scale (UPDRS) was used for pre-intervention and post-intervention assessment.

Intervention

The conventional rehabilitation treatment protocol included warm-up, dynamic stretching, aerobic exercise, strength training, balance and motor control training, flexibility and stretching, and cool-down.

The Brain Gym exercise protocol included drinking water, spot marching, cross crawl, hook-ups, neck rolls, positive points, gravity glider, earth buttons, a lazy 8's, and the energy yawn.

RESULTS

The majority of participants were male (63.3%), while females were 36.7% of the study sample, indicating a male predominance among individuals with Parkinson's disease in the present study.

The mean UPDRS score in Group A (Brain Gym + conventional physiotherapy) decreased from 71.73 to 69.47, reflecting an improvement of 2.26 points (3.15%).

The mean UPDRS score in Group B (conventional rehabilitation) decreased from 77.93 to 75.07, reflecting a mean improvement of 2.86 points (3.67%).

Both groups showed improvement in mean UPDRS scores after the intervention, with the conventional rehabilitation group demonstrating a marginally greater mean improvement than the experimental group, although the difference was not statistically significant.

To compare the effectiveness of the interventions, change scores were calculated by subtracting the post-intervention UPDRS scores from the pre-intervention scores. Mann–Whitney U analysis demonstrated no statistically significant difference in the magnitude of improvement between the experimental and conventional physiotherapy groups ($U = 106.50$, $p = 0.816$).

DISCUSSION

The present study investigated the effectiveness of Brain Gym exercises combined with conventional physiotherapy compared with conventional physiotherapy alone in individuals with Parkinson's disease using the Unified Parkinson's Disease Rating Scale (UPDRS).

Both groups showed improvement in UPDRS scores following the intervention. However, no statistically significant difference was observed between the experimental and conventional groups in the magnitude of improvement.

The experimental group showed a mean improvement of 2.26 points (3.15%), whereas the conventional rehabilitation group showed a mean improvement of 2.86 points (3.67%). The between-group comparison was not statistically significant, indicating that the addition of Brain Gym exercises did not result in superior clinical outcomes within the intervention period.

The absence of a significant between-group difference may also be explained by the relatively small sample size, short intervention duration, and the progressive nature of Parkinson's disease, which can influence responsiveness to rehabilitation.

Overall, the findings of the present study suggest that conventional physiotherapy remains an effective intervention for improving motor function in individuals with Parkinson's disease. While Brain Gym exercises were safe and feasible to administer, they did not demonstrate additional therapeutic benefit beyond that achieved with conventional physiotherapy alone.

CONCLUSION

Although the conventional physiotherapy group showed slightly greater improvement, the difference between the groups was not statistically significant ($p > 0.05$). Therefore, the null hypothesis was accepted, indicating that both interventions were equally effective in improving motor function within the limitations of the present study.

REFERENCES

- 1.Kalinderi K, Bostantjopoulou S, Fidani L. Parkinson's disease: Epidemiology and stem cell therapy. *Oncol Rev.* 2016;10(1):16-22.
- 2.Zafar S, Yaddanapudi SS. Parkinson disease. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024.
- 3.O'Sullivan SB, Schmitz TJ, Fulk GD. Physical rehabilitation. 7th ed. St. Louis (MO): Elsevier; 2019. p. 193-194.
- 4.DeLisa JA. Physical medicine and rehabilitation: Principles and practice. 6th ed. Philadelphia (PA): Wolters Kluwer; 2020.
- 5.Osborne JA, Botkin R, Colon-Semenza C, et al. Physical therapist management of Parkinson disease: Clinical practice guideline. *Phys Ther.* 2022;102(4).
- 6.American College of Sports Medicine. ACSM's guidelines for exercise testing and prescription. 10th ed. Philadelphia (PA): Wolters Kluwer; 2018.
- 7.Dennison PE, Dennison G. Brain Gym: Teacher's edition. Ventura (CA): Edu-Kinesthetics Inc.; 1989.
- 8.Goetz CG, Tilley BC, Shaftman SR, Stebbins GT, Fahn S, Martinez-Martin P, et al. Movement Disorder Society-sponsored revision of the Unified Parkinson's Disease Rating Scale (MDS-UPDRS): Scale presentation and clinimetric testing results. *Mov Disord.* 2008;23(15):2129-2170.
- 9.Abdolahi A, Scoglio N, Killoran A, Dorsey ER, Biglan KM. Potential reliability and validity of a modified version of the Unified Parkinson's Disease Rating Scale that could be administered remotely. *Mov Disord.* 2013;28(6):730-733.
- 10.Hoehn MM, Yahr MD. Parkinsonism: Onset, progression and mortality. *Neurology.* 1967;17(5):427-442.
- 11.Bhattad R, Gandhi B. Effect of Brain Gym exercises on executive functions and dual task performance in persons with Parkinson's disease. 2024.
- 12.Khan L, Shivdikar R, Kumar A. Effects of Brain Gym exercises on attention and anxiety in adolescents: An experimental study. *Int J Physiother Res.* 2024;12(3):4697-4702.

Copyright & License:

© Authors retain the copyright of this article. This work is published under the Creative Commons Attribution 4.0 International License (CC BY 4.0), permitting unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.