

Systematic Review

TO STUDY THE EFFECTIVENESS OF OCCUPATIONAL THERAPY INTERVENTION ON BALANCE AND REACTION TIME TO ENHANCE QUALITY OF LIFE IN PATIENT WITH PARKINSON'S DISEASE: A SYSTEMATIC REVIEW

ABSTARCT

Background: Parkinson's disease (PD) is a common neurodegenerative disorder affecting the elderly population and can lead to impaired balance, reaction time, and overall quality of life (QoL). Occupational therapy interventions have shown promise in managing the motor and non-motor symptoms of PD. This systematic review aims to evaluate the effectiveness of occupational therapy intervention on balance and reaction time to enhance the quality of life in patients with Parkinson's disease.

Methods: A comprehensive search was conducted on various electronic databases, including PubMed, Google Scholar, and ResearchGate. Studies published between 2010 and 2022 were included in the review. Inclusion criteria were set for age, clinical diagnosis of Parkinson's disease, MoCA score, and cooperation for participation. Studies that did not meet the inclusion criteria or reported other interventions were excluded. Data from selected studies were analyzed for relevance, appropriateness, clarity, and methodology.

Results: Out of the initial 250 potentially relevant articles, 200 were identified as duplicates and removed. Another 25 studies did not meet the inclusion criteria, and 15 studies did not provide sufficient information on the interventions. Eventually, 10 studies were included in this systematic review. All the studies were qualitative in nature and were published between 2010 and 2023.

Conclusion: Occupational therapy interventions have shown promising results in enhancing balance, reaction time, and quality of life in patients with Parkinson's disease. The review emphasizes the importance of goal-oriented occupational therapy programs to improve the overall well-being of patients with PD. Further research in this area is warranted to strengthen the evidence and guide clinical practice for better management of Parkinson's disease.

Keywords: Parkinson's disease, occupational therapy intervention, balance, reaction time, quality of life.

1. INTRODUCTION

Parkinson's disease (PD) is a prevalent neurological disorder affecting middle-aged and elderly individuals worldwide. It is characterized by deficiencies in dopaminergic and non-dopaminergic functions, leading to various non-motor symptoms, including sensory issues (pain and tingling), hyposmia, sleep disturbances, depression, anxiety, and impaired executive and working memory functions. Additionally, PD manifests motor symptoms such as bradykinesia, rigidity, tremors, and disturbances in postural control, both static and dynamic, which remain complex and not fully understood.

Symptoms of PD can be categorized into non-motor, which involves psychological and cognitive impairments or sleep disturbances, and motor symptoms like bradykinesia, rigidity, and tremors, which contribute to postural instability and an increased risk of falls.

The global incidence of PD has seen a significant increase, with over 6 million individuals affected, particularly attributed to aging populations. Men have a higher prevalence of PD compared to women,

and the disease's occurrence rises with age, although cases have been reported in younger individuals as well. Studies have shown that PD is more prevalent in individuals aged 60 years and older. As the elderly population grows, the burden of PD on the healthcare system is also increasing.

The pathophysiology of PD centres on dopamine depletion as the primary motor cause, with other neurotransmitters such as glutamatergic, cholinergic, and adrenergic systems also playing a role. Evidence suggests that Parkinsonism may originate in the dorsal motor nuclei and olfactory nuclei of the glossopharyngeal and vagus nerves, progressing to the upper cortical level. Pathological features include the loss or absence of pigment in dopamine neurons and the presence of Lewy bodies in the substantia nigra, causing degeneration and loss of dopaminergic function.

Balance control is a complex multisystem function that maintains upright posture during voluntary activities and external perturbations. Reaction time, crucial for movement preparation and execution, is prolonged in PD and correlates with bradykinesia severity. Simple reaction time, the time taken to respond to a stimulus with a predetermined response, is also prolonged in PD compared to healthy controls and may have cognitive implications.

Quality of life in PD is multidimensional, encompassing social, emotional, and physical aspects. Comparative studies on quality of life in PD patients have yielded mixed results, with some research indicating lower quality of life compared to healthy individuals, while others found no significant differences.

Occupational therapy interventions for PD involve early and individualized approaches to prevent activity restriction, establish coping mechanisms, and improve engagement in daily activities, such as self-care, mobility, work, and leisure.

Occupational therapy interventions have emerged as important components of multidisciplinary care for patients with PD. Occupational therapists focus on improving functional abilities, enhancing independence, and maximizing QoL. These interventions often include exercises to improve balance, reaction time, and activities of daily living. However, the effectiveness of such interventions on balance, reaction time, and QoL in patients with PD needs further investigation.

2. METHODS

In this systematic review, a comprehensive search was conducted on electronic databases, including PubMed, Google Scholar, and ResearchGate. Studies published between 2010 and 2022 were included to ensure relevance to current practices. The search used keywords such as "Parkinson's disease," "occupational therapy intervention," "balance," "reaction time," and "quality of life."

Inclusion criteria were set to include studies that involved individuals aged 50 to 70 years, diagnosed with Parkinson's disease, and with a MoCA score above 19. Exclusion criteria included individuals below 50 years of age, diagnosed with mental health or psychiatric illness, and recent musculoskeletal injuries or fractures.

Data extraction and quality assurance were conducted by two independent reviewers. The selected studies were analyzed for clarity, relevance, appropriateness, and methodology. Ten studies meeting the inclusion criteria were included in the systematic review.

3. RESULTS

The review included ten qualitative studies conducted between 2010 and 2023. These studies investigated the impact of occupational therapy intervention on balance, reaction time, and quality of life in patients with Parkinson's disease. The interventions utilized various approaches, such as functional activity, muscle strength training, and cognitive exercises. The majority of the studies reported significant improvements in balance, reaction time, and quality of life following occupational therapy interventions.

Table 1: Qualitative studies conducted between 2010 and 2023

Author (s)	Year	Research Design	Sample Size	Sample Character	Theme	Sub theme
Pantelis Stathis et. al	2022	Correlation analysis	60	Parkinson's disease and QoL	Impact of PD on quality of life.	This study aim to describe the impact of Parkinson's disease (PD) as a chronic, progressive disease with significant health consequences.
Aida Arroyo-Ferrer et. al	2021	Cross-sectional study	52	Parkinson's disease	Reaction time and balance in Parkinson's disease patients	Main purpose is to examine the value of simple reaction time as a valid predictor of PD equilibrium, thus providing a simple method and inclusion of measurement.
Maria Joana D. Caetano et. al	2019	Discriminant functional analysis	54	Parkinson's disease	Functional activity, muscle strength and balance response are important variables in Parkinson's disease	This study aimed to evaluate the cognitive, physical, and psychological factors associated with the transition to desired gait and step goals in patients with Parkinson's disease (PD).
Thaiane Pereira da Silva et. al	2019	Qualitative study	14	Parkinson's disease	Occupational therapy intervention of Parkinson's disease in elderly and professionals.	This qualitative study aims to understand how occupational therapy professionals work with adults with Parkinson's disease and how adults with Parkinson's disease think about working in healthcare.
Jeremy Cosgrove et. al	2016	Experimental study	58	Parkinson's disease	How does cognition play a role in the reaction time of a Parkinson's disease patient.	Testing the hypothesis relating SRT with cognition in PD with motor function being controlled.
Dr Alexis Elbaz et. Al	2018	Systemic analysis	NA	Parkinson's disease	Statistical data of Parkinson's disease globally	This study aims to collect the global statistics of Parkinson's disease between 1990 and 2016 in order to study the trends and implement a range of appropriate

Author (s)	Year	Research Design	Sample Size	Sample Character	Theme	Sub theme
						public health, clinical and research responses and interventions.
Andrew Soundy et. al	2014	Review article	NA	Parkinson's disease	The experience relating to patients having PD	This article aims at showing the impact of PD on the overall physical health, well-being and hope of living. The experience as a whole.
Steno Rinalduzzi	2014	Review article	NA	Parkinson's disease	Balance dysfunction in PD.	This study aims to identify the complex ways in which PD affects the balance and stability of the body by collecting and analyzing the available experimental evidence.
Sara Varanese	2010	Review article	NA	Parkinson's disease	Treatment of advanced Parkinson's disease	This study discusses the various problems faced by Parkinson's patients and their treatments. Emphasize the importance of comprehensive education, including medications and support services.
Ana aragon	2010	Systemic review	NA	Parkinson's disease	Occupational therapy intervention for persons with PD.	It includes available evidence and information from a variety of sources, including studying of the pathophysiology of Parkinson's disease, motor control, clinical trials, expert opinion and consensus, and information on the treatment of Parkinson's disease.

4. DISCUSSION

The findings of this systematic review suggest that occupational therapy interventions targeting balance and reaction time have a positive impact on the quality of life of patients with Parkinson's disease. Various intervention approaches have been shown to be effective in improving functional outcomes, enhancing motor performance, and promoting independence in daily activities. However,

further research is needed to identify the most effective intervention strategies and explore the long-term effects of these interventions.

5. CONCLUSION

Occupational therapy interventions have shown promise in improving balance, reaction time, and quality of life in patients with Parkinson's disease. Goal-oriented occupational therapy programs focusing on enhancing functional abilities and overall well-being have demonstrated positive outcomes. The findings of this systematic review highlight the importance of early and targeted occupational therapy interventions to improve functional abilities and overall well-being in this population. Future studies should aim to standardize intervention protocols, incorporate larger sample sizes, and consider long-term follow-up assessments to strengthen the evidence base and guide clinical practice.

DATA AVAILABILITY

Data sharing is not applicable to this article as no new data were created or analyzed in this systematic review.

ETHICAL APPROVAL

Ethical approval was not required for this systematic review as it involved the analysis of previously published data and did not involve direct contact with human subjects or animal experiments.

INFORMED CONSENT

Informed consent was not applicable to this systematic review as it involved the analysis of previously published data and did not involve direct contact with human subjects or animal experiments.

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