



ROLE OF ECONOMIC EVALUATION IN NEUROLOGICAL PHYSIOTHERAPY: A NARRATIVE REVIEW

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ABSTRACT

Background: Neurological disorders represent a significant global health burden, often leading to long-term disability and increased healthcare costs. Neurological physiotherapy plays a vital role in improving functional outcomes, but it is resource-intensive, necessitating evaluation of both clinical and economic effectiveness. **Objective:** To review and synthesize existing evidence on the role of economic evaluation in neurological physiotherapy and its implications for clinical practice and healthcare decision-making. **Methods:** A narrative review was conducted using databases including PubMed, Scopus, Web of Science, CINAHL, PEDro, and Google Scholar. Keywords such as economic evaluation, cost-effectiveness, neurorehabilitation, and various neurological conditions were used. Studies involving economic analyses (cost-effectiveness, cost-utility, and cost-benefit) in neurological physiotherapy were included. A qualitative synthesis was performed based on type of evaluation, clinical outcomes, and economic findings. **Results:** Most studies reported cost-effectiveness and cost-utility analyses, commonly using incremental cost-effectiveness ratios (ICERs) and quality-adjusted life years (QALYs). Neurological physiotherapy interventions were generally found to be cost-effective, particularly task-specific and intensive rehabilitation approaches. Community-based and home-based rehabilitation reduced healthcare costs while maintaining comparable outcomes. Telerehabilitation demonstrated cost-effectiveness, whereas advanced technologies such as robotics and virtual reality showed mixed economic results due to high initial costs. Key gaps included limited data from low- and middle-income countries, short follow-up durations, and underreporting of indirect costs. **Conclusion:** Economic evaluation is essential in neurological physiotherapy to balance costs with patient outcomes. Evidence supports the cost-effectiveness of many physiotherapy interventions, especially when long-term benefits are considered. Future research should incorporate long-term and societal perspectives to enhance decision-making and ensure sustainable neurorehabilitation services.

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INTRODUCTION

Neurological disorders are a major global health concern, affecting nearly one billion people worldwide and contributing significantly to the global burden of disease (1,18,21).

The World Health Organization (WHO) defines

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neurorehabilitation as “an active process through which individuals with neurological impairments achieve optimal physical, mental, and social functioning” (2,3). The goal of rehabilitation professionals is to minimize disability and improve functional independence. Principles of neurological rehabilitation emphasize restoring function through task-oriented and patient-centered approaches (22).

Technological advancements have increasingly been integrated into rehabilitation, enhancing therapy intensity, repetition, and patient engagement (4,5,24). Neuroplasticity principles further support the role of repetitive, task-specific training

in recovery following neurological injury (25). Neurological physiotherapy plays a central role in improving mobility, balance, and functional independence.

However, neurological physiotherapy is resource-intensive, requiring long-term therapy, specialized equipment, and skilled professionals. With rising healthcare costs, particularly in low- and middle-income countries, evaluating both clinical effectiveness and economic value is essential.

Economic evaluation is defined as the comparative analysis of alternative interventions in terms of both costs and consequences (1,6). It supports decision-making for healthcare providers, policymakers, and organizations.

MATERIALS AND METHODS

Study Design

A narrative review methodology was adopted to synthesize existing literature due to heterogeneity in study designs and outcomes.

Data Sources and Search Strategy

A systematic search was conducted in PubMed, Scopus, Web of Science, CINAHL, PEDro, and Google Scholar using keywords such as: *economic evaluation, cost-effectiveness, neurorehabilitation, stroke rehabilitation, Parkinson's disease, spinal cord injury, multiple sclerosis, and cerebral palsy*.

Additional manual searches were performed using references of selected studies.

Eligibility Criteria

Inclusion Criteria:

- Studies involving economic evaluation of neurological physiotherapy
- RCTs, cohort studies, systematic reviews, and economic models
- Studies reporting cost-effectiveness, cost-utility, or cost-benefit outcomes

Exclusion Criteria:

- Non-neurological conditions
- Pharmacological or surgical-only studies
- Editorials, conference abstracts, and unpublished work

Data Synthesis and Quality Appraisal

A qualitative synthesis was conducted based on:

- Type of economic evaluation
- Neurological condition
- Clinical and economic outcomes

Quality was assessed based on cost transparency, outcome measures, and reporting standards (17).

RESULTS AND DISCUSSION

Types of Economic Evaluation

The most commonly reported methods were:

- Cost-effectiveness analysis (CEA)
- Cost-utility analysis (CUA)

Studies frequently reported incremental cost-effectiveness ratios (ICERs) using functional outcomes or quality-adjusted life years (QALYs) (8). Cost-benefit analyses were less common due to challenges in monetizing rehabilitation outcomes.

Cost-Effectiveness of Neurological Physiotherapy

Neurological physiotherapy interventions were generally found to be cost-effective compared to standard or minimal care (7).

Task-specific and intensive rehabilitation improves functional outcomes without significantly increasing costs (9,25). Community-based and home-based rehabilitation approaches reduce direct healthcare costs while maintaining similar functional outcomes (13).

Cost-Utility and Quality of Life

Cost-utility studies demonstrated improvements in QALYs and health-related quality of life (10). Early and continuous rehabilitation was associated with better outcomes, supporting value-based care models.

Economic Impact of Advanced Technologies

Economic findings for advanced technologies were mixed:

- **Robotic and virtual reality therapies:** effective but costly (15,16,24)
- **Telerehabilitation:** cost-effective by reducing travel costs and therapist time (14,20)

These approaches are more economically viable when used selectively or alongside conventional therapy.

Key Gaps Identified

The review identified several limitations:

- Limited evidence from low- and middle-income countries (19)
- Underrepresentation of pediatric populations
- Short follow-up durations
- Lack of inclusion of indirect costs such as caregiver burden and productivity loss

These limitations may underestimate the true economic value of neurological physiotherapy.

CONCLUSION

Economic evaluation plays a crucial role in neurological physiotherapy by demonstrating the balance between costs and patient outcomes. Evidence suggests that most physiotherapy interventions are cost-effective, particularly when long-term improvements in functional independence and quality of life are considered.

Strategies such as early intervention, community-based rehabilitation, and appropriate integration of technology provide optimal economic outcomes. Future research should focus on long-term follow-up, inclusion of societal perspectives, and greater representation from low- and middle-income countries. Incorporating economic evaluation into clinical practice and policy-making will help ensure sustainable, accessible, and patient-centered neurorehabilitation services.

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