Review

The Impact of Self-Management Program on Quality of Life and Neurological Function in Stroke Patients: A Systematic Review

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ABSTRACT

Background: *Stroke is the leading cause of death and disability with a high global prevalence, including in Indonesia, which has the second highest stroke mortality rate in Asia. Self-management is a promising rehabilitation strategy to improve post-stroke patients' quality of life (QoL) and neurological function. However, the results of previous studies are still varied and inconsistent. Purpose: To evaluate evidence from randomized controlled trials (RCTs) regarding the effectiveness of self-management programs in enhancing quality of life (QoL) and neurological function among stroke patients, to provide evidence-based recommendations for clinical practice*
Methods: *The systematic review screened RCT studies from PubMed, Scopus, ScienceDirect, and ClinicalKey databases published in the last 5 years. The inclusion criteria are based on the principle of PICOS, with interventions in self-management programs, QoL outcomes, and neurological functions—quality assessment using the CASP Checklist for RCTs.*
Results: *Of the 2020 articles identified, 11 studies with 3,892 participants met the criteria. The self-management programs used varied, including telerehabilitation, physical exercise, personalized music, and multifaceted interventions. The duration of the program ranges from 3 to 52 weeks. Most studies showed significant improvements in QoL and neurological function of stroke patients.*
Conclusion: *Self-management programs are effective in improving the QoL and neurological function of stroke patients, with effectiveness affected by the type of intervention and the program duration. These findings support the implementation of self-management programs in evidence-based stroke rehabilitation.*

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Introduction

Stroke is one of the leading causes of death and disability worldwide, with a high global prevalence. Statistically, 1 in 4 adults over the age of 25 is expected to have a stroke in their lifetime (Feigin et al., 2022). Indonesia ranks second in the highest death rate of stroke cases in Asia (Tan et al., 2024). A stroke occurs due to a disorder in the cerebrovascular system that causes a reduced blood supply to the brain, such as due to thrombosis, embolism, or bleeding (Alsubiheen et al., 2022; Kuriakose & Xiao, 2020). This condition can trigger a decline

in motor and cognitive function, which impacts the emotional status of patients and worsens their quality of life. Chronic diseases such as stroke are also closely related to a decrease in quality of life (QoL), and therefore, monitoring and improving the QoL of post-stroke patients is one of the focuses in clinical practice (Bártlová et al., 2022).

Stroke rehabilitation often takes a long time and demands the patient's ability to adjust to the new condition. However, many post-stroke patients have difficulty managing their daily needs and lifestyle changes required after a stroke. In recent years, self-management has become a promising strategy to support stroke rehabilitation (Rahman et al., 2023). Self-management is the patient's ability to manage disease symptoms, treatment, and physical, social, and lifestyle changes by making decisions, self-acting, problem-solving, maintaining relationships with service providers, and utilizing available resources.

Although some studies show that self-management programs can improve quality of life (QoL) (Fryer et al., 2016; Kalav et al., 2022) and neurological function in stroke patients (Faizah et al., 2023; Huang et al., 2021; Si et al., 2021), The findings have been somewhat inconsistent, as studies have employed varying methodologies and outcome measures. This variability poses challenges in deriving clear, evidence-based conclusions regarding the effectiveness of self-management programs in enhancing quality of life and neurological function among stroke patients.

Methods

Eligibility Criteria

The inclusion criteria for this study were developed based on the principles of PICOS (Population, Intervention, Comparison, Outcome, and Study Design) as listed in Table 1. The included studies used randomized controlled trials (RCTs) with self-management programs as an intervention method, covering all types of self-management programs. In addition, only articles published in English and within the last 5 years are included. Meanwhile, articles that do not provide full text are excluded.

Items	Detail
Participants	Stroke survivor
Intervention	Self-management program
Comparison	Control group
Outcome	Quality of Life, Neurological Function
Study Designs	Randomized Controlled Trial

Search strategy for the identification of studies

Literature searches were conducted across four electronic databases: PubMed, Scopus, ScienceDirect, and ClinicalKey. The search utilized specific keywords and Boolean operators, including "stroke" AND "self-management programs," "quality of life" AND "neurological function," to identify relevant articles. The search focused on studies published within the last five years, up to October 2024.

Study selection

A total of 877 articles were initially identified across four databases. Articles were subsequently screened based on their titles and keywords, with those lacking relevant keywords excluded after full-text review. Ultimately, only the most pertinent articles were selected and finalized for inclusion in the research.

Quality Assessment

To ensure the quality of the review, articles that meet the inclusion criteria will be assessed using PICOS (Population, Intervention, Comparison, Outcome, and Study Design).

RESULTS

Selection and Study Characteristics

The initial search identified as many as 2020 articles from various electronic databases, namely Scopus (3), PubMed (7), ScienceDirect (1933), and ClinicalKey (74). After the initial screening process, 1534 articles were removed for various reasons, including duplicate detection (3 articles) using Mendeley software, published over the last 5 years (866 articles), not in English (4 articles), and not research articles (661 articles).

A total of 486 articles were continued to the screening stage. Of these, 460 articles were issued because they were irrelevant to the self-management program. Furthermore, 26 articles were taken for full-text evaluation, and none failed to be accessed at this stage. Full-text evaluation resulted in the deletion of 15 articles for the following reasons: not related to stroke (7 articles), not a Randomised Controlled Trial study (2 articles), and irrelevant to quality of life (QoL) and neurological function (6 articles). Finally, 11 articles were selected to be included in this systematic analysis.

Research Location

The research reviewed covers a variety of geographical locations. In Asia, the study was conducted in Vietnam (Nguyen et al., 2024), Tiongkok (Fan et al., 2024; Lin et al., 2022; Wu et al., 2020), dan Beijing (B. Zhang et al., 2024). In the United States, the study was conducted in New York City (Naqvi et al., 2023), Ohio (Gauthier et al., 2022), and New South Wales (Fakes et al., 2024). European research includes Switzerland (Bruyneel et al., 2023) and Austria (Willeit et al., 2020). Meanwhile, one study was conducted in Benin, Africa (Niama Natta et al., 2021). This variation in location shows the diversity of cultures and health systems in implementing self-management programs for stroke patients.

Sample in Research

A total of 3,892 participants were involved in the eleven studies reviewed. The number of samples in each study varied, ranging from 16 people in the study in Switzerland (Bruyneel et al., 2023) to 2,149 people in Austria (Willeit et al., 2020). The average age of the participants ranged from 53 to 72 years old. The study involved stroke patients with a variety of conditions, such as dysphagia (B. Zhang et al., 2024), motor disorders (Gauthier et al., 2022; Niama Natta et al., 2021), impaired cognitive function (Fan et al., 2024), depress pasca-stroke (Nguyen et al., 2024), as well as neurological weakness (Wu et al., 2020).

Results

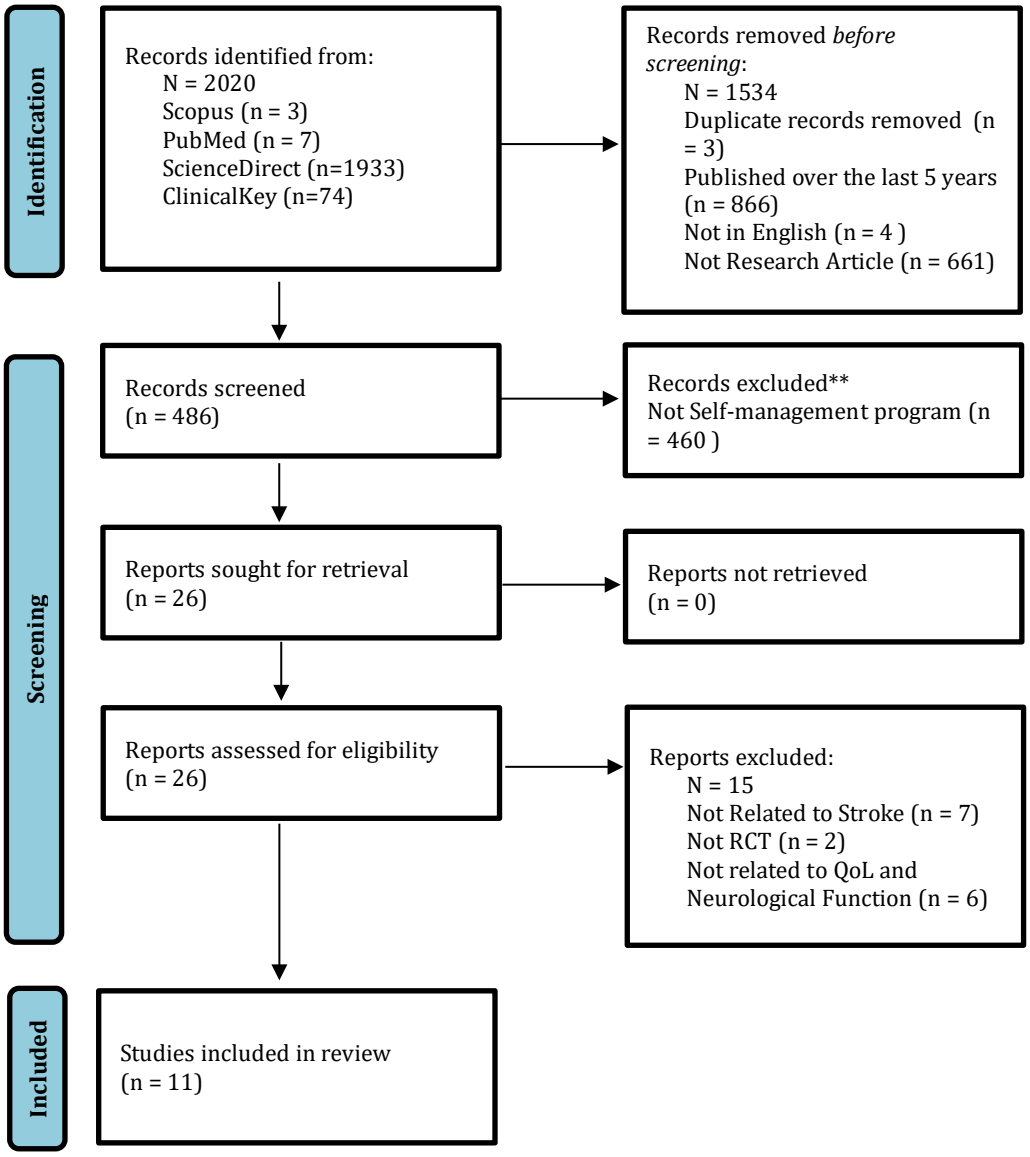

Figure 1. Flowchart PRISMA

Characteristics of Self-Management Programs

The self-management program implemented has a variety of approaches. Technology-based approaches include telerehabilitation (Naqvi et al., 2023; Wu et al., 2020), Video game rehabilitation (Gauthier et al., 2022; B. Zhang et al., 2024), and consumer portals (Fakes et al., 2024). The physical activity-based approach involves a dance program (Bruyneel et al., 2023) and self-rehabilitation exercises (Niama Natta et al., 2021). Other programs include nurse-led health training (Lin et al., 2022), a personal music listening program (Fan et al., 2024), as well as multifaceted interventions, such as Motivational Interviewing and periodic health check-up programs (Nguyen et al., 2024).

Program Duration

The duration of the self-management program varies between 3 and 52 weeks, depending on the type of intervention implemented. The shortest program is a 3-week rehab video game (Gauthier et al., 2022), while the most extended duration is STROKE-CARD for 52 weeks (Willeit et al., 2020). The average duration of the intervention in these eleven studies was about 14 weeks.

Measuring Tools for Viewing QoL and Neurological Function

To assess quality of life (QoL), the measuring tools used include Stroke Impact Scale 3.0 (Nguyen et al., 2024), Swallowing Quality of Life (SWAL-QOL) (Zhang et al., 2024), EQ-5D (Willeit et al., 2020), dan Stroke-Specific Quality of Life Scale (SSQoL) (Wu et al., 2020; Lin et al., 2021). Meanwhile, neurological function is measured using a variety of instruments, such as the Fugl-Meyer Motor Function Assessment (Wu et al., 2020), NIH Stroke Scale (NIHSS) (Fan, 2023; Willeit et al., 2020), dan Wolf Motor Function Test (WMFT) (Natta et al., 2020; Gauthier et al., 2022).

The Effectiveness of Self-Management Programs on QoL

Most studies showed significant improvements in QoL in the intervention group. The home rehabilitation program improved the QoL score from 48.3 to 62.6 (Nguyen et al., 2024), while nurse-led health training programs showed a significant increase in QoL ($p < 0.001$) (Lin et al., 2021).

Effectiveness of Self-Management Programs on Neurological Function

Several interventions have shown effectiveness in improving neurological function. The personal music listening program significantly improved neurological function ($p = 0.008$) (Fan, 2023). In addition, motor function was improved in the telerehabilitation program, with higher Fugl-Meyer scores in the intervention group (Wu et al., 2020).

Effectiveness of Self-Management Programs on QoL and Neurological Function Simultaneously

Some programs provide simultaneous effects on QoL and neurological function. For example, the STROKE-CARD program showed a decrease in mortality and disability rates and an increase in patient QoL (Willeit et al., 2020). In addition, self-rehabilitation exercises improved quality of life as well as motor function with significant results ($p < 0.001$) (Natta et al., 2020).

Table 1. Characteristic Study

Author (Year)	Location	Primary Intervention (Duration)	Outcome Variables	Quick Results
Nguyen et al. (2024)	Vietnam	Motivational Intervention + Home Rehabilitation (12 weeks)	Depression, Fatigue, ADL, QoL	Depression ↓ from 9.1 to 1.8; ADL ↑ from 58.8 to 68.8; QoL ↑ from 48.3 to 62.6 ($p < 0.001$)
Zhang et al. (2024)	Beijing	Facial recognition-based video games (4 weeks)	Swallowing Function, QoL related to swallowing	Swallowing function ↑ significant; QoL did not differ significantly ($p = 0.227$); compliance ↑ ($p = 0.032$)
Fakes et al. (2024)	Australia	EnableMe consumer portal (24 weeks)	QoL, Depression	QoL ↑ at 3 months; decrease in PHQ-9 at 3 and 6 months
Fan (2024)	China	Personalized music (12 weeks)	Cognitive Function, ADL	Fungsi kognitif dan neurologis ↑ ($p = 0,027$ dan $p = 0,008$); ADL ↑ ($p = 0,019$)
Natta et al. (2021)	Benin	Self-rehabilitation exercises (8 weeks)Self-rehabilitation exercises (8 weeks)	Motor Function, QoL	All aspects of the intervention were significant compared to control ($p < 0.001$)
Gauthier et al. (2022)	USA	VIGoROUS video game (3 weeks)	Motor Function, Arm Use	Self-gaming is more effective than traditional therapy ($p < 0.05$)
Naqvi et al. (2023)	USA	Telehealth After Stroke Care (12 weeks)	Psychological Stress, QoL	Depression decreased ($p = 0.06$); no significant difference in QoL
Wu et al. (2020)	China	Program Telerehabilitasi (12 weeks)	Fungsi Motorik, QoL	Motor function of the intervention group ↑ (83.70 vs. 75.29); QoL ↑ (190.57 vs 175.90)
Lin et al. (2022)	China	Nurse-led health training (24 weeks)	Self-efficacy, QoL, Knowledge	Self-efficacy and QoL increased

Author (Year)	Location	Primary Intervention (Duration)	Outcome Variables	Quick Results
				significantly ($p < 0.001$)
Bruyneel et al. (2023)	Switzerland	Dance + Conventional Care Program (6 weeks)	Balance, Motor Function	Significant balance recovery ($p \leq 0.022$); Insignificant QoL ($p > 0.050$)
Willeit et al. (2020)	Austria	STROKE-CARD (52 weeks)	QoL, Neurological Function, Rehabilitation	Mortality and disability were lower in the intervention group

Discussion

Impaired mobility and neurological function are often a significant problem in stroke patients, which can significantly reduce the quality of life of patients (Gurková et al., 2023). A study states that more than 50% of stroke sufferers experience a low quality of life (Ramos-Lima et al., 2018). This study examines the effectiveness of various self-management programs aimed at improving the quality of life and neurological function of stroke patients. The findings indicate that these programs positively influence both quality of life and neurological function, with outcomes varying based on the type of intervention, program frequency, and duration.

The review of eleven articles highlights the utilization of various types of self-management programs, including technological approaches, physical activity, music therapy, and multifaceted interventions. Notably, the majority of the studies focused on implementing self-management programs through technological approaches. This aligns with findings from numerous studies that emphasize the benefits of technology in improving bodily functions, particularly those of the upper and lower limbs (Veerbeek et al., 2017; X. Zhang et al., 2017). In addition, the use of technology in the rehabilitation process can make it easier for patients and nurses to access the program even though they are in remote areas (Clunne et al., 2018; Lyu et al., 2022). As a consideration, the facilities and infrastructure to support the use of technology in the area where the patient is rehabilitating must be directly proportional to the patient's rehabilitation needs.

The findings in this systematic review indicate that self-management programs can be given to stroke patients with various conditions, both physical and psychological disorders. This finding aligns with the results of Faizah et al.'s study (2023), which uses the integration of Health Behavior Therapy in self-management programs. In its implementation, an essential aspect of the self-management program approach is that patients must understand their contribution to progress and self-management because managing the condition by the individual is the core of the rehabilitation process with the self-management program (Rhoda et al., 2021).

In the eleven studies studied, the

average duration of rehabilitation using self-management programs varied greatly from 3 to 52 weeks. Although there was no overall long-term association of intervention administration with improved neurological function and improved quality of life, earlier and more intensive rehabilitation programs in the acute phase of stroke were associated with walking recovery and reasonable status of functional independence, following the concept that "time is brain recovery" (Morreale et al., 2016).

Cochrane review conducted by Jones and Riazi (2011) reported that self-management programs may benefit stroke patients living in the community and may affect patients' quality of life and self-efficacy. Our findings suggest self-management programs can be used to improve stroke patients' motor function and quality of life. For example, the use of Face recognition-driven video games in patients with swallowing disorders self-management programs have been proven to improve the swallowing ability and quality of life of stroke patients. Another example is the use of personalized music therapy, which can serve as a practical option for enhancing motor function and supporting the activities of daily living (ADL) in stroke patients. However, self-management programs should not be regarded merely as supplementary "add-ons" to treatment, implemented only after the patient has been discharged from rehabilitation. Instead, they should be fully integrated into the overall stroke rehabilitation process (Rhoda et al., 2021).

Conclusion

This systematic review shows that self-management programs have the potential to improve the quality of life (QoL) and neurological function of stroke patients. Of the 11 studies analyzed, different types of self-management interventions, such as telerehabilitation, personalized music therapy, video game-based rehabilitation, and self-rehabilitation exercises, were shown to provide significant benefits depending on the type, frequency, and duration of the program applied. Most studies reported significant improvements in QoL as well as patient motor function, with the best results seen in multifaceted, technology-based programs that can be accessed in a variety of geographic locations, including remote areas.

However, although self-management programs have been shown to be effective in improving some parameters, shorter intervention durations or limitations in technology access can affect outcomes. In addition, this approach cannot be considered as an adjunct alone but needs to be systematically integrated into the rehabilitation of stroke patients for optimal outcomes. Future studies need to further explore the working mechanisms and effectiveness of these programs in the long term to maximize their impact on stroke patient recovery.

Authors Contributions

The authors' contributions to this literature review encompassed various stages of the research process: one author conceptualized the study framework, developed search protocols, and curated a comprehensive database of literature; another author critically evaluated the selected sources, synthesized key findings, and identified emerging themes and research gaps; while a third author meticulously structured the manuscript, integrated diverse perspectives, and ensured coherence and logical progression of arguments.

Conflicts of Interest

The author stated that there is no conflict of interest related to this study.

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