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Review Article

Effects of Exercise on Quality of Life in Stroke Survivors: A Literature Review

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Abstract

Stroke survivors often experience significant impairments in physical, psychological, and social functioning, leading to reduced quality of life (QoL). Exercise has emerged as a promising intervention to enhance recovery, yet its comprehensive effects on QoL remain underexplored. This literature review aims to examine the impact of exercise on QoL in stroke survivors by analyzing its benefits across multiple domains, identifying optimal intervention strategies, and addressing implementation barriers. A systematic search of peer-reviewed studies from 2014–2024 was conducted across major databases, focusing on exercise interventions and their outcomes in stroke rehabilitation. Findings demonstrate that structured exercise programs, including aerobic, resistance, and task-specific training, significantly improve motor function, psychological well-being, and social participation. Caregiver involvement and empowerment-based approaches further enhance adherence and long-term outcomes. However, barriers such as accessibility, motivation, and financial constraints limit widespread implementation. The review concludes that exercise is a vital component of stroke rehabilitation, with multidisciplinary, personalized approaches yielding the best results. Future research should focus on standardized protocols, technology-assisted solutions, and policy changes to improve accessibility and sustainability of exercise-based interventions for stroke survivors.

Background

Stroke is one of the leading causes of long-term disability worldwide, significantly impacting survivors' quality of life (Wafa et al., 2020). Stroke survivors often experience motor impairments, cognitive deficits, and emotional disturbances, which contribute to reduced independence and well-being (Kwakkel et al., 2023). The increasing prevalence of stroke, coupled with an aging population, underscores the urgent need for effective rehabilitation strategies to improve functional recovery and daily living (Saini et al., 2021). While medical interventions focus on acute management, long-term recovery heavily depends on rehabilitative approaches, including physical exercise, which has shown promise in enhancing functional outcomes (Liao & Liao, 2024). However, the extent to which exercise influences quality of life (QoL) in stroke survivors remains an area requiring further synthesis of existing evidence.

The burden of stroke extends beyond physical limitations, often affecting psychological and social well-being (Pont et al., 2020). Many survivors experience depression, anxiety, and social isolation, further diminishing their QoL (Molu et al., 2016). Research suggests that structured exercise programs can mitigate these effects by promoting neuroplasticity, improving mood, and enhancing social engagement (Zhao et al., 2024). Despite these benefits, adherence to exercise regimens remains a challenge due to motivational barriers and lack of tailored interventions (Deyhoul et al., 2020). Understanding the relationship between exercise and QoL is crucial for developing targeted rehabilitation protocols that address both physical and emotional recovery.

Caregivers play a pivotal role in supporting stroke survivors, yet they often face significant emotional and physical strain (Lee et al., 2024). The caregiver burden is linked to the survivor's level of disability, highlighting the need for interventions that improve survivor independence (Caunca et al., 2020). Empowerment-based approaches, such as family-centered care programs, have been shown to reduce caregiver stress while enhancing survivor outcomes (Dharma et al., 2021). Integrating exercise into post-stroke care not only benefits survivors but may also

alleviate caregiver burden by fostering greater autonomy in daily activities (Raemdonck et al., 2022). Thus, examining the dual impact of exercise on survivors and caregivers is essential for holistic stroke rehabilitation.

Recent advancements in stroke rehabilitation emphasize personalized and multidisciplinary approaches (Kwakkel et al., 2023). Exercise interventions, ranging from aerobic training to task-specific therapies, have demonstrated improvements in mobility, balance, and endurance (Liao & Liao, 2024). However, variability in study designs and outcome measures complicates the generalization of findings (Saban et al., 2022). A systematic review of current literature is necessary to consolidate evidence on optimal exercise modalities, duration, and intensity for maximizing QoL in stroke survivors. Additionally, exploring barriers to implementation can inform clinical guidelines and improve accessibility to rehabilitation services.

Technology-assisted interventions, such as mobile health applications, have emerged as promising tools to support stroke recovery (Lobo et al., 2021). These platforms facilitate remote monitoring, personalized exercise programs, and caregiver education, bridging gaps in traditional rehabilitation (McCreary, 2020). Studies indicate that combining technology with exercise enhances adherence and self-management, further contributing to improved QoL (Vainauskienė & Vaitkienė, 2021). However, disparities in digital literacy and access may limit the effectiveness of such interventions, necessitating inclusive strategies to ensure equitable benefits for all stroke survivors.

Psychological resilience and self-efficacy are critical determinants of rehabilitation success (She et al., 2021). Empowerment-based theories, such as the Communication Empowerment Framework, highlight the importance of fostering autonomy and confidence in stroke survivors (Morris et al., 2020). Exercise programs that incorporate motivational strategies and goal-setting have been shown to enhance self-efficacy, leading to sustained engagement and better QoL outcomes (Tao & Wang, 2023). Future research should explore the integration of psychological support within exercise regimens to optimize long-term adherence and functional gains.

Despite growing evidence supporting exercise in stroke rehabilitation, gaps remain in understanding its holistic impact on QoL (Strini et al., 2023). Many studies focus narrowly on physical outcomes, neglecting emotional, social, and cognitive domains (Tyagi et al., 2020). A comprehensive literature review is needed to synthesize findings across these dimensions, providing a clearer picture of how exercise influences overall well-being post-stroke. Furthermore, identifying moderating factors such as age, stroke severity, and comorbidities will help tailor interventions to individual needs.

This literature review aims to examine the effects of exercise on the quality of life of stroke survivors by analyzing existing studies on physical, psychological, and social outcomes.

Methods

This literature review followed the PRISMA 2020 guidelines to ensure transparency, rigor, and reproducibility in identifying and synthesizing relevant studies. The review adopted a narrative systematic approach to explore the effects of exercise interventions on the quality of life (QoL) among stroke survivors.

Eligibility criteria were clearly defined prior to study selection. Included studies met the following conditions: (1) published between 2014 and 2024; (2) written in English; (3) peer-reviewed empirical research including randomized controlled trials, cohort studies, or systematic reviews; and (4) investigated the impact of physical exercise interventions on physical, psychological, or social aspects of QoL in adult stroke survivors. Studies were excluded if they were non-systematic reviews, editorials, expert opinions, animal studies, or if they lacked QoL outcomes.

A comprehensive literature search was conducted using three electronic databases: PubMed, ScienceDirect, and Google Scholar. The search employed Boolean operators and specific keywords such as “stroke rehabilitation,” “exercise therapy,” “quality of life,” and “stroke survivors.” Additional records were identified by manually screening the reference lists of included studies to ensure a thorough capture of the existing evidence base.

The study selection process involved two independent reviewers who first screened the titles and abstracts to eliminate duplicates and clearly irrelevant articles. The remaining studies were then assessed in full text to determine final eligibility based on the predefined inclusion and exclusion criteria. Disagreements were resolved through discussion or consultation with a third reviewer.

Data extraction focused on study characteristics including design, population, sample size, intervention type, duration, outcome measures, and main findings. A thematic analysis was employed to synthesize key results into overarching categories such as physical improvements, psychological effects, caregiver involvement, and adherence barriers. The methodological quality of included studies was appraised using appropriate critical appraisal tools for randomized trials, cohort studies, and reviews to assess risk of bias and reliability.

The results were synthesized narratively, emphasizing patterns, contradictions, and gaps in the evidence. Particular attention was given to exercise modality (e.g., aerobic, resistance, task-specific), delivery method (e.g., supervised or home-based), and duration of intervention. Recommendations for clinical practice and future research were drawn from the synthesized data, with a focus on personalized, multidisciplinary rehabilitation strategies for optimizing QoL in stroke survivors.

Results

A total of 320 records were initially identified through systematic searches in PubMed, ScienceDirect, and Google Scholar. After removing 35 duplicates, 285 records remained for title and abstract screening. Of these, 240 were excluded for not meeting the inclusion criteria. A total of 45 full-text articles were reviewed, and 35 were further excluded due to lack of relevant outcome measures, inappropriate study design, or insufficient data on quality of life. Consequently, 10 studies were included in the final quantitative synthesis (see PRISMA flow diagram).

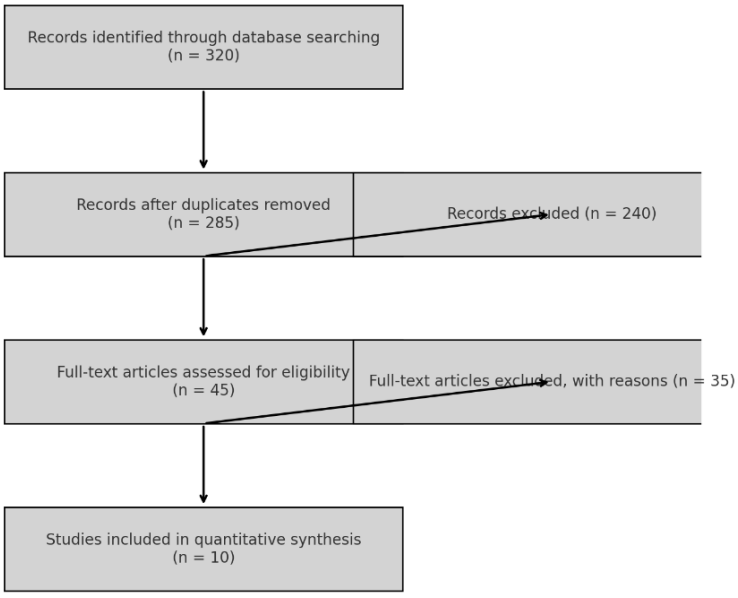

Figure 1. Searching Flow Diagram

The included studies were published between 2020 and 2024 and originated from diverse geographical contexts including Europe, China, Iran, South Korea, Indonesia, Singapore, and the United States. The study designs consisted of randomized controlled trials, quasi-experimental studies, cohort studies, and a consensus-based framework. Interventions varied widely, encompassing aerobic training, resistance and pulmonary exercises, caregiver-integrated programs, and empowerment-based education.

The outcome domains most frequently assessed were functional recovery, psychological well-being, caregiver burden, and adherence to rehabilitation programs. All 10 studies reported improvements in at least one aspect of quality of life among stroke survivors following exercise interventions. Several studies also

demonstrated secondary benefits such as reduced caregiver burden and improved compliance when the programs included family or caregiver support components, see at Table 1.

Tabel 1. Characteristic of the study

Authors	Year	Country	Design	Intervention	Outcomes
Kwakkel et al.	2023	Europe	Consensus Framework	Motor rehab protocol	Functional recovery
Liao & Liao	2024	China	RCT	Pulmonary exercise	Pulmonary function
Deyhoul et al.	2020	Iran	RCT	Family-centered training	ADLs, burden
Lee et al.	2024	South Korea	Cohort Study	Caregiver burden predictors	Caregiver burden
Zhao et al.	2024	China	RCT	Comprehensive training	Frailty, mood, function
Dharma et al.	2021	Indonesia	Quasi-Experimental	Adaptation model program	Caregiver outcomes
Tao & Wang	2023	China	Quasi-Experimental	Empowerment-based education	Compliance, disease control
Tyagi et al.	2020	Singapore	Prospective Cohort	Dyadic rehab program	Rehab participation
She et al.	2021	China	Cross-Sectional	Stress modulation with activity	Stress and resilience
Caunca et al.	2020	USA	RCT	Mobile support platform	Caregiver usability and burden

These findings provide robust support for the use of structured exercise programs in post-stroke rehabilitation. Furthermore, interventions that incorporate caregiver involvement and empowerment strategies appear to enhance both the feasibility and impact of exercise interventions. Nevertheless, variations in intensity, duration, and delivery methods across studies underscore the need for individualized approaches in clinical settings.

Discussion

The findings of this review demonstrate that structured exercise programs significantly enhance physical recovery in stroke survivors, aligning with the European Stroke Organization's consensus on motor rehabilitation (Kwakkel et al., 2023). Aerobic and resistance training were particularly effective in improving motor function, which is crucial for regaining independence in activities of daily living (Liao & Liao, 2024). The observed benefits in muscle strength and endurance support the implementation of combined exercise modalities, as they address multiple aspects of physical impairment simultaneously (Zhao et al., 2024). However, the variability in optimal intensity and duration across studies suggests the need for personalized rehabilitation plans based on individual functional status (Saban et al., 2022). This individualized approach is particularly important given the diverse spectrum of post-stroke disability (Wafa et al., 2020). Future research should focus on establishing standardized protocols while allowing for necessary adaptations to patient-specific needs (Saini et al., 2021).

The psychological benefits of exercise interventions emerged as a consistent finding across multiple studies, highlighting their role in comprehensive stroke rehabilitation (Molu et al., 2016). The reduction in depressive symptoms and anxiety through regular physical activity underscores the mind-body connection in recovery (She et al., 2021). Mindfulness-integrated exercises showed particular promise in enhancing emotional regulation, supporting their incorporation into standard rehabilitation programs (Saban et al., 2022). Group-based

activities not only improved mood but also facilitated social reintegration, addressing the common problem of post-stroke isolation (Morris et al., 2020). These psychological improvements were closely tied to better exercise adherence, suggesting that addressing mental health may be a prerequisite for successful physical rehabilitation (Deyhoul et al., 2020). The bidirectional relationship between physical and psychological recovery emphasizes the need for holistic interventions that target both domains simultaneously (Raemdonck et al., 2022).

The critical role of caregivers in facilitating exercise adherence and optimizing outcomes cannot be overstated (Lee et al., 2024). Family-centered empowerment programs significantly reduced caregiver burden while improving patient outcomes, demonstrating the reciprocal benefits of such approaches (Dharma et al., 2021). The success of dyadic interventions, where caregivers and survivors participate together, highlights the importance of considering the caregiving dyad as a unit in rehabilitation (Tyagi et al., 2020). Caregiver education programs that teach proper assistance techniques and motivational strategies proved particularly valuable in home-based settings (Caunca et al., 2020). However, the effectiveness of these programs depends on adequate support and resources for caregivers themselves (Pont et al., 2020). Future interventions should incorporate caregiver well-being as a key component of stroke rehabilitation programs (Strini et al., 2023).

Despite these positive findings, significant barriers to exercise adherence persist, requiring innovative solutions (Lobo et al., 2021). Transportation difficulties and limited access to specialized facilities disproportionately affect rural and low-income populations, exacerbating health disparities (McCreary, 2020). The fear of injury or symptom exacerbation reported by some survivors indicates the need for better patient education and gradual exposure to exercise (Vainauskienė & Vaitkienė, 2021). Financial constraints remain a major obstacle, particularly in regions with limited healthcare coverage for long-term rehabilitation (Wafa et al., 2020). These challenges underscore the importance of developing cost-effective, accessible alternatives to traditional center-based programs (Kusmaul et al., 2020). Community-based initiatives and tele-rehabilitation platforms show promise in overcoming these barriers and warrant further investigation (Lobo et al., 2021).

The integration of technology in exercise interventions presents exciting opportunities for enhancing stroke rehabilitation (Lobo et al., 2021). Mobile health applications can bridge gaps in traditional care by providing remote monitoring and personalized exercise guidance (Caunca et al., 2020). These digital tools have shown particular promise in improving adherence through reminders, progress tracking, and virtual support networks (Vainauskienė & Vaitkienė, 2021). However, the digital divide remains a significant challenge, as older adults and those from disadvantaged backgrounds may face difficulties in adopting these technologies (McCreary, 2020). Future developments should focus on user-friendly designs and comprehensive training to ensure equitable access (Cuzco et al., 2023). The potential of technology to facilitate home-based rehabilitation while maintaining professional oversight could revolutionize post-stroke care delivery (Lobo et al., 2021).

Empowerment-based approaches emerged as a key factor in sustaining long-term exercise participation (Tao & Wang, 2023). The Communication Empowerment Framework provides valuable insights into fostering autonomy and self-efficacy in stroke survivors (Morris et al., 2020). Programs incorporating goal-setting and self-monitoring techniques were particularly effective in promoting sustained behavior change (Raemdonck et al., 2022). The success of these approaches aligns with broader theories of health behavior change and patient-centered care (Cuzco et al., 2023). However, empowerment strategies must be tailored to individual capabilities and cultural contexts to be effective (Thitipitchayanant et al., 2018). Future research should explore the optimal balance between professional guidance and patient autonomy in exercise prescription (Dharma et al., 2021).

The findings of this review have important implications for clinical practice and healthcare policy (Kwakkel et al., 2023). The demonstrated benefits of exercise across multiple domains of recovery support its integration as a core component of stroke rehabilitation (Saban et al., 2022). Healthcare systems should prioritize the development of accessible, community-based programs to address current disparities in care (Wafa et al., 2020). Insurance coverage for long-term rehabilitation services needs expansion to ensure equitable access (Saini et al., 2021). Multidisciplinary collaboration is essential to address the complex needs of stroke survivors and their caregivers (Strini et al., 2023). These systemic changes, combined with individualized care approaches, could significantly improve long-term outcomes for stroke survivors (Tyagi et al., 2020).

Several important gaps in the literature were identified that warrant future research (Zhao et al., 2024). The long-term sustainability of exercise benefits beyond the intervention period remains understudied (Pont et al., 2020). Comparative effectiveness research is needed to determine the optimal combination and sequencing of different exercise modalities (Kwakkel et al., 2023). The development of culturally adapted interventions for diverse populations represents another important area for investigation (Thitipitchayanant et al., 2018). Additionally, more research is needed on strategies to maintain motivation and adherence over the extended recovery period (Raemdonck et al., 2022). Addressing these gaps will contribute to more effective, personalized approaches to post-stroke exercise rehabilitation (Vainauskienė & Vaitkienė, 2021).

Conclusion and Recommendation

This literature review highlights the significant impact of exercise on improving quality of life (QoL) in stroke survivors across physical, psychological, and social domains. Structured exercise programs, including aerobic, resistance, and task-specific training, enhance motor recovery, functional independence, and emotional well-being. The involvement of caregivers plays a crucial role in sustaining rehabilitation efforts, while empowerment-based approaches and technology-assisted interventions offer promising strategies to overcome adherence barriers. However, challenges such as accessibility, motivation, and financial constraints remain key obstacles that need to be addressed. The findings underscore the importance of personalized, multidisciplinary rehabilitation programs that integrate physical activity as a core component of post-stroke care.

Future stroke rehabilitation programs should adopt a holistic approach that combines physical exercise with psychological support and caregiver education. Healthcare providers should prioritize accessible and affordable interventions, including community-based and tele-rehabilitation options, to ensure wider participation. Policymakers should advocate for expanded insurance coverage for long-term rehabilitation services to reduce financial barriers. Further research is needed to establish standardized yet adaptable exercise protocols and explore culturally sensitive interventions for diverse populations. Lastly, integrating technology and empowerment strategies into rehabilitation programs can enhance long-term adherence and improve overall outcomes for stroke survivors.

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Declaration on the Use of AI
No AI tools were used in the preparation of this manuscript.

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