PTJ: Physical Therapy & Rehabilitation Journal | *Physical Therapy*, 2025;105:pzaf044
https://doi.org/10.1093/ptj/pzaf044
Advance access publication date April 1, 2025
Review

Effectiveness of Home–Based Rehabilitation on Activities of Daily Living in Patients With Stroke: Systematic Review and Meta-Analysis

Yerim Do, MPT[1]; Youngeun Lim, MPT[2]; Shiyu Jin, BS[3]; Haneul Lee, DSc[2,3,*]

[1]Department and Research Institute of Rehabilitation Medicine, College of Medicine, Yonsei University, Seoul 03722, Korea
[2]Department of Physical Therapy, College of Medical Science, Gachon University, Incheon 21936, Korea
[3]Graduate School, Department of Physical Therapy, College of Medical Science, Gachon University, Incheon 21936, Korea

*Corresponding author: Haneul Lee, DSc, Department of Physical Therapy, College of Medical Science, Gachon University, Hambangmeo-ro 191, Yeonsu-gu, Incheon, Korea (leehaneul84@gachon.ac.kr)

ABSTRACT

Objective: This systematic review compared the effectiveness of home–based rehabilitation with that of hospital-based rehabilitation and usual care on activities of daily living (ADL) independence in patients with stroke.

Methods: Ovid MEDLINE, Ovid EMBASE, and the Cochrane Library databases were searched for studies published between January 2000 and January 2024. This review was registered in the International Prospective Register of Systematic Reviews. Randomized controlled trials on home–based rehabilitation of patients with stroke were included. The included studies investigated ADL independence, upper limb function, mobility, balance, aerobic endurance, and quality of life. Two independent researchers extracted data using an extraction form and assessed the risk of bias and quality of evidence.

Results: Forty-six studies were included in the qualitative synthesis, and 34 studies were included in the quantitative synthesis using Review Manager software 5.4. ADL independence was not significantly different between patients receiving home–based rehabilitation and hospital-based rehabilitation (standardized mean difference (SMD) = 0.17 [95% CI = 0.00 to 0.34], $I^2 = 29\%$). However, a significant difference was observed between home–based rehabilitation and usual care (SMD = 1.24 [95% CI = 0.69 to 1.79], $I^2 = 91\%$).

Conclusion: Home–based rehabilitation is comparable to hospital-based rehabilitation and more effective than usual care and should be considered for patients with stroke after discharge to facilitate effective recovery. However, the high overall risk of bias requires cautious interpretation.

Impact: Home–based rehabilitation can be an effective alternative method for improving ADL independence in patients with stroke by providing a familiar and convenient environment.

Key words: Activities of Daily Living; Home Care Services; Rehabilitation; Stroke.

Received: June 4, 2024; **Revised:** October 28, 2024; **Accepted:** November 14, 2024

INTRODUCTION

Stroke is the leading cause of adult disability worldwide, with an annual incidence of 15 million, resulting in 5 million deaths and 5.5 million cases of permanent disability.[1,2] Approximately 60% of people who have survived a stroke are unable to walk independently during the early stages of a stroke.[3] This is often exacerbated by spasticity in the lower limbs, which impairs balance and walking ability and increases the risk of falls.[4] Moreover, spasticity can lead to various complications such as pain, joint stiffness, and muscle weakness, ultimately resulting in difficulties in performing basic daily activities.[5,6] Consequently, nearly 75% of patients with stroke experience difficulties in performing activities of daily living (ADL).[7] This increases the patients' dependency on others, thus adversely affecting their quality of life (QoL) and potentially leading to depression and anxiety. As both patients and their family members face increased burdens, this study highlights the importance of addressing ADL improvement through the treatment of patients with stroke.[8,9]

According to the principles of neuroplasticity, patients with stroke undergoing rehabilitation can leverage their brain's ability to reroute functions from damaged to healthy areas, thus emphasizing the importance of early and continuous rehabilitation.[10] However, transportation issues and costs hinder patients with stroke from receiving interventions typically conducted in hospitals or rehabilitation centers.[10] By contrast, home–based rehabilitation provides the advantage of a familiar and convenient environment. Providing tailored daily tasks within a home setting can promote a more successful recovery of functional ADL. In addition, it significantly reduces initial hospitalization without negatively affecting mortality or fall frequency.[10–12] Hence, home–based rehabilitation programs replacing traditional stroke rehabilitation conducted in outpatient clinics or hospitals have increased.[13,14]

A Cochrane review has revealed that telerehabilitation was as effective as in-person treatment in enhancing ADL, QoL, and depression.[15] However, despite the various types of home–based rehabilitation, only telerehabilitation was considered in the analysis. Thus, a broader range of home–based rehabilitation programs needs to be included, and a comprehensive systematic review and meta-analysis of the latest high-quality evidence is required. This systematic review aimed to evaluate the effectiveness of home–based rehabilitation and compare it with hospital-based rehabilitation or usual care, focusing on improving ADL independence after stroke.

METHODS

This systematic review followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and was registered in the International Prospective Register of Systematic Reviews (CRD42024526273).[16]

Data Sources and Search Strategy

Ovid MEDLINE, Ovid EMBASE, and the Cochrane Library were searched for relevant studies published between January 2000 and January 2024. The search terms were combined with keywords related to stroke and home–based rehabilitation obtained from MeSH terms, Emtree terms, and text words. A detailed search strategy is provided in Supplementary Material 1. All procedures were performed by 2 independent researchers (Y.D. and Y.L.).

Table 1. Clinical Questions (Population, Intervention, Control, and Outcomes)

Category	Description
Population	Patients diagnosed with stroke, regardless of the period since onset Adults (≥18 years old)
Intervention	Home–based rehabilitation Supervision conducted by a health professional at least once (in person or remotely) Intervention program carried out at home for more than two-thirds of the time
Comparison	hospital-based rehabilitation (inpatient, outpatient, or both) Usual care
Outcomes	Measures of activities of daily living independence, upper limb function, mobility, balance, aerobic endurance, and quality of life
Study design	Randomized controlled trials

Study Selection

Two independent researchers established the following criteria for study inclusion: Randomized controlled trials (RCTs), original articles, patients diagnosed with stroke, intervention as home rehabilitation under supervision, and use of appropriate outcomes such as ADL independence, upper limb function, mobility, balance, aerobic endurance, and QoL. The criteria were based on the clinical questions focused on in the present study (Table 1).

The 2 researchers initially screened titles and abstracts after eliminating duplicates using EndNote. The full texts were subsequently screened and selected through discussion. Any disagreements were resolved by other researchers (S.J. and H.L.).

Data Extraction

Independent researchers used a data extraction form for each study. The form required information on the author, publication year, country, number of participants, age, type of stroke, severity of stroke, and treatment details, including treatment duration, frequency of visits, length of treatment, and type of programs. Additionally, the adherence rate to the programs and any adverse events occurring during program implementation were recorded. The following outcome measures were also collected: Barthel Index (BI) and modified BI for ADL independence; Fugl-Meyer Assessment for Upper Extremity (FMA-UE) and Box and Block Test (BBT) for upper limb function; walking speed for mobility; Berg Balance Scale for balance; 6-minute walk test for aerobic endurance; and 36-Item Short Form Health Survey (SF-36) or 12-Item Short Form Health Survey and EuroQoL 5 Dimensions for QoL. Data were collected immediately after the intervention. Any missing data were requested from the author via e-mail, and data for which we did not receive a response were excluded. The extracted information is summarized in Supplementary Material 2.

Quality Assessment

The included studies were assessed for methodological quality using the Cochrane risk-of-bias version 2 for RCTs.[17] The 5 domains of the tool were evaluated by 2 independent researchers, and disagreements were resolved through discussion. The domains comprised risk of bias arising from the randomization process, risk of bias due to deviations from the intended interventions, missing outcome data, risk of bias in outcome measurement, and risk of bias in the selection of the reported results. The response for each item in the domains was "yes," "probably yes," "probably no," "no," or "no information." The overall bias was calculated by synthesizing each result of the domains and is presented as "high risk," "low risk," or "some concerns."

The quality of the evidence was evaluated using the Grading of Recommendations, Assessment, Development, and Evaluation approach.[18] The level of evidence was downgraded by 1 or 2 points from high quality according to the 5 criteria.[18] The criteria were the risk of bias, inconsistency (I^2: ≥ 50 or ≥ 75), indirectness (proportion of studies reporting stroke onset: <50%), imprecision (total number of participants: <300), and potential publication bias.[18,19]

Data Synthesis and Analysis

The results of the studies were synthesized for meta-analysis using Review Manager software 5.4 (Cochrane Collaboration, London, UK). Data reported as means and standard deviations with 95% CIs were used for the analysis, and data reported as medians and interquartile ranges were converted into means and standard deviations using a validated formula.[20,21] The effect size was calculated using the mean difference (MD) for continuous data; however, the standardized mean difference (SMD) was used when the same outcome was assessed using different scales.[22] The statistical heterogeneity of the pooled data was evaluated using the I^2 statistic. A fixed-effects model was used when the I^2 was $\leq 50\%$, whereas a random-effects model was used when the I^2 was >50%. Sensitivity was analyzed by excluding several studies that were included in the examination. Publication bias was evaluated using a funnel plot when at least 10 studies were available. A subgroup analysis was conducted to evaluate the effect of home–based rehabilitation according to the treatment received by the control group (hospital-based rehabilitation and usual care). The subgroup analysis was performed based on the type of supervision to evaluate the effectiveness of home–based rehabilitation. Additionally, data were stratified by acute stroke and chronic stroke to assess the effectiveness of ADL improvement. The cost-effectiveness reported in the studies was qualitatively analyzed.

RESULTS

Search Results

Overall, 15,408 studies were identified from the 3 databases. Duplicate studies were eliminated using the EndNote function. After screening titles and abstracts, 11,057 studies were excluded. Subsequently, 220 full-text studies were assessed, and 4 studies were included via manual search. A qualitative synthesis was conducted with 46 studies, and 178 were excluded based on the eligibility criteria. The PRISMA flow diagram is shown in Figure 1.

Characteristics of the Included Studies

Supplementary Material 2 presents the general characteristics of the included studies published between 2000 and 2023. Home–based rehabilitation was compared with hospital-based rehabilitation in 27 studies[11,23–48] and with usual care in 21 studies.[12,37,40,49–66] In studies comparing home– and hospital-based rehabilitation, the intervention ranged from 45 to 120 minutes per session and from 2 to 12 weeks in duration, respectively. Eighteen studies were supervised in person,[11,25,26,28,31,32,34,35,37–42,45–48] whereas 10 studies were supervised remotely through telerehabilitation.[23,24,26,27,29,30,33,36,43,44] Furthermore, in studies comparing home–based rehabilitation and usual care, the intervention duration ranged from 2 to 24 weeks, with sessions lasting between 30 and 120 minutes. In 20 studies, health professionals conducted supervisory visits,[12,37,40,50–66] whereas telerehabilitation was conducted in 1 study.[49]

Twenty studies were conducted in Asia, which is the most frequently studied region.[12,23–29,32,33,39,42,52,54,55,57,60–62,64] Twelve studies were conducted in Europe,[11,31,34–37,43–45,47,53,66] 9 in North America,[30,40,41,48–50,58,63,65] 2 each in Africa[38,56] and Oceania,[46,59] and 1 in South America.[51] The total number of patients was 4049, with 1823 and 2226 in the intervention and control groups, respectively. Nineteen studies focused on patients who experienced acute stroke within 6 months, whereas 14 studies targeted patients with chronic stroke. Thirteen studies did not specify stroke onset.

Quality Assessment of the Included Studies

The 46 RCTs were assessed using Cochrane risk-of-bias version 2 for RCTs. Of these, 23 were considered to have a low risk because of proper randomization processes. Forty-four studies did not have missing data or were analyzed using the intention-to-treat principle, resulting in a low risk in domain 3. Forty-one studies were categorized as having some concerns or a high risk because they did not report the research protocol. None of the 46 RCTs were classified as having a low risk in the overall risk of bias, consisting of 22 having a high risk and 24 having some concerns. Supplementary Material 3 summarizes the responses to the signaling questions along with a graph.

Six outcomes were evaluated in each analysis by the Grading of Recommendations, Assessment, Development, and Evaluation approach. The ADL independence was evaluated with high certainty in the analysis comparing hospital-based rehabilitation. However, in the analysis comparing usual care, the quality of evidence for ADL independence was very low owing to high statistical heterogeneity. The detailed results of the assessment are provided in Supplementary Material 4 (Suppl. Tables 1 and 2).

Home–Based Rehabilitation vs hospital-based Rehabilitation

ADL Independence

Seven studies were included in the meta-analysis,[27,28,33–35,46,48] BI was used to assess ADL independence in 3 studies, and modified BI was used in 4 studies. No significant difference was observed between home–based and hospital-based rehabilitation (SMD = 0.17 [95% CI = −0.00 to 0.34], $I^2 = 29\%$) (Figure 2). Four studies were excluded from the

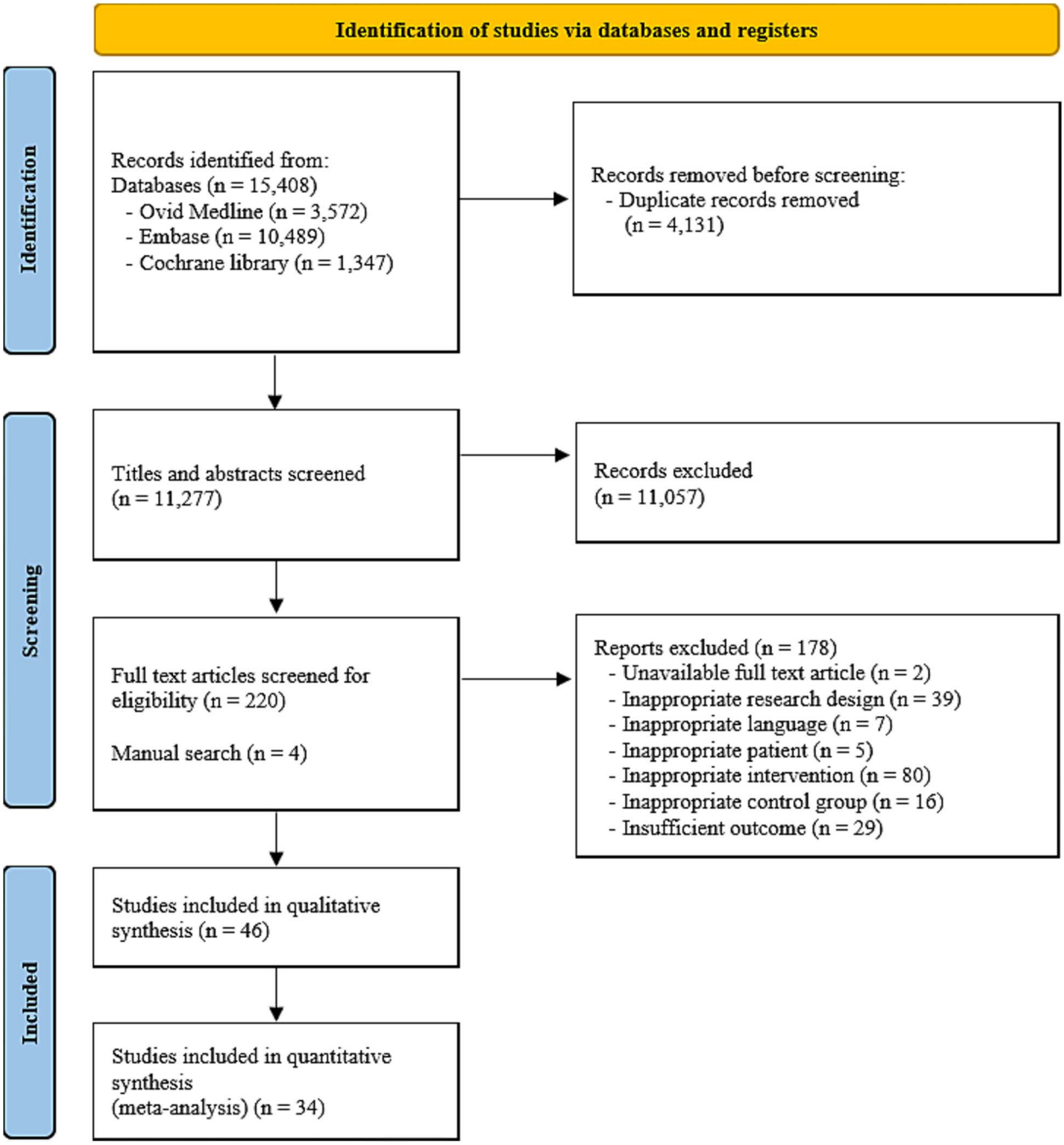

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses Flow Diagram.

quantitative synthesis because of the unavailability or incompleteness of the appropriate raw data.[24,29,37,47] However, 2 studies have reported no significant differences between the 2 groups.[29,47] Moreover, in a study conducted by Hofstad et al, no significant difference in mean values was observed between 5 weeks of home–based rehabilitation and day units at 3 and 6 months.[37]

Additionally, 2 studies[27,33] were included in the remote supervision home–based rehabilitation subgroup, while 5 studies[28,34,35,46,48] were included in the in-person supervision home–based rehabilitation subgroup. There was no significant difference in ADL independence between home–based and hospital-based rehabilitation groups in either subgroup (remote: SMD = 0.37 [95% CI = −0.02 to 0.76], $I^2 = 42\%$; in person: SMD = 0.12 [95% CI = −0.07 to 0.31], $I^2 = 26\%$).

Upper Limb Function

Six studies were included in the meta-analysis of upper extremity motor function using the FMA-UE,[24,25,30,32,42,43] indicating no significant difference between the home–based and hospital-based groups (MD = 1.27 [95% CI = −0.43 to 2.96], $I^2 = 7\%$) (Figure 3a). In BBT, the synthesized data from the 2 studies showed no significant improvement between the 2 groups (MD = −1.09 [95% CI = −5.56 to 3.37], $I^2 = 0\%$) (Figure 3b).[30,32]

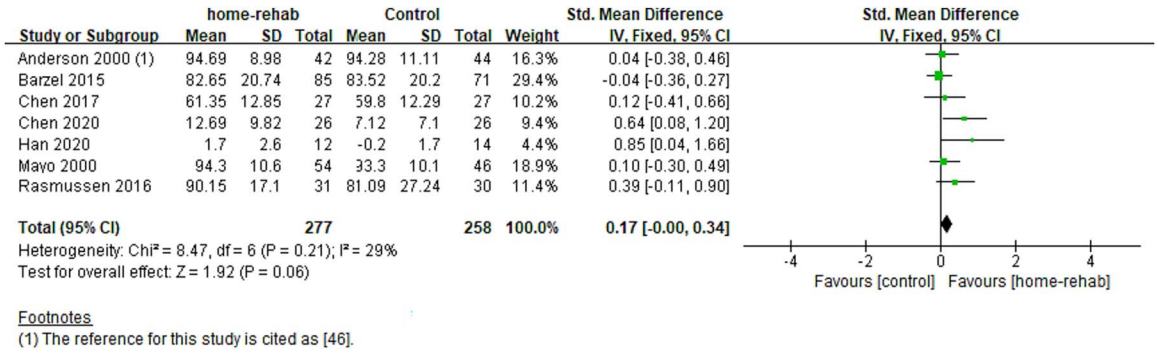

Figure 2. Independence in Activities of Daily Living in Home–Based Rehabilitation vs hospital-based Rehabilitation. Abbreviations: IV = inverse variance; Std. = standardized.

Among the studies that assessed FMA-UE, 3 studies implemented the home–based rehabilitation remotely,[24,30,43] while another 3 studies conducted it in person.[25,32,42] There was no significant difference between home–based and hospital-based groups in either subgroup (remote: SMD = 0.56 [95% CI = −1.48 to 2.61], $I^2 = 44\%$; in person: SMD = 2.81 [95% CI = −0.21 to 5.84], $I^2 = 0\%$). Additionally, the subgroup included 1 study[30] that performed home–based rehabilitation remotely and 1 study[32] that conducted home–based rehabilitation with in-person supervision to assess BBT. Both studies reported no significant differences compared to hospital-based rehabilitation.

Mobility

In 6 studies, walking speed was assessed using the 5-, 6-, 10-, and 30-m walk tests.[11,26,31,32,38,45] The pooled data showed no significant difference between home–based and hospital-based rehabilitation (SMD = −0.05 [95% CI = −0.26 to 0.17], $I^2 = 0\%$) (Figure 3c).

Lim et al conducted home–based rehabilitation with remote supervision and reported no significant difference in walking speed compared to hospital-based rehabilitation.[26] Similarly, studies[11,31,32,38,45] that implemented home–based rehabilitation with in-person supervision also found no significant improvement in walking speed (in person: SMD = −0.05 [95% CI = −0.28 to 0.17], $I^2 = 6\%$).

Balance

Four studies were included in the meta-analyses.[24,33,36,41] The pooled data using the Berg Balance Scale indicated that balance was not significantly different between the home–based and hospital-based groups (MD = −0.32 [95% CI = −1.60 to 0.95], $I^2 = 0\%$) (Figure 3d).

In the home–based rehabilitation with remote supervision subgroup, which included 3 studies,[24,33,36] there was no significant difference in Berg Balance Scale scores compared with hospital-based rehabilitation groups (remote: SMD = 0.07 [95% CI = −1.58 to 1.73], $I^2 = 0\%$). Additionally, Ducan et al reported no significant difference in balance for home–based rehabilitation with in-person supervision.[41]

QoL

QoL for the mental and physical components of the SF-36 and SF-12 was assessed in 3 studies.[24,46,48] No significant improvement in either component was observed between home–based rehabilitation and hospital-based rehabilitation (mental: SMD = −0.02 [95% CI = −0.26 to 0.23], $I^2 = 0\%$; physical: SMD = 0.06 [95% CI = −0.18 to 0.31], $I^2 = 28\%$) (Figure 3e and 3f).

Pooled data from 2 studies assessing QoL using the EuroQoL 5 Dimensions revealed that home–based rehabilitation was not significantly more effective than home–based rehabilitation in improving this parameter (MD = 0.02 [95% CI = −0.13 to 0.17], $I^2 = 85\%$) (Figure 3g).[32,34] In addition, Asano et al have reported no significant differences between the 2 groups.[29]

The synthesized data from 2 studies[46,48] that implemented in-person supervision for home–based rehabilitation showed no differences compared with the hospital-based groups for the mental and physical components of the SF-36 (mental: SMD = −0.06 [95% CI = −0.35 to 0.22], $I^2 = 0\%$; physical: SMD = 0.03 [95% CI = −0.25 to 0.32], $I^2 = 62\%$). Additionally, 1 study that implemented supervised remote home–based rehabilitation reported no significant improvement in either component of the SF-36.[24]

Home–Based Rehabilitation vs Usual Care

ADL Independence

Nine studies,[12,52–55,57,59,60,62] including 5 studies using the BI and 4 studies using the modified BI, were included in the meta-analysis. A significant improvement in ADL independence was observed with home–based rehabilitation compared with usual care despite the high heterogeneity (SMD = 1.24 [95% CI = 0.69 to 1.79], $I^2 = 91\%$) (Figure 4). A sensitivity analysis was conducted by excluding 2 studies[54,60] categorized as having a high risk of bias due to deviations from the intended intervention; however, the results did not change (SMD = 1.09 [95% CI = 0.46 to 1.72], $I^2 = 90\%$). The funnel plot showed an asymmetric distribution, with more studies reporting positive results (Suppl. Material 5). Six studies did not provide raw data immediately after treatment, leading to their exclusion from the meta-analysis.[37,58,61,63,64,66] Chaiyawat et al have reported a significant improvement in the ADL independence of patients receiving home–based rehabilitation compared with those receiving usual care at 24 months.[61] However, several studies have reported no significant differences between the 2 groups.[63] Lin et al have also reported no significant improvement in ADL independence.[64] Additionally, 3 studies have reported no significant difference between the 2 groups; however, this result was not observed immediately after the intervention.[37,58,66]

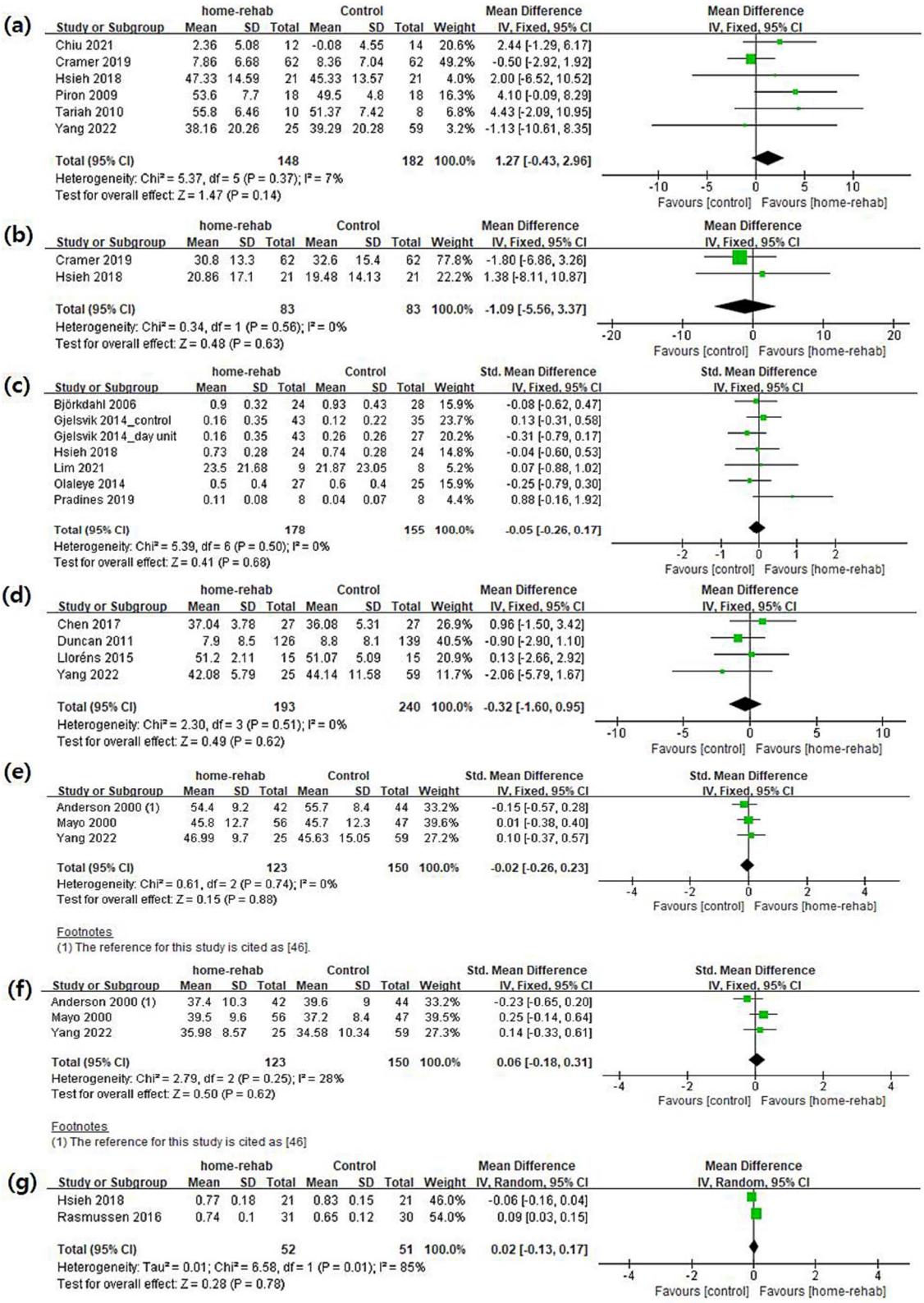

Figure 3. Upper Limb Function, Mobility, Balance, and Quality of Life in Home–Based Rehabilitation vs hospital-based Rehabilitation. Abbreviations: IV = inverse variance; Std. = standardized.

Upper Limb Function

In a meta-analysis of upper extremity motor function using the FMA-UE,[49,56,65] the pooled data showed no significant differences between the home–based and usual care groups (MD = 2.19 [95% CI = −3.25 to 7.62], $I^2 = 55\%$) (Figure 5a). The study by Adams et al[49] was excluded from the sensitivity analysis because of concerns regarding the risk of bias owing to deviations from the intended

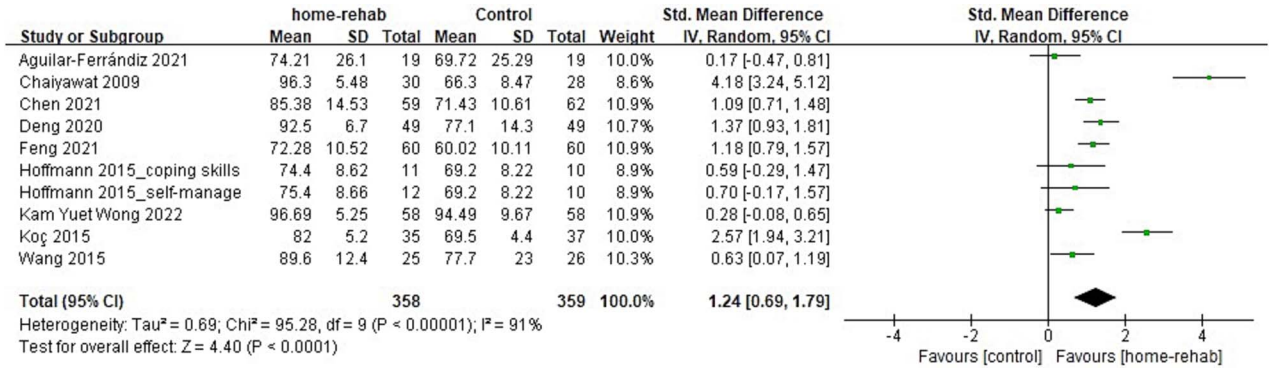

Figure 4. Independence in Activities of Daily Living in Home–Based Rehabilitation vs Usual Care. Abbreviations: IV = inverse variance; Std. = standardized.

intervention. Although the results did not change, the statistical heterogeneity decreased to 0% (MD = 0.31 [95% CI = −2.01 to 2.63], $I^2 = 0\%$). Additionally, Adams et al reported a significant improvement in the home–based rehabilitation with remote supervision compared to the usual care group. BBT was used to assess upper limb function in 2 studies,[49,56] which showed no significant effect.

Mobility

Four studies[12,40,54,65] assessed mobility using the 10-m walk test, which was synthesized in the meta-analysis. The results of this test improved significantly with home–based rehabilitation compared with usual care (SMD = 0.45 [95% CI = 0.28 to 0.62], $I^2 = 0\%$) (Figure 5b).

Balance

The data pooled from 4 studies assessing balance using the Berg Balance Scale showed significant improvement with home–based rehabilitation compared with usual care (MD = 2.69 [95% CI = 1.49 to 3.88], $I^2 = 0\%$) (Figure 5c).[12,40,51,65]

Aerobic Endurance

The synthesized data from 4 studies assessing aerobic endurance showed significant effectiveness with home–based rehabilitation compared with usual care (MD = 34.41 [95% CI = 22.79 to 45.04], $I^2 = 0\%$) (Figure 5d).[12,40,51,65]

QoL

Deng et al have reported a significant difference in both the mental and physical components of the SF-36 after an 8-week intervention between the home–based and usual care groups.[57] Meanwhile, Brouwer et al have reported no significant difference between the 2 groups at 3, 6, 9, 12, and 15 months after 2 weeks of rehabilitation.[58]

Effectiveness of Home–Based Rehabilitation for Acute and Chronic Stroke

The effectiveness of home–based rehabilitation for ADL independence in patients with acute and chronic stroke was qualitatively analyzed. In studies comparing home- and hospital-based rehabilitation, 8 targeted patients with acute stroke[27,29,33,34,37,46–48] and 2 included patients with chronic stroke.[24,35] Studies on patients with acute stroke have reported no significant difference between the intervention and control groups, except for 1.[27] A study on chronic stroke also showed no significant improvement between the 2 groups.[35]

Studies comparing home–based rehabilitation and usual care were divided into 3 categories: 7 studies targeting acute stroke,[37,52,57,60–63] 2 studies on patients with chronic stroke,[12,64] and 5 studies that did not report the onset of stroke.[53–55,59,66] Four studies have reported that home–based rehabilitation significantly improved ADL independence in patients with acute stroke compared with the usual care.[57,60–62] However, 3 studies did not identify significant differences between the 2 types of rehabilitation in patients with acute stroke.[37,52,63] In a study on patients with chronic stroke, Wang et al reported that home–based rehabilitation was significantly more effective in improving physical function than the control. However, Lin et al have reported no significant improvement in ADL independence.[64]

Cost-Effectiveness

Home–based rehabilitation demonstrated significant potential for significant cost savings compared to hospital-based rehabilitation for patients with stroke. Three studies reporting cost-effectiveness were analyzed qualitatively,[34,36,45] and 1 additional study was included as it accompanied 1 of the included studies.[67] Lloréns et al reported an estimated cost saving of $654.72 per participant in home–based rehabilitation compared with hospital-based rehabilitation, with savings primarily attributed to reduced human resource and travel costs.[36] Similarly, Björkdahl et al reported that home–based rehabilitation was approximately €1830 less expensive per participant than hospital rehabilitation.[45] Anderson et al conducted a cost minimization analysis, revealing that the mean cost per patient was $8040 for home–based rehabilitation and $10,054 for hospital-based rehabilitation, though the difference was not statistically significant.[67] Likewise, Rasmussen et al also reported lower total costs for home–based rehabilitation, highlighting its cost-effectiveness.[58]

DISCUSSION

In this systematic review, we screened 46 RCTs that provided home–based rehabilitation for patients with stroke, and 34 studies were included in the meta-analysis. This study is the most recent comprehensive review comparing home–based rehabilitation with different control group interventions. Home–based rehabilitation yields comparable

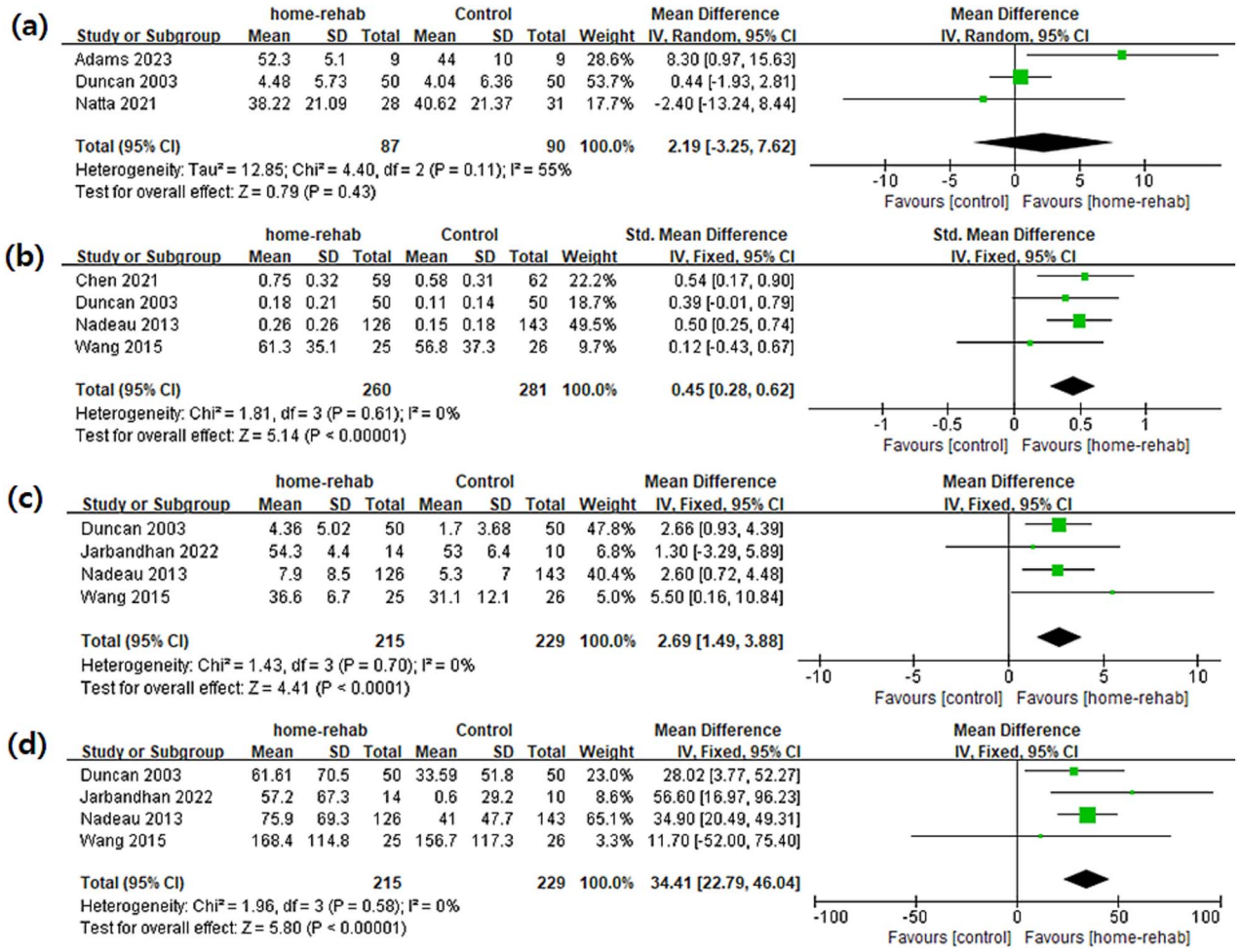

Figure 5. Upper Limb Function, Mobility, Balance, and Aerobic Endurance in Home–Based Rehabilitation vs Usual Care. Abbreviations: IV = inverse variance; Std. = standardized.

benefits to hospital-based rehabilitation in terms of ADL independence, upper limb function, mobility, balance, and QoL, while superior results were observed when compared with usual care. These results align with those of previous systematic reviews that have demonstrated that home–based rehabilitation produces effects comparable to those of center–based rehabilitation on mobility, balance,[49] and upper limb function[19] in patients with stroke. Similarly, findings from a Cochrane review[15] have indicated that telerehabilitation was comparable with in-person therapy. Wong et al observed no significant differences between structured home–based rehabilitation—which utilizes technology and/or assistive devices for motivation—and non-structured home–based rehabilitation.[68] In addition, despite some clinical heterogeneity regarding the characteristics of home–based treatments with varied amounts and types of supervision among trials, these differences did not affect outcomes.[19] To enhance the external validity of the review, our study included all types of home–based rehabilitation supervised by health professionals to comprehensively incorporate a broader range of home–based rehabilitation-related studies. In addition, a subgroup analysis was conducted to investigate whether the effectiveness of home–based rehabilitation in improving ADL independence varies depending on the phase of stroke, whether acute or chronic, and whether the supervision was conducted remotely or in person.

Comparative Efficacies of Home–Based Rehabilitation and hospital-based Rehabilitation

In most studies included in this review, supervision was facilitated through the advancement of various technologies or systematic management by experts to ensure the successful progression of rehabilitation programs at home. Home–based rehabilitation demonstrated similar benefits in improving ADL independence as hospital-based rehabilitation. The subgroup analysis stratified by acute and chronic stroke revealed consistent findings. The majority of home–based rehabilitation programs provides context-dependent learning and incorporate daily objects relevant to patients.[69] As patients who engage in practice within a familiar environment are more likely to promote the transfer of skills they have learned to real-world activities, the familiarity and comfort of home–based rehabilitation compared with hospital-based settings may have influenced the outcomes.[10,69,70]

Furthermore, no significant differences in upper limb function, mobility, balance, and QoL of patients were observed between the 2 rehabilitation programs, supporting their effectiveness in stroke rehabilitation. However, Hsieh et al have reported conflicting results regarding QoL measured using

the Euro-QoL 5 Dimensions.[32] This may have been influenced by the inherent characteristics of hospital-based settings, which allow individuals to exercise alongside more people, leading individuals with depression, who tend to be less responsive to clinical trials, to be more engaged and experience psychological benefits such as improvements in mood or activation levels.[19] Although the quality of evidence for these outcomes ranged from very low to moderate, the main reasons for this were differences in intervention settings in the study design between home–based and hospital-based rehabilitation, which led to difficulties in blinding participants and intervention providers and inadequate reporting of information related to stroke onset in many studies. For similar reasons, the overall risk of bias may have been generally categorized as either some concern or high. Only 2 trials examined the upper limb function-related outcome using BBT, thus failing to meet the evaluation criterion of having >300 participants. This could be improved by conducting larger trials.

In addition to the clinical benefits, home–based rehabilitation offers significant cost savings compared to hospital-based care, primarily due to reductions in human resources and travel costs. These economic advantages suggest that home–based rehabilitation for patients with stroke is not only clinically effective but also financially viable, particularly for health-care systems with limited resources or for populations with reduced access to hospital-based services. By providing both clinical efficacy and economic feasibility, home–based rehabilitation can help expand access to stroke rehabilitation while reducing the financial burden on health-care systems. These cost savings further support its broader implementation as a sustainable alternative to conventional hospital-based rehabilitation. However, as only a few studies[34,36,45] have conducted cost–benefit analyses, future research should incorporate more detailed evaluations to better guide clinical decision-making and resource allocation.

Comparative Efficacies of Home–Based Rehabilitation and Usual Care

Significant differences in ADL independence were observed between usual care and home–based rehabilitation, with very low-quality evidence owing to high heterogeneity and inappropriate reporting of stroke onset-related information. However, a subgroup analysis based on the stroke phase revealed controversial results regarding the improvement in ADL independence in patients with acute stroke. This can be influenced by natural recovery, which can improve basic motor and sensory functions after stroke, especially within the first 6 months, and is often spontaneous and driven by biological healing processes in the brain.[71,72] This type of recovery—which is not caused by targeted interventions—includes the resolution of temporary effects such as swelling in the brain or reorganization of brain functions.[71] Another factor that influenced the results was the inclusion of both active and no rehabilitation in the usual care group. Active rehabilitation may mitigate potential differences in outcomes compared with home–based rehabilitation.

Significant differences in mobility, balance, aerobic endurance, and QoL were observed between home–based rehabilitation and usual care. Moreover, Allen et al[73] have reported the cost-effectiveness and superior efficacy of home–based rehabilitation compared with usual care, indicating the usefulness of home–based treatments for patients requiring extensive training over a prolonged duration or increasing the practice volume. However, no significant difference in upper limb function assessed by the FMA—which primarily focuses on assessing specific motor functions and sensory impairments—was observed between the 2 groups.[74,75] This finding is consistent with that of Duncan et al,[65] who have reported functional improvements attributable to natural recovery in the upper extremities assessed using the FMA, even in the usual care group. Furthermore, Deng et al[57] have reported differences between home–based treatment and usual care, whereas Brouwer[58] insisted that QoL assessed using the Euro-QoL 5 Dimensions did not differ between the 2 rehabilitation programs. This variation may be attributed to differences in the duration of their interventions, as Brouwer et al conducted therapy sessions for only 2 weeks. This aligns with a previous study that has reported no differences between short-term structured home–based treatment and usual care in improving ADL and QoL and reducing symptoms of depression.[15]

Study Limitations

Information required to conduct a subgroup analysis stratified by stroke onset time—particularly in relation to ADL independence—was insufficient, as most studies did not specify or report whether participants had acute or chronic stroke. The variability in stroke onset timing between studies compromised the strength of the evidence in our meta-analysis. Considering that patients with first-time stroke exhibited better improvements in ADL independence, instrumental ADL, and QoL compared to those with recurrent stroke, and that stroke severity also affects these outcomes, these aspects should be addressed in future research.[76] However, owing to the limited number of studies, the current review did not conduct subgroup analyses based on stroke recurrence and severity, and it assessed only the immediate effects of home–based stroke rehabilitation, highlighting the need for further research on long-term outcomes. Finally, as most studies have inadequately reported detailed intervention information, further studies to adhere to the Template for Intervention Description and Replication checklist for better reporting.

CONCLUSION

Home–based stroke rehabilitation is as effective as hospital-based rehabilitation and more effective than usual care in improving ADL independence in patients with stroke. Thus, home–based rehabilitation is a valuable strategy for patient care and should be considered in discharge planning when continued care is necessary. However, due to the high overall risk of bias in the included studies, these results should be interpreted with caution. Further high-quality research is necessary to confirm these findings and to explore the long-term effects of home–based rehabilitation for patients with stroke, providing definitive guidance for its implementation.

CRediT—CONTRIBUTOR ROLES

Yerim Do (Conceptualization [equal], Formal analysis [equal], Investigation [lead], Writing—original draft [lead], Writing—review & editing [equal]), Youngeun Lim (Data curation [equal], Formal analysis [equal], Investigation [supporting], Methodology [lead], Writing—review & editing [equal]), Shiyu Jin (Data curation [equal], Investigation [Supporting], Visualization [lead], Writing—review & editing [equal]), and

Haneul Lee (Conceptualization [equal], Formal analysis [equal], Project administration [lead], Supervision [lead], Writing—review & editing [equal]).

SUPPLEMENTARY MATERIAL

Supplementary material is available online.

FUNDING

There are no funders to report for this study.

DISCLOSURES

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.

SYSTEMATIC REVIEW REGISTRATION

This systematic review followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and was registered in the International Prospective Register of Systematic Reviews (CRD42024526273).[16]

DATA AVAILABILITY

The data used to support the findings of this study are available from the corresponding author upon request.

REFERENCES

1. Xing L, Wang Z, Hao Z, Pan P, Yang A, Wang J. Cuproptosis in stroke: focusing on pathogenesis and treatment. *Front Mol Neurosci*. 2024;17:1349123.
2. Chayati N, Setyopranoto I, Effendy C. The effectiveness of home-based care interventions for stroke survivors: a systematic review of physical and psychological outcomes. *Malaysian Journal of Public Health Medicine*. 2020;20(1):199–219.
3. Nascimento LR, Rocha RJ, Boening A, Ferreira GP, Perovano MC. Home-based exercises are as effective as equivalent doses of Centre-based exercises for improving walking speed and balance after stroke: a systematic review. *J Phys*. 2022;68(3):174–181. https://doi.org/10.1016/j.jphys.2022.05.018
4. Tyson SF, Hanley M, Chillala J, Selley A, Tallis RC. Balance disability after stroke. *Phys Ther*. 2006;86(1):30–38.
5. Thibaut A, Chatelle C, Ziegler E, Bruno M-A, Laureys S, Gosseries O. Spasticity after stroke: physiology, assessment and treatment. *Brain Inj*. 2013;27(10):1093–1105. https://doi.org/10.3109/02699052.2013.804202
6. Gialanella B, Santoro R, Ferlucci C. Predicting outcome after stroke: the role of basic activities of daily living predicting outcome after stroke. *Eur J Phys Rehabil Med*. 2013;49(5):629–637.
7. Kim K, Kim YM, Kim EK. Correlation between the activities of daily living of stroke patients in a community setting and their quality of life. *J Phys Ther Sci*. 2014;26(3):417–419. https://doi.org/10.1589/jpts.26.417
8. Silverio VS, Porras VA, Costa IR. Caregiver burden in relation to cognitive status and dependence on activities of daily living in stroke patients: a cross-sectional study in the Dominican Republic. *Revista Científica de la Sociedad de Enfermería Neurológica (English ed)*. 2022;56:37–42. https://doi.org/10.1589/jpts.26.417
9. Yao S-C, Hsieh S-I, Lee J-D, Chu T-P, Fan J-Y. Physical function, depressive symptoms, and quality of life with post-acute stroke care. *Collegian*. 2023;30(3):475–482.
10. Chi N-F, Huang Y-C, Chiu H-Y, Chang H-J, Huang H-C. Systematic review and meta-analysis of home-based rehabilitation on improving physical function among home-dwelling patients with a stroke. *Arch Phys Med Rehabil*. 2020;101(2):359–373. https://doi.org/10.1016/j.apmr.2019.10.181
11. Gjelsvik BEB, Hofstad H, Smedal T, et al. Balance and walking after three different models of stroke rehabilitation: early supported discharge in a day unit or at home, and traditional treatment (control). *BMJ Open*. 2014;4(5):e004358. https://doi.org/10.1136/bmjopen-2013-004358
12. Wang T-C, Tsai AC, Wang J-Y, et al. Caregiver-mediated intervention can improve physical functional recovery of patients with chronic stroke: a randomized controlled trial. *Neurorehabil Neural Repair*. 2015;29(1):3–12. https://doi.org/10.1177/1545968314532030
13. Gbiri CA, Olawale OA, Isaac SO. Stroke management: informal caregivers' burdens and strians of caring for stroke survivors. *Annals of Physical and Rehabilitation Medicine*. 2015;58(2):98–103. https://doi.org/10.1016/j.rehab.2014.09.017
14. Siemonsma P, Döpp C, Alpay L, Tak E, Nv M, Chorus A. Determinants influencing the implementation of home-based stroke rehabilitation: a systematic review. *Disabil Rehabil*. 2014;36:2019–2030. https://doi.org/10.3109/09638288.2014.885091
15. Laver KE, Adey-Wakeling Z, Crotty M, Lannin NA, George S, Sherrington C. Telerehabilitation services for stroke. *Cochrane Database Syst Rev*. 2020;1(1):CD010255. https://doi.org/10.1002/14651858.CD010255.pub3
16. Page MJ, McKenzie JE, Bossuyt PM, et al. Updating guidance for reporting systematic reviews: development of the PRISMA 2020 statement. *J Clin Epidemiol*. 2021;134:103–112. https://doi.org/10.1016/j.jclinepi.2021.02.003
17. Higgins JP. Cochrane handbook for systematic reviews of interventions. *Cochrane Collaboration and John Wiley & Sons Ltd*. 2008. http://wwwcochrane-handbookorg
18. Balshem H, Helfand M, Schünemann HJ, et al. GRADE guidelines: 3. Rating the quality of evidence. *J Clin Epidemiol*. 2011;64(4):401–406. https://doi.org/10.1016/j.jclinepi.2010.07.015
19. Nascimento LR, Gaviorno LF, de Souza BM, Goncalves JV, Arêas FZS. Home-based is as effective as Centre-based rehabilitation for improving upper limb motor recovery and activity limitations after stroke: a systematic review with meta-analysis. *Clin Rehabil*. 2022;36(12):1565–1577. https://doi.org/10.1177/02692155221121015
20. Luo D, Wan X, Liu J, Tong T. Optimally estimating the sample mean from the sample size, median, mid-range, and/or mid-quartile range. *Stat Methods Med Res*. 2018;27(6):1785–1805. https://doi.org/10.1177/0962280216669183
21. Wan X, Wang W, Liu J, Tong T. Estimating the sample mean and standard deviation from the sample size, median, range and/or interquartile range. *BMC Med Res Methodol*. 2014;14:1–13. https://doi.org/10.1186/1471-2288-14-135
22. Lin L, Aloe AM. Evaluation of various estimators for standardized mean difference in meta-analysis. *Stat Med*. 2021;40(2):403–426. https://doi.org/10.1002/sim.8781
23. Chen J, Li J, Qiao F, Shi Z, Lu W. Effects of home-based telerehabilitation on dynamic alterations in regional intrinsic neural activity and degree centrality in stroke patients. *PeerJ*. 2023;11:e15903. https://doi.org/10.7717/peerj.15903
24. Yang Z-Q, Du D, Wei X-Y, Tong RK-Y. Augmented reality for stroke rehabilitation during COVID-19. *Journal of NeuroEngineering and Rehabilitation*. 2022;19(1):136. https://doi.org/10.1186/s12984-022-01100-9
25. Chiu E-C, Chi F-C, Chen P-T. Investigation of the home-reablement program on rehabilitation outcomes for people with stroke: a pilot study. *Medicine*. 2021;100(26):e26515. https://doi.org/10.1097/MD.0000000000026515
26. Lim J-H, Lee H-S, Song C-S. Home-based rehabilitation programs on postural balance, walking, and quality of life in

patients with stroke: a single-blind, randomized controlled trial. *Medicine*. 2021;100(35):e27154. https://doi.org/10.1097/MD.0000000000027154
27. Chen J, Sun D, Zhang S, et al. Effects of home-based telerehabilitation in patients with stroke: a randomized controlled trial. *Neurology*. 2020;95(17):e2318–e2330. https://doi.org/10.1212/WNL.0000000000010821
28. Han D-S, Chuang P-W, Chiu E-C. Effect of home-based reablement program on improving activities of daily living for patients with stroke: a pilot study. *Medicine*. 2020;99(49):e23512. https://doi.org/10.1097/MD.0000000000023512
29. Asano M, Tai BC, Yeo FY, et al. Home-based tele-rehabilitation presents comparable positive impact on self-reported functional outcomes as usual care: the Singapore tele-technology aided rehabilitation in stroke (STARS) randomised controlled trial. *J Telemed Telecare*. 2021;27(4):231–238. https://doi.org/10.1177/1357633X19868905
30. Cramer SC, Dodakian L, Le V, et al. Efficacy of home-based telerehabilitation vs in-clinic therapy for adults after stroke: a randomized clinical trial. *JAMA Neurology*. 2019;76(9):1079–1087. https://doi.org/10.1001/jamaneurol.2019.1604
31. Pradines M, Ghedira M, Portero R, et al. Ultrasound structural changes in triceps surae after a 1-year daily self-stretch program: a prospective randomized controlled trial in chronic hemiparesis. *Neurorehabil Neural Repair*. 2019;33(4):245–259. https://doi.org/10.1177/1545968319829455
32. Hsieh Y-w, Chang K-c, Hung J-w, Wu C-y, Fu M-h, Chen C-c. Effects of home-based versus clinic-based rehabilitation combining mirror therapy and task-specific training for patients with stroke: a randomized crossover trial. *Arch Phys Med Rehabil*. 2018;99(12):2399–2407. https://doi.org/10.1016/j.apmr.2018.03.017
33. Chen J, Jin W, Dong WS, et al. Effects of home-based telesupervising rehabilitation on physical function for stroke survivors with hemiplegia: a randomized controlled trial. *American Journal of Physical Medicine & Rehabilitation*. 2017;96(3):152–160. https://doi.org/10.1097/PHM.0000000000000559
34. Rasmussen RS, Østergaard A, Kjær P, et al. Stroke rehabilitation at home before and after discharge reduced disability and improved quality of life: a randomised controlled trial. *Clin Rehabil*. 2016;30(3):225–236. https://doi.org/10.1177/0269215515575165
35. Barzel A, Ketels G, Stark A, et al. Home-based constraint-induced movement therapy for patients with upper limb dysfunction after stroke (HOMECIMT): a cluster-randomised, controlled trial. *The Lancet Neurology*. 2015;14(9):893–902. https://doi.org/10.1016/S1474-4422(15)00147-7
36. Lloréns R, Noé E, Colomer C, Alcañiz M. Effectiveness, usability, and cost-benefit of a virtual reality–based telerehabilitation program for balance recovery after stroke: a randomized controlled trial. *Arch Phys Med Rehabil*. 2015;96(3):418–425. e2. https://doi.org/10.1016/j.apmr.2014.10.019
37. Hofstad H, Gjelsvik BEB, Næss H, Eide GE, Skouen JS. Early supported discharge after stroke in Bergen (ESD stroke Bergen): three and six months results of a randomised controlled trial comparing two early supported discharge schemes with treatment as usual. *BMC Neurol*. 2014;14:1–10. https://doi.org/10.1186/s12883-014-0239-3
38. Olaleye OA, Hamzat TK, Owolabi MO. Stroke rehabilitation: should physiotherapy intervention be provided at a primary health care Centre or the patients' place of domicile? *Disabil Rehabil*. 2014;36(1):49–54. https://doi.org/10.3109/09638288.2013.777804
39. Erdoğan Uçar D, Paker N, Buğdaycı D. Lokomat: a therapeutic chance for patients with chronic hemiplegia. *NeuroRehabilitation*. 2014;34(3):447–453. https://doi.org/10.3233/NRE-141054
40. Nadeau SE, Wu SS, Dobkin BH, et al. Effects of task-specific and impairment-based training compared with usual care on functional walking ability after inpatient stroke rehabilitation: LEAPS trial. *Neurorehabil Neural Repair*. 2013;27(4):370–380. https://doi.org/10.1177/1545968313481284
41. Duncan PW, Sullivan KJ, Behrman AL, et al. Body-weight–supported treadmill rehabilitation after stroke. *N Engl J Med*. 2011;364(21):2026–2036. https://doi.org/10.1056/NEJMoa1010790
42. Tariah HA, Almalty A-M, Sbeih Z, Al-Oraibi S. Constraint induced movement therapy for stroke survivors in Jordon: a home-based model. *Int J Ther Rehabil*. 2010;17(12):638–646. https://doi.org/10.12968/ijtr.2010.17.12.638
43. Piron L, Turolla A, Agostini M, et al. Exercises for paretic upper limb after stroke: a combined virtual-reality and telemedicine approach. *J Rehabil Med*. 2009;41:1016–1020. https://doi.org/10.2340/16501977-0459
44. Piron L, Turolla A, Tonin P, Piccione F, Lain L, Dam M. Satisfaction with care in post-stroke patients undergoing a telerehabilitation programme at home. *J Telemed Telecare*. 2008;14(5):257–260. https://doi.org/10.1258/jtt.2008.080304
45. Björkdahl A, AsL N, Grimby G, Sunnerhagen KS. Does a short period of rehabilitation in the home setting facilitate functioning after stroke? A randomized controlled trial. *Clin Rehabil*. 2006;20(12):1038–1049. https://doi.org/10.1177/0269215506071230
46. Anderson C, Rubenach S, Mhurchu CN, Clark M, Spencer C, Winsor A. Home or hospital for stroke rehabilitation? Results of a randomized controlled trial: I: health outcomes at 6 months. *Stroke*. 2000;31(5):1024–1031. https://doi.org/10.1161/01.STR.31.5.1024
47. Kalra L, Evans A, Perez I, Knapp M, Donaldson N, Swift CG. Alternative strategies for stroke care: a prospective randomised controlled trial. *Lancet*. 2000;356(9233):894–899. https://doi.org/10.1016/S0140-6736(00)02679-9
48. Mayo NE, Wood-Dauphinee S, Côté R, et al. There's no place like home: an evaluation of early supported discharge for stroke. *Stroke*. 2000;31(5):1016–1023. https://doi.org/10.1161/01.STR.31.5.1016
49. Adams RJ, Ellington AL, Kuccera KA, Leaman H, Smithson C, Patrie JT. Telehealth-guided virtual reality for recovery of upper extremity function following stroke. *OTJR. Occup Ther J Res*. 2023;43(3):446–456. https://doi.org/10.1177/15394492231158375
50. Feldman PH, McDonald MV, Onorato N, Stein J, Williams O. Feasibility of deploying peer coaches to mentor frontline home health aides and promote mobility among individuals recovering from a stroke: pilot test of a randomized controlled trial. *Pilot and Feasibility Studies*. 2022;8(1):22. https://doi.org/10.1186/s40814-022-00979-4
51. Jarbandhan A, Toelsie J, Veeger D, Bipat R, Vanhees L, Buys R. Feasibility of a home-based physiotherapy intervention to promote post-stroke mobility: a randomized controlled pilot study. *PLoS One*. 2022;17(3):e0256455. https://doi.org/10.1371/journal.pone.0256455
52. Kam Yuet Wong F, Wang SL, Ng SS, et al. Effects of a transitional home-based care program for stroke survivors in Harbin, China: a randomized controlled trial. *Age Ageing*. 2022;51(2):afac027. https://doi.org/10.1093/ageing/afac027
53. Aguilar-Ferrándiz ME, Toledano-Moreno S, García-Ríos MC, et al. Effectiveness of a functional rehabilitation program for upper limb apraxia in poststroke patients: a randomized controlled trial. *Arch Phys Med Rehabil*. 2021;102(5):940–950. https://doi.org/10.1016/j.apmr.2020.12.015
54. Chen S, Lv C, Wu J, Zhou C, Shui X, Wang Y. Effectiveness of a home-based exercise program among patients with lower limb spasticity post-stroke: a randomized controlled trial. *Asian Nursing Research*. 2021;15(1):1–7. https://doi.org/10.1016/j.anr.2020.08.007
55. Feng W, Yu H, Wang J, Xia J. Application effect of the hospital-community integrated service model in home rehabilitation of

stroke in disabled elderly: a randomised trial. *Ann Palliat Med*. 2021;10(4):4670–4677. https://doi.org/10.21037/apm-21-602
56. Natta DDN, Lejeune T, Detrembleur C, et al. Effectiveness of a self-rehabilitation program to improve upper-extremity function after stroke in developing countries: a randomized controlled trial. *Annals of Physical and Rehabilitation Medicine*. 2021;64(1):101413. https://doi.org/10.1016/j.rehab.2020.03.017
57. Deng A, Yang S, Xiong R. Effects of an integrated transitional care program for stroke survivors living in a rural community: a randomized controlled trial. *Clin Rehabil*. 2020;34(4):524–532. https://doi.org/10.1177/0269215520905041
58. Brouwer B, Bryant D, Garland SJ. Effectiveness of client-centered "tune-ups" on community reintegration, mobility, and quality of life after stroke: a randomized controlled trial. *Arch Phys Med Rehabil*. 2018;99(7):1325–1332. https://doi.org/10.1016/j.apmr.2017.12.034
59. Hoffmann T, Ownsworth T, Eames S, Shum D. Evaluation of brief interventions for managing depression and anxiety symptoms during early discharge period after stroke: a pilot randomized controlled trial. *Top Stroke Rehabil*. 2015;22(2):116–126. https://doi.org/10.1179/1074935714Z.0000000030
60. Koç A. Exercise in patients with subacute stroke: a randomized, controlled pilot study of home-based exercise in subacute stroke. *Work*. 2015;52(3):541–547. https://doi.org/10.3233/WOR-152156
61. Chaiyawat P, Kulkantrakorn K. Effectiveness of home rehabilitation program for ischemic stroke upon disability and quality of life: a randomized controlled trial. *Clin Neurol Neurosurg*. 2012;114(7):866–870. https://doi.org/10.1016/j.clineuro.2012.01.018
62. Chaiyawat P, Kulkantrakorn K, Sritipsukho P. Effectiveness of home rehabilitation for ischemic stroke. *Neurol Int*. 2009;1(1):e10. https://doi.org/10.4081/ni.2009.e10
63. Torres-Arreola LP, Doubova SV, Hernandez SF, et al. Effectiveness of two rehabilitation strategies provided by nurses for stroke patients in Mexico. *J Clin Nurs*. 2009;18(21):2993–3002. https://doi.org/10.1111/j.1365-2702.2009.02862.x
64. Lin JH, Hsieh CL, Lo SK, Chai HM, Liao LR. Preliminary study of the effect of low-intensity home-based physical therapy in chronic stroke patients. *Kaohsiung J Med Sci*. 2004;20(1):18–22. https://doi.org/10.1016/S1607-551X(09)70079-8
65. Duncan P, Studenski S, Richards L, et al. Randomized clinical trial of therapeutic exercise in subacute stroke. *Stroke*. 2003;34(9):2173–2180. https://doi.org/10.1161/01.STR.0000083699.95351.F2
66. Wolfe CD, Tilling K, Rudd AG. The effectiveness of community-based rehabilitation for stroke patients who remain athome: a pilot randomized trial. *Clin Rehabil*. 2000;14(6):563–569. https://doi.org/10.1191/0269215500cr362oa
67. Anderson C, Mhurchu CN, Rubenach S, Clark M, Spencer C, Winsor A. Home or hospital for stroke rehabilitation? Results of a randomized controlled trial: II: cost minimization analysis at 6 months. *Stroke*. 2000;31(5):1032–1037. https://doi.org/10.1161/01.STR.31.5.1032
68. Wong Y, Ada L, Wang R, Månum G, Langhammer B. Self-administered, home-based, upper limb practice in stroke patients: a systematic review. *J Rehabil Med*. 2020;52(10):1–13. https://doi.org/10.2340/16501977-2738
69. Toh SFM, Chia PF, Fong KN. Effectiveness of home-based upper limb rehabilitation in stroke survivors: a systematic review and meta-analysis. *Front Neurol*. 2022;13:964196. https://doi.org/10.3389/fneur.2022.964196
70. Gelaw AY, Janakiraman B, Gebremeskel BF, Ravichandran H. Effectiveness of home-based rehabilitation in improving physical function of persons with stroke and other physical disability: a systematic review of randomized controlled trials. *J Stroke Cerebrovasc Dis*. 2020;29(6):104800. https://doi.org/10.1016/j.jstrokecerebrovasdis.2020.104800
71. Zhao L-R, Willing A. Enhancing endogenous capacity to repair a stroke-damaged brain: an evolving field for stroke research. *Prog Neurobiol*. 2018;163:5–26. https://doi.org/10.1016/j.jstrokecerebrovasdis.2020.104800
72. Byblow WD, Stinear CM, Barber PA, Petoe MA, Ackerley SJ. Proportional recovery after stroke depends on corticomotor integrity. *Ann Neurol*. 2015;78(6):848–859. https://doi.org/10.1002/ana.24472
73. Allen L, John-Baptiste A, Meyer M, et al. Assessing the impact of a home-based stroke rehabilitation programme: a cost-effectiveness study. *Disabil Rehabil*. 2019;41(17):2060–2065. https://doi.org/10.1080/09638288.2018.1459879
74. Nguyen DTH, Trinh DTT. Correlation of the Fugl Meyer assessment, Motricity index and Barthel index scales in the assessment of rehabilitation in post-stroke patients. *MedPharmRes*. 2023;7(4):1–10. https://doi.org/10.32895/UMP.MPR.7.4.1
75. Rodríguez-Pérez MP, Sánchez-Herrera-Baeza P, Montes-Montes R, et al. How do Motor and sensory function correlate with daily performance recovery after post-stroke robotic intervention? A secondary analysis of a non-randomized controlled trial. *Biomedicines*. 2023;11(3):853. https://doi.org/10.3390/biomedicines11030853
76. Chu C-L, Chen Y-P, Chen CC, et al. Functional recovery patterns of hemorrhagic and ischemic stroke patients under post-acute care rehabilitation program. *Neuropsychiatr Dis Treat*. 2020;16:1975–1985. https://doi.org/10.2147/NDT.S253700

Physical Therapy, 2025, 105, pzaf044
https://doi.org/10.1093/ptj/pzaf044
Review