

## Factors Influencing Functional Improvement, Intervention and Its Outcome in Post-Stroke Rehabilitation in Community: A Scoping Review

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### ABSTRAK

Kebanyakan pesakit strok terpaksa menjalani kehidupan dengan ketidakupayaan berkaitan strok dan 53.1% pesakit strok dilepaskan dengan kebergantungan fungsi, menunjukkan bahawa sejumlah besar individu strok masih memerlukan penjagaan berterusan di rumah selepas discaj. Walaupun terdapat pelbagai intervensi dan pengurusan untuk pesakit pasca strok telah diterbitkan, terdapat batasan dalam mencari faktor yang boleh mempengaruhi pemulihan fungsi untuk pesakit pasca strok dalam komuniti. Kajian ini bertujuan untuk mengkaji faktor-faktor yang mempengaruhi penambahbaikan fungsi, intervensi dan hasilnya dalam pesakit pasca strok di komuniti untuk membantu ahli terapi mewujudkan program kesinambungan yang berkesan bagi populasi ini. Empat pangkalan data elektronik utama telah digunakan untuk menjalankan semakan ini iaitu; Ebsco Medline, Scopus, ProQuest dan Science Direct. Penyelidikan yang diasaskan oleh Arksey dan O'Malley digunakan sebagai rangka kerja untuk melaksanakan proses semakan. Kajian skop ini menjurus kepada kajian yang menggunakan pesakit strok yang didiagnos kurang dari 12 bulan semasa kajian, melibatkan sesi rehabilitasi di rumah, komuniti atau yang fokus pada peningkatan fungsi pesakit. Selain daripada itu, kajian yang melibatkan gabungan terapi hospital dan rumah juga diambil kira dan hanya kajian yang ditulis dalam Bahasa Inggeris dari Januari 2013 hingga Febuari 2024 telah digunakan. Dari semakan yang dijalankan, empat tema yang muncul dari semakan ini termasuklah (i) pendekatan terapi dalam pemulihan strok; (ii) intervensi yang biasa dijalankan bagi pemulihan strok; (iii) peningkatan fungsi pesakit yang dipengaruhi oleh masa terapi yang dihabiskan oleh mereka; dan (iv) terapi spesifik yang menunjukkan peningkatan yang lebih besar dalam peningkatan fungsi tertentu. Oleh itu, kajian skop ini dapat memberi manfaat dan panduan kepada pengamal kesihatan, terutamanya kumpulan pelbagai jenis

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*disiplin untuk merancang dan menyesuaikan sebarang program atau garis panduan yang boleh membantu dalam peningkatan fungsi pesakit strok dalam komuniti.*

*Kata kunci: Hasil kefungsiian; penjagaan strok; penyampaian penjagaan kesihatan; pemulihan strok*

## ABSTRACT

Most stroke survivors have to live their lives with stroke-related disabilities and 53.1% of stroke patients are discharged with functional dependence indicating that a relatively large number of stroke individuals still require continuous care at home after discharge. Although various interventions and management for post-stroke patients have been published, there are limitations in finding factors that can influence functional recovery for post-stroke patients in the community. This scoping study aimed to explore factors that influence functional improvement, interventions and outcomes in post-stroke patients in the community to help therapists to create effective continuity programs for this population. Four main electronic databases were used to conduct this review namely; Ebsco Medline, Scopus, ProQuest and Science Direct. Research established by Arksey and O'Malley was used as a framework to carry out the review process. This scope study aimed at studies that use stroke patients who were diagnosed less than 12 months during the study, involving rehabilitation sessions at home, in the community or that focus on increasing the patient's functionality. Apart from that, studies involving a combination of hospital and home therapy were also taken into account and only studies written in English from January 2013 to February 2024 were used. From the review conducted, four themes emerged from this review including: (i) therapy approach in stroke rehabilitation; (ii) common interventions for stroke rehabilitation; (iii) the improvement of the patient's function which was affected by the therapy time spent by them; and (iv) specific therapies had shown greater improvement in specific functional improvements. Therefore, this scope study can provide benefits and direction for health practitioners, especially multidisciplinary groups to design, adapt any program or guidelines that can help in improving the functionality of stroke patients in the community.

Keyword: Functional outcome; healthcare delivery; stroke care; stroke rehabilitation

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## INTRODUCTION

Stroke is classified as one of the non-communicable diseases (NCDs) besides heart disease, cancer, diabetes and chronic lung disease. With 74% of the cause of death by these NCDs, it affects low- and

middle-income countries in which the person died prematurely or before the age of 70 years old (WHO 2022). Therefore, not only it overwhelms the health systems, but it has a great impact on individuals, families and communities. Based on the framework proposed by the Stroke

Recovery and Rehabilitation Roundtable (SRRR), they encapsulate the definition of timeline for several important biological recovery processes in stroke patients. They suggested that the first week until the first month post stroke, which is acute and early subacute phase is a crucial time for neural plasticity. Meanwhile, 3-6 months post-stroke was labeled as late sub-acute, whereas all the incidents that are more than 6 months was classified as chronic stroke phase whereby in the phase, endogenous plasticity and improvement in impairment and function are less substantial (Bernhardt et al. 2017). The earlier the stroke patient undergoes rehabilitation after onset, the more improvement was recorded related to their functional outcomes (Maulden et al. 2005) and there is a lack of evidence found which focus on the time to begin rehabilitation post-stroke but the early initiation at the first two weeks post-stroke is beneficial for better functional outcome (Coleman et al. 2017).

There is an increment in the prevalence of stroke affected an individual below 65 years old which can be seen by the increase cases of 53.3% and 50.4% in men and women, respectively, with an average age of 35-39 years old (Tan & Venketasubramanian 2022). Most of the individuals are at their productive age, hence related disabilities after stroke will have a huge impact on their economic and financial status, health and well-being, as well as their social and working life. Recovery from stroke is dependent on adequate diagnosis, treatment and rehabilitation, and in most cases, rehabilitation becomes one of the largest aspects that ensure the improvement of the patient (Nordin et al. 2014), and that

extra hours of rehabilitation and additional family-mediated exercise therapy have a significant impact on recovery after stroke (Galvin et al. 2011). By understanding the neuroplasticity related to the recovery of motor function after stroke is important to healthcare workers which could guide them in the development of appropriate training protocol (Dimyan & Cohen 2011). Most of the stroke survivors have to live their lives with stroke-related disabilities and 53.1% of stroke patients discharged with functional dependence which show quite a large number of stroke individual still need continuous care at home after being discharged (Tan & Venketasubramanian 2022).

Although there are various interventions and management for post-stroke patients have been published, there are limitations in finding the factors that can influence functional recovery for post-stroke patients in community. Other than understanding pathophysiology of the disease itself, these factors are crucial for healthcare worker in order to craft a structured and comprehensive rehabilitation following stroke based on patient's conditions. The conventional rehabilitation process given in hospitals or government clinics is usually not conducive to be carried out at home and requires the expertise of a therapist to be implemented, so the improvement of the patient's functionality cannot be maximised if the patient only depends on the care delivered by a professional therapist. Therefore, this scoping review intended to explore the factors influencing functional improvement in post-stroke patients at home or community therefore it can help therapist to craft a continuation program that effective for this populations.

## MATERIALS AND METHODS

Four databases were used to search the journal which were Scopus, Science Direct, ProQuest and Ebsco Medline. This scoping review was conducted based on Arskey and O'Melly's study framework and the PRISMA-ScR checklist (*see attachment in supplementary materials*). This review had been approve by Research Ethical Committee UKM (*JEP-2023-933*).

### Stage 1: Identify the research question

Scoping Review Question i.e. (i) What is the factor influencing functional recovery/improvement for post-stroke rehabilitation in community?; (ii) What is the reported outcome of the intervention used that influenced functional recovery/improvement in post-stroke rehabilitation?

### Stage 2: Identify the relevant study

A search of the related article was done between 1 March 2024 to 5 March 2024 using keywords ("stroke rehabilitation" OR "post-stroke therapy" OR "post-stroke therapy") AND ("stroke" OR "cerebrovascular accident") AND ("functional recovery" OR "functional improvement") AND ("home program" OR "home-based therapy") in the four databases namely Scopus, Science Direct, ProQuest and Ebsco Medline.

### Stage 3: Study selection

The inclusion criteria for this scoping review included: (i) ischemic stroke cases <12 month onset; (ii) home-based/community-based/functional recovery; (iii) a combination of home-based

therapy with clinical-based therapy; and (iv) English language-based journal from January 2013 until February 2024. Exclusion criteria for this scoping review included: (i) the participant with any cognitive issue, language issue (aphasia) and neglect issue; (ii) abstract, books, review or study protocol; (iii) virtual-based therapy/off-the-shelf consoled games therapy/robotic assistance; (iv) involved only pharmacological intervention, without rehabilitation therapy

### Stage 4: Charting the data

As per the research requests, comprehensive articles from relevant sources were obtained and analysed. By developing a data charting form in Microsoft Words, two reviewers (M.S.K. and R.J) examined each article independently, noting details such as author(s), year of publication, study site, research aim(s), methodology, subjects, study type, intervention and conduct, and research findings. When two assessors produced different conclusion on any aspect under examination, a discussion was held to decide whether or not to include the study in the review.

### Stage 5: Collating, summarising and reporting report

The articles found were collected, reviewed and documented based on the following topics: (i) screening tools; (ii) the type of intervention and associated approach; and (iii) the outcome of the intervention along with the overall results. These details were further discussed in the findings section of this review.

## RESULTS

In the identification process the total of 420 articles was found, total of 89 duplicated articles was removed. The titles and abstracts of all articles had been read through and 265 articles were excluded. The remaining of 76 articles were retrieved for additional analysis. A further 66 articles were excluded from the review because they did not focus on stroke rehabilitation, involving chronic stroke patients, or involving the use of

high-end equipment in the intervention procedure (virtual reality, Xbox, Kinect, etc.). Only 11 articles that fulfilled the inclusion criteria were included in the evaluation. The summary procedures of the selected articles were shown in Figure 1.

### Characteristic of Study

This thoroughscopingreview encompassed earlier research on interventions for post-stroke rehabilitation that are available.

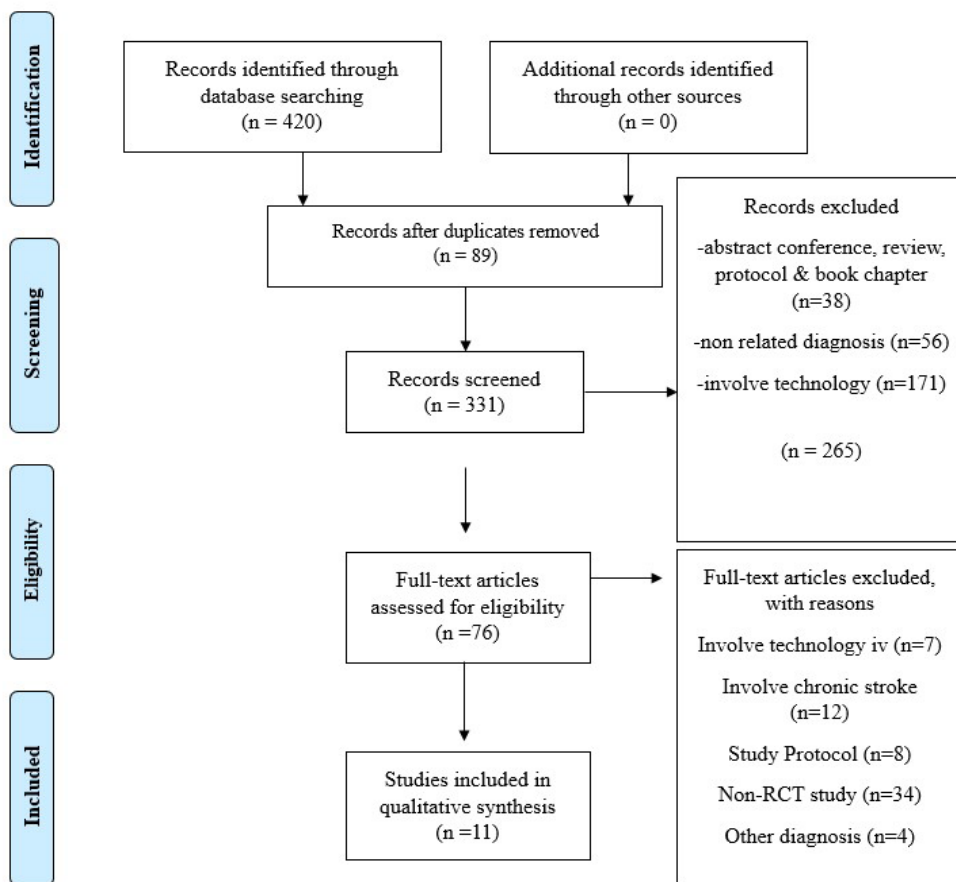


FIGURE 1: Summary of outlining article selection pro using PRISMA flow diagram

The age range of the studies considered in this scoping review was from 49.33 to 74 years old, on average. The high-risk factor for stroke in an individual supported this age range. A total of 503 participants were involved in these 11 investigations, which consisted of 9 randomised controlled trials (RCT) and 2 pilot studies. There was a control group in every RCT trial group in the study. Madhoun et al. (2020) conducted the shortest study time, lasting for 25 days, whereas other studies were completed in between one to twelve months rehabilitation duration. The time spend for each therapy session reported by the authors depended on the type of intervention conducted. The summary characteristic of the selected articles was shown in Table 1.

### Stroke Rehabilitation

Occupational therapists and physical therapists are part of the multidisciplinary team in post-stroke rehabilitation approach used in all 11 studies that were included in this scoping review. Majority of the research was designed as a focused, at-home, exercise program with functional rehabilitation as the end goal. The way that home-based exercise was administered varied among studies even though the essence of the intervention was quite comparable. Hsieh et al. (2018) and Koc et al. (2018) focused on home-based exercise with guidance by nursing professional, whereas another 6 studies conducted by Cunningham et al. (2015), Kara and Ntsiea (2015), Mayo et al. (2013), Simpson et al. (2017), Chen et al. (2021) and Kim et al. (2018) focused on self-administered home program with weekly or monthly monitoring by the healthcare professionals.

There was also a study designed to focus on the effectiveness of certain targeted exercises that were carried out in hospital and community-based settings in which the patients involved needed to complete the targeted exercise as outlined in the study protocol (Kara & Ntsiea 2015; Koç 2015). However, another study aimed to investigate the efficacy of specific targeted workouts performed in hospital and community settings, where patients were required to finish the targeted exercises following the study protocol (Kim et al. 2018; Lee et al. 2017).

### Intervention for Post-stroke Rehabilitation

The interventions for post-stroke patients are diverse and varied including the use of different strategies to address both upper and lower extremity function. In the study conducted by Kim et al. (2018), the Constraint-Induced Movement Therapy technique was utilised to specifically target motor function improvement in the upper extremities. Similarly, mirror therapy, as investigated by Madhoun et al. (2020), showed promise in enhancing functional movement and self-care tasks for stroke patients. The bilateral arm training, as explored by Lee et al. (2017), also presented a viable approach to upper extremity functional improvement.

On the other hand, interventions for lower extremities focused on maintaining walking speed after discharge, as reported in the study by Mayo et al. (2013) was one of the objectives in post-stroke rehabilitation. Additionally, improving balance, as studied by Puckree and Naidoo (2014), and managing lower limb spasticity, as investigated by Chen et al.

TABLE 1: Characteristic of study

First Author	Nature of intervention	Age/Mean/Range	Sample size	Duration of Intervention
Cunningham et al. (2015)	Task-specific upper limb training, home based	Not mention in paper	n=24	6 weeks
Kara et al. (2015)	Targeted exercise with booklet, home-based	60.8 ± 15.5 years	n=42 experimental group (n=21) control group (n=21)	4 weeks
Koc (2015)	Targeted exercise done by nurse researcher, home-based	Mean 67 years old	n=72 experimental group (n=35) control group (n=37)	12 weeks
Mayo et al. (2013)	Targeted exercised, home-based	CG: 67.7 ± 14.4; EG: 67.8 ± 12.3	n=87 cycle group (n=43) exercise group (n=44)	12 months
Puckree & Naidoo (2014)	Targeted exercise, community-based rehabilitation	50-74 years old	n=50 experimental group (n=25) control group (n=25)	7 months
Simpson et al. (2017)	Home-based upper limb targeted exercise with behavioral strategy	66.4 (7.8; 53-76)	n=8	6 months
Chen et al. (2021)	Home based exercise with behavioral strategy	IG: 55.41 ± 6.78 years, CG: 56.41 ± 6.13years	164 (IG: n=59, CG: n=62)	12 months
Hsieh et al. (2018)	Nurse guided, home based rehabilitation	CG: 56.41 ± 6.13 years	24 Home based (n=12) clinic based (n=12)	12 weeks 4 weeks home based, 4weeks wash out period, 4 weeks clinic based
Kim et al. (2018)	Home-based rehabilitation and clinic-based rehabilitation	IG: 49-74 years old CG: 49-72	14 sample (experimental group=7, control group=7)	5 months
Madhoun et al. (2020)	Targeted therapy, hospital-based	Task-based mirror therapy: 49.33 ± 10.43 Control group: 53.93 ± 8.76	30 TMBT group (n=15) and control group (n=15)	25 days
Lee et al. (2017)	Targeted therapy, hospital-based	Bil arm task training: 57.33 ± 9.88 Control group: 54.60 ± 16.03	30 experimental group (n=15) and control group (n=15).	8 weeks



(2021), were also key areas of emphasis in post-stroke rehabilitation.

Furthermore, there was notable attention given to the development of structured home programs, as evidenced by the studies conducted by Cunningham et al. (2016), Kara and Ntsiea (2015) and Koç (2015). These studies aimed to assess the feasibility and adherence to home-based interventions, highlighting the importance of ensuring the successful delivery of rehabilitation programs to post-stroke patients in their natural home environments.

The multifaceted nature of these interventions underscored the complexity of addressing functional improvement in post-stroke patients, requiring a comprehensive and tailored approach to address the diverse needs of this population.

### **Factors Influencing Functional Recovery among Post-stroke Patients**

One issue that stroke survivors face is functional impairment, especially in the first 6 months after stroke (Chien et al. 2020). Various studies focus on improving functional independence for post-stroke patients using different intervention strategies. One key factor that influences functional recovery among stroke patients is additional therapy time, with most studies focusing on providing extra therapy hours targeting specific goals. Additional 1 hour's additional therapy time at home, seven-times a week with self-monitored practice was suggested in order to improve self-efficiency in practice and fostering self-management (Cunningham et al. 2016). Moreover, other study acknowledged that with the additional therapy time, patient

can improve their endurance and able to tolerate 1 hour intervention with increase of exercise duration (Koç 2015)

Additionally, all the reviewed studies concentrated on interventions that only target either the upper limb or lower limb function. Specific functions were found to be improved such as balance, stability, walking ability and reducing spasticity of lower limb with the specific training for lower limb provided during the studies (Chien 2020; Koç 2015; Mayo et al. 2013; Puckree & Naidoo 2014). For the study that focus in upper limb rehabilitation, results showed significant improvements in the used of hand and also the transfer of skill for Activity of Daily living where led to the functional improvement of the patients (Cunningham et al. 2016; Lee et al. 2017; Madhoun et al. 2020; Simpson et al. 2017). Subsequently, studies focusing on delivering home exercise programs to stroke patients provided insight into adherence to these programs, with evidence suggesting that home exercise programs helped to maintain improvements in patients' function (Kara & Ntsiea 2015; Koç 2015; Mayo et al. 2013; Simpson et al. 2017). The summary of the selected articles was shown in Table 2.

### **DISCUSSION**

This scoping review aimed to explore the factors influencing functional recovery and enhancement of functional ability in stroke survivors. While numerous studies have investigated functional recovery after a stroke, there is currently no dedicated study examining regarding the influential factors. The findings indicate that early exposure to treatment and increased engagement in rehabilitation processes



TABLE 2: Summary of findings

Authors/Year	Purposes	Study Design	Outcome Measure	Setting	Sample size	Finding from selected articles	Limitations of the study
Cunningham et al. (2015)	To justify the development of a home-based, task-specific upper limb program	Pilot Study	Action Reaction Arm Test (ARAT)	United Kingdom	n=24	The intensity, content and level of difficulty of the program are acceptable and show beneficial results toward functional improvement	Only show feasibility data for this study to be conducted at home
Kara et al. (2015)	To identify the effect of a written and pictorial home exercise prescription on adherence to top home exercise program	Randomized Controlled Trial	Modified Rivermead Mobility Index (MRMI) and Barthel Index	South Africa	n=42 experimental group (n=21) control group (n=21)	Additional pictorial and written home exercises do not lead to better adherence to the home exercise program	A complete set of exercises is not given in this study
Koc (2015)	To determine whether a structured, physiologically based exercise program produces better outcomes in stroke recovery	Pilot study	Barthel Index	Turkey	n=72 experimental group (n=35) control group (n=37)	Structured exercised post-stroke shows greater impact in post-stroke functional improvement	Long-term program (12 weeks)
Mayo et al. (2013)	To explore the effectiveness of home-based exercise program in improving walking ability & other mobility health outcome	Randomized Controlled trial	Six Minutes Walking Test (6MWT), Berg Balance Scale, Community Balance and Mobility Scale, Stroke Impact Scale, RAND 36	Canada	n=87 cycle exercise group (n=43) group (n=44)	The home-based exercise program shows effective result in maintaining walking capacity after discharge	Long term program and there is some issue in adhering to exercise
Puckree & Naidoo (2014)	To evaluate the effect of a balance and stability focused outpatient community-based rehabilitation and regular physiotherapy program	Randomized Controlled trial	Postural Assessment Scale (PASS), Berg Balance Scale (BBS)	USA	n=50 experimental group (n=25) control group (n=25)	The balance and stability focused community-based rehabilitation program is more effective in improving stability and balance compare to regular physiotherapy program	Small number of participant & there is some issue with patient compliance in the program

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Simpson et al. (2017)	To investigate the feasibility of a phone monitored home exercise program for upper limb	Randomized Controlled trial	Chedoke Arm & Home Inventory, Motor Activity Log, Grip Strength & COPM	Canada	n=8	Phone-monitored upper limb home exercise benefits community-dwelling individuals with stroke & behavioural strategies benefit the transfer of skills into daily upper limb used	Small sample size & best suited with mild to moderate level of impairment only
Chen et al. (2021)	To evaluate the effectiveness of a home-based exercise program for patients with lower limb spasticity post-stroke compared to conventional rehabilitation	Randomized Controlled trial	Fugl Meyer Assessment, Modified Ashworth Scale (MAS), Gait Speed, Step Size & Barthel Index	China	164 (IC: n=59, CG: n=62)	The study found that the home-based exercise program is effective in reducing lower limb spasticity and improving motor function, walking ability and activities of daily living in post stroke patients	Single center study & semi supervised by researcher because involving home exercise program
Hsieh et al. (2018)	To explore the effect of home-based rehabilitation versus clinic-based rehabilitation on different aspect of health-related outcome in patients with stroke.	Randomized Controlled trial	Fugl Mayer Assessment (FMA) Box & Block Test, Revised Nottingham Sensory Assessment.	Taiwan	25	Home rehabilitation shows improved use of UE in various daily task where self-perceived health status is improved by clinical-based intervention.	there is no established optimal duration and frequency of home program yet & long study period
Kim et al. (2018)	To explore the effect of combines therapy of modified Constraint Induced therapy (mCIMT) with mental practice against those of mCIMT alone on corticospinal excitability, movement quality, function and activities of daily living in stroke patients.	Randomized control trial	3D motion analysis, Jebsen-Taylor hand function test, and motor activity log	Korea	14 sample (experimental group=7, control group=7)	combined therapy of mental practice and modified constraint-induced therapy (mCIMT) result in more effective improvements in corticospinal excitability, upper limb function and performance in daily activities compared to mCIMT alone	There is no prove which group gains more quality of movement

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Madhoun et al. (2020)	To investigate the effectiveness of task-based mirror therapy (TBMT) compared to occupational therapy (OT) in improving upper limb motor function and activities of daily living in subacute stroke patient	Single Blinded Randomized Control Trial	Fugl-Mayer Assessment (FMA) and Modified Barthel Index (MBI)	China	30 TMBT group (n=15) and control group (n=15)	task-based mirror therapy (TMBT) was more effective than occupational therapy (OT) alone in improving upper limb motor function and activities of daily living in subacute stroke patient	Small sample size and this study does not compare TMBT & MIT alone
Lee et al. (2017)	To investigate the effectiveness of bilateral arm training for improving upper limb function and activities of daily living (ADL) performance in hemiplegic stroke patients.	Randomized Control Trial	Fugl-Meyer assessment (FMA), the Box and Block Test (BBT), and the modified Barthel index (MBI).	Korea	30 experimental group (n=15) and control group (n=15).	Both experimental group experience improvements in upper limb function and activities of daily living (ADL) performance after the intervention	Small number of participants

contribute to improved functional improvement. This conclusion is supported by five experimental studies focusing on improvements in function, as well as lower limb and upper limb enhancements (Chien et al. 2020; Hsieh et al. 2018; Kim et al. 2018; Lee et al. 2017; Madhoun et al. 2020). The majority of these studies demonstrate that targeted interventions result in higher-quality improvements in both functional and physical abilities.

One of the main themes that emerged was the improvement of functional outcomes and prognosis of stroke patients can be influenced by the total therapy time spent by them. Total therapy time for post-stroke patients can be seen as the intensity of the therapy and also the dose-response relationship towards the therapy time. Most of the studies come out from the Western populations and there is emerging evidence from Asia that can support similar findings (Kimura et al. 2022; Ko et al. 2020). The study shows that early admission to a rehabilitation program is highly associated with the improvement of functional recovery. Moreover, previous studies indicated that to regain independence among stroke survivors, they need to spend more hours on post-stroke rehabilitation to improve functionality and reduce impairment (Nordin et al. 2014). This evidence was crucial to direct the clinical practice where healthcare professionals should prioritise in providing sufficient therapy time to stroke patients during the acute phase of rehabilitation to maximise the functional outcomes. Furthermore, this baseline can be used by healthcare providers in strategies for their frequency and duration of therapy sessions, implementing multidisciplinary programs that can

provide more targeted outcomes, and also utilising interventions available that may help in achieving higher therapy sessions for the patient (Ko et al. 2020).

Interventions for post-stroke rehabilitation are usually tailored specifically to specific impairments or functional limitations experienced by individuals. This approach aims to optimise the outcomes by focusing on the areas of deficits identified through the assessment. Therefore, the review shows that all experimental studies that focus on specific interventions show greater improvements in patients' functional outcomes. This is supported by Horn et al. (2005) and Salter et al. (2006), stating the repetitive task-oriented method showed significant improvement in motor and functional recovery compared to facilitative approaches (Harris et al. 2009). From these findings, healthcare professionals can work together in coordinated and tailored targeted interventions to approach different domains of inpatient areas of deficit to enhance the efficiency and effectiveness of rehabilitation efforts that lead to better functional outcomes and improved quality of life for stroke survivors.

In summary, dedicating more time to therapy sessions can enhance functional improvement, helping healthcare professionals allocate resources more effectively. To maximise therapy benefits, incorporating additional time for safe, self-directed patient practice is essential. Tailoring therapy according to the specific individual needs and their current functional ability could ensure a more effective, as well as comprehensive multidisciplinary rehabilitation strategy.

## Limitation of the Study

Although wide variety of study designs were included in this review, the quantity of studies that can be reviewed is limited. We only review English-based articles which may lead to selection bias and the specific search on the availability of interventions that is without the applications of high technology devices may limit the search area, however, we focused on including various type of protocols and methods of delivery for home-based therapy in post-stroke rehabilitation.

## CONCLUSION

This scoping review gives more insight on the factor that influencing functional recovery post-stroke and this review will help researcher to create tools that can help stroke survivor to invest more time for their therapy and also at the same time focus on targeted therapy that needed based on their current ability. Multidisciplinary teams involved in rendering post-stroke rehabilitation can tailor home exercise program which is safe and practical to be performed by patients at home without requiring extra cost and structured intervention for continuation of therapy which can increase their therapy dose, and at the same time executing the targeted therapy for their functional improvement effectively

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