

## Psychological Interventions to Improve Participation in Stroke Survivors: A Systematic Review

(Intervensi Psikologi untuk Meningkatkan Penyertaan dalam Pesakit Strok: Kajian Sistematis)

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### Abstract

*Psychological factors such as low self-esteem, depressive and anxiety symptoms have been found to hinder stroke survivors' social participation and adversely affect their quality of life. While there have been previous reviews that studied on interventions on social participation after stroke, there is a lack of studies that utilize psychological interventions for participation among stroke survivors. This review aims to provide a comprehensive overview of psychological interventions designed to improve post-stroke participation and assess their effectiveness. Three databases (MEDLINE, Scopus, and Web of Science) were used to identify relevant articles using search terms strategies that are related to stroke, participation and psychological health. Eligible articles are studies using randomized controlled trial or pre- and post-interventions design that measured participation and psychological outcomes. Eleven studies met the inclusion criteria, with varied sample sizes, intervention types, and measurement tools. The findings revealed that while psychological interventions can improve participation, inconsistencies in measurement and a lack of focus on participation as a primary outcome limit the strength of the conclusions, with some studies did not show long-term improvements. Positive effects on participation were observed in interventions involving home visits with multidisciplinary care, cognitive behavioural therapy (CBT) augmented with occupational therapy, self-management through virtual services, and group music therapy alongside occupational therapy. These findings highlight the need for further research focusing on psychological interventions with participation as primary outcomes in stroke rehabilitation.*

**Keywords:** social participation, stroke rehabilitation, depression, anxiety, psychological intervention, quality of life

### Abstrak

*Faktor psikologi seperti harga diri yang rendah, gejala kemurungan, dan kebimbangan didapati menghalang penyertaan dalam kalangan pesakit strok serta memberi kesan buruk terhadap kualiti hidup mereka. Walaupun terdapat kajian sistematik sebelum ini mengenai intervensi untuk penyertaan selepas strok, terdapat kekurangan kajian yang menggunakan intervensi psikologi untuk meningkatkan penyertaan dalam kalangan pesakit strok. Kajian ini bertujuan untuk memberikan gambaran menyeluruh tentang intervensi psikologi yang direka untuk meningkatkan penyertaan selepas strok dan menilai keberkesanannya. Tiga pangkalan data (MEDLINE, Scopus, dan Web of Science) telah digunakan untuk mengenal pasti artikel yang relevan menggunakan strategi carian berkaitan strok, penyertaan, dan kesihatan psikologi. Artikel yang terpilih adalah kajian yang menggunakan reka bentuk penyelidikan ujian terkawal rawak atau intervensi pra dan pasca yang mengukur hasil penyertaan dan kesan terhadap psikologi pesakit. Sebanyak sebelas kajian memenuhi kriteria inklusif, dengan saiz sampel, jenis intervensi, dan alat pengukuran yang berbeza. Penemuan menunjukkan bahawa walaupun intervensi psikologi dapat meningkatkan penyertaan, kesimpulan kajian ini adalah terhad. Hal ini kerana, terdapat ketidakseragaman dalam pengukuran, kekurangan tumpuan kepada penyertaan sebagai hasil utama, dan beberapa kajian yang tidak menunjukkan penambahbaikan jangka panjang. Kesan positif terhadap penyertaan ditemui dalam intervensi lawatan ke rumah dengan penjagaan pelbagai disiplin, terapi kognitif tingkah laku (CBT) yang digabungkan dengan terapi pekerjaan, pengurusan sendiri melalui perkhidmatan maya, dan terapi muzik berkumpulan bersama terapi pekerjaan. Penemuan ini menekankan keperluan untuk kajian lanjut yang memberi tumpuan kepada intervensi psikologi dengan penyertaan sebagai hasil utama dalam pemulihan strok.*

**Kata Kunci:** Penyertaan sosial, Pemulihan strok, Kemurungan, Kebimbangan, Intervensi psikologi, Kualiti Hidup

## INTRODUCTION

Stroke is a significant global health concern, ranking as the third leading cause of morbidity in 2021, responsible for approximately 10% of total deaths worldwide (World Health Organization 2024). According to the latest report from the Department of Statistics Malaysia (DOSM), cerebrovascular disease is the third leading cause of death in Malaysia (2023). Moreover, the burden of stroke in Malaysia has steadily increased, with 47,911 cases reported in 2019, resulting in 19,928 deaths, and a prevalence of 443,995 individuals affected (Feigin et al. 2021). Additionally, the country also reported 512,726 Disability-Adjusted Life Years (DALYs) lost due to stroke, highlighting the significant impact of the reduced Quality of Life caused by stroke-related disabilities. In regards to this rising trend, post-stroke participation restriction is recognized as major element of recovery, which is associated with long-term impacts of physical limitations and emotion disorders (Zhou et al. 2023). Physical limitations, such as reduced mobility, can commonly lead to social isolation due to difficulties to re-engage in work and participating in leisure activities (Elayoubi et al. 2023). Research has shown that stroke survivors participated less in vocational activities 6 months after a stroke, which is associated with lower satisfaction and increased participation restrictions (Blömer et al. 2015).

The International Classification of Functioning, Disability and Health (ICF) developed by the World Health Organization (WHO) in 2001 provides a comprehensive framework for understanding the multidimensional nature of health and disability. According to the ICF, the concept of participation refers to an individual's involvement in different life situations which represents the interaction of individuals in social, economic, cultural, spiritual and civil affairs (WHO 2001). This definition emphasis on the individual's ability to perform activities and to participate in real-life, everyday situations. Participation is influenced by the interplay between an individual's impairments (in body functions and structures), activity limitations and contextual factors (including both personal and environmental aspects). Personal factors are the background of individual's life such as socio-demographic, internal abilities and behavioural and psychological aspects. Whereas environmental factors are the physical, social and attitudinal environment which people conduct their lives. Participation restriction, is defined as the difficulties an individual may encounter when engaging in life situations (WHO 2001). In recent years, 'participation' and 'participation restriction' have gained prominence in stroke research, as they are the important determinants of quality of life (Della

Vecchia et al. 2019; Zhou et al. 2023). Studies show that a low level of participation is associated with an increased risk of adverse health outcomes including depressive symptoms (Blömer et al. 2015), stroke recurrence, decreased quality of life and higher mortality (Zhang et al. 2016).

A review of interventions aimed at enhancing participation recovery among stroke survivors found that most current approaches predominantly emphasis on improving physical function or activity limitations (Engel-Yeger et al. 2018). Strategies such as exercise-based programs, occupational therapy and repetitive task practice have been found to improve likelihood of participation after treatment by addressing physical functions including mobility, fitness, and motor function (Engel-Yeger et al. 2018). However, these interventions fall short in addressing the psychological factors, which corresponds to the component of contextual factors in the ICF and have been shown to be closely associated with participation. Existing literature review has found that psychological factors, particularly self-esteem and acceptance were identified as positively associated with participation after stroke (Della Vecchia et al. 2019). Other studies also frequently reported that depressive symptoms (Chau et al. 2009; de Graaf et al. 2017; E Andrenelli et al. 2015; Elayoubi et al. 2023; Ezekiel et al. 2019), low self-esteem (Chau et al. 2009; Della Vecchia et al. 2019), and anxiety symptoms (de Graaf et al. 2016) are significant psychological determinants of participation restrictions.

Although physical function recovery is important to help stroke survivors to participate in society, this approach only partially aligns with the ICF framework, which also emphasizes the psychosocial factors that influence participation. Additionally, a systematic review exploring stroke survivors' experiences with rehabilitation revealed that many report low satisfaction when therapy focuses solely on physical improvements, as it neglects the broader emotional and social challenges that survivors face after stroke (Peoples, Satink, and Steultjens 2011). Given that participation is a major outcome of rehabilitation (Zhou et al. 2023), it is important that rehabilitation address the psychological barriers that hinder individuals from fully engaging in the community and fulfilling social roles. Previous research on long-term stroke survivors' experiences indicates that, motivation and self-acceptance are the key factors in successful community reintegration and participation in meaningful activities (Norlander et al. 2018). Therefore, it is imperative to integrate psychological interventions alongside physical therapy, ensuring a more comprehensive recovery to better address participation restrictions.

Several systematic reviews have examined different intervention approaches for improving participation in stroke survivors. Lee et al. (2019) reviewed community-based participation, with a focus on the content and the effectiveness of the intervention. They found that the majority of community-based interventions addressed leisure, interpersonal relations and community life, while areas such as political life, education, assisting others and religious activities were less addressed. Warner et al. (2015) assessed the effectiveness of self-management programs aimed at improving function and participation after stroke. Wolf et al. (2014) explored occupation-based interventions designed to improve activities of daily living and social participation following stroke.

Based on current knowledge, there remains a significant gap in the literature regarding the use of psychological interventions to improve participation after stroke. No existing systematic reviews have specifically examined the role of psychological approaches as an intervention or

the effectiveness of psychological intervention in addressing participation restriction. Given the importance of psychological factors in participation restriction, there is a need for a comprehensive synthesis of recent literatures on the effectiveness of psychological interventions in promoting participation, that can be informative to health care professionals as part of rehabilitation program. Therefore, the purpose of this systematic review is to: 1) provide a comprehensive overview of the psychological interventions employed to improve participation among stroke survivors; and 2) to assess the effectiveness of these interventions in improving participation among stroke survivors.

## METHOD

The present review employed a systematic literature search according to the Preferred Reported Items for Systematic Reviews and Meta-Analyses (PRISMA) flow-diagram (Page et al. 2021) as depicted in Figure 1.

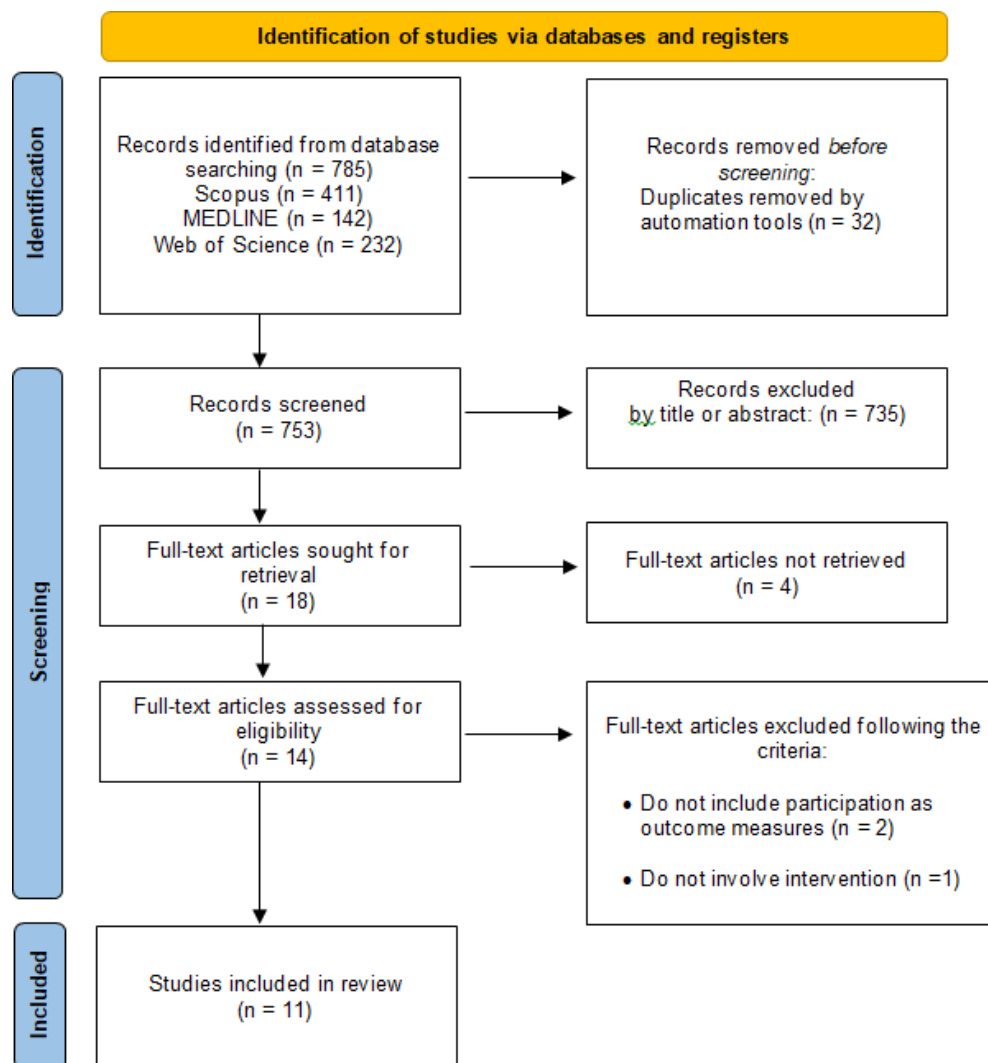


Figure 1. PRISMA flowchart (Page et al. 2021)

## SEARCH STRATEGY

A literature search was performed using the Scopus, MEDLINE and Web of Science databases. The date of the last search was set from inception to 18<sup>th</sup> January 2024. The search strategy was built by combining search terms both as free texts and Medical Subject Headings (MeSH) terms with associated keywords using Boolean operators. The search terms are further detailed based on the three domains, as shown in Table 1.

Table 1. Keyword search list used in Scopus, MEDLINE and Web of Science

[1]	stroke OR ischaemia OR haemorrhage OR "cerebrovascular accident" OR infarct
[2]	social AND (participation* OR engagement OR adjustment* OR restriction*)
[3]	depression OR anxiety OR "psychological distress" OR "mood disorders"

## STUDY SELECTION

The criteria of selection for these studies follow the PICO format specifying the Patient/Population, Intervention, Comparison, and Outcomes (Higgins 2008).

### Types of studies

Original articles published in English between January 2013 until December 2023 are eligible for inclusion. The studies must be experimental trials designed to investigate the effects of psychological intervention on participation after stroke, such as randomized controlled trials (RCT), and quasi-experimental studies. Articles were excluded if they were commentaries, meta-analysis, review articles, study protocols and editorials.

### Types of participants

Participants in the included studies must be adults, aged 18 and above, diagnosed with stroke including transient ischemic attack (TIA), hemorrhagic stroke, or ischemic stroke.

### Types of intervention

Intervention must employ a psychological or behavioural intervention operationalized as psychotherapy or psychosocial-behavioral intervention. Studies using non-psychological approaches including pharmacological intervention, immunology, medical imaging and physiotherapy training were excluded.

### Types of Comparison

Studies including any form of comparison such as intervention vs. control groups, or observational studies comparing different populations. Not restricted to only randomized controlled trials; may include non-randomized controlled trials that provide comparative data.

### Types of Outcomes

Participation as an outcome measure is defined by the level of social engagement or involvement in community and leisure activities following the intervention. Psychological variables such as mood, coping, depression, and anxiety, were also included as secondary outcomes.

## RESULTS

From the search, 785 records were initially identified across three databases: MEDLINE, Scopus and Web of Science, resulting in 753 documents after duplicates were removed. Titles and abstracts were then assessed independently and blindly by two assessors, with final arbitration on inclusion from both assessors. All disagreements were dissolved through discussion. Full-text screening (n = 14 studies) was done independently by both authors and final inclusion into the systematic review was agreed upon. A total of 11 studies were included in the systematic review. An overview of the included studies including main outcomes and findings is provided in Table 2. Study quality was assessed using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) criteria. Of the 11 studies, five studies were from the Netherlands, followed by Australia (n = 2), and one each from the United States, Canada, Hong Kong and the United Kingdom. All articles were distributed within a time frame of 10 years (2013-2023). The majority of the study designs were randomized controlled trials (RCT) (n = 7) and the remaining studies employing a pre-post intervention design.

## PARTICIPANTS

There were a total of 1135 participants included in the 11 studies, with participants age ranges from 25 to 92 years old. The eligibility criteria to participate based on time since stroke onset varied, ranging from 2 weeks to 12 months. The most common eligibility criteria required at least 3 months after stroke onset to participate in the studies.



### Participation measures

In nine of the 11 studies, participation was measured as secondary outcomes, while only two studies (Tielemans et al. 2015; van de Ven et al. 2017) as primary outcomes. The terms “social participation” (Kootker et al. 2017; Hoi et al. 2023; Mead et al. 2022; Rauwenhoff et al. 2022; van de Ven et al. 2017) and “participation” (Rochette et al. 2013; Raghavan et al. 2016 & Sathananthan et al. 2021) were the most frequently used. Additionally, studies that measured “social activities” (Fens et al. 2014) and “work and social adjustment” (Minshall et al. 2020) were also included as they aligned with the ICF definitions of participation.

The included studies used a variety of measurement tools used to assess social participation. The Utrecht Scale for Evaluation of Rehabilitation-Participation (USER-P) was the most frequently utilized in four of the 11 studies (Kootker et al. 2017; Rauwenhoff et al. 2022; Tielemans et al. 2015; van de Ven et al. 2017). The second most common tool was the participation subscale of the Stroke Impact Scale (SIS) (Mead et al. 2022; Raghavan et al. 2016). Other assessments used to measure participation were the Assessment of Life Habits (LIFE-HI) (Rochette et al. 2013), Frenchay Activities Index (FAI) (Fens et al. 2014), Reintegration to Normal Living Index (RNLI) (Lo et al. 2023), Community Integration Questionnaire (CIQ) (Sathananthan et al. 2021), and Work and Social Adjustment Scale (WSAS) (Minshall et al. 2020).

Regarding psychological variables, depression was a primary outcome measure in two studies (Kootker et al. 2017; Rauwenhoff et al. 2022), while it appeared as secondary outcome measures in eight studies, referred to by terms such as “depression and anxiety symptoms” (Fens et al. 2014; Lo et al. 2023; Minshall et al. 2020; Sathananthan et al. 2021; van de Ven et al. 2017), “emotional functioning” (Tielemans et al. 2015) and “mood” (Rochette et al. 2013 & Mead et al. 2022). The Hospital Anxiety and Depression Scale (HADS) was the most frequently used to assess psychological variables in these studies. One study measured mental well-being using the World Health Organization Well-Being Index (Raghavan et al. 2016).

### Intervention protocol

Of the 11 studies, eight studies focused on individual-based therapy, while three studies utilized group-based intervention. Among the individual-based interventions, three studies employed telephone-delivery interventions (Lo et al. 2023; Mead et al. 2022; Rochette et al. 2013). Rochette et al. (2013) used phone call support

through a program WE CALL, where a trained hospital staff addressed participants’ concerns post-discharge, provide information, monitored recovery progress and referred them to local community services when needed. Another study, Mead et al. (2022) applied cognitive behavioural principles to telephone-delivery interventions, aiming to help participants overcome fears about physical activity and address unhelpful thoughts associated with fatigue and low mood. The third telephone-delivery intervention study utilized phone calls for follow-up prior to online video consultation to tailor sessions according to the patient’s needs (Hoi et al. 2023).

Another study provided a flexible personalized psychosocial intervention via telephone, face-to-face or online consultation, with most participants opted for in-person sessions (Minshall et al. 2020). This intervention used a collaborative therapy framework, including both the participants and their carer, facilitated by a psychologist (Minshall et al. 2020). Two other studies targeted post-stroke depression and anxiety using psychological approach (Kootker et al. 2017; Rauwenhoff et al. 2022). The first study applied Acceptance and Commitment Therapy (ACT) approach to help reduce post-stroke anxiety, depression, and improve social participation (Rauwenhoff et al. 2022). The second study used individualized cognitive behavioural therapy (CBT) augmented with occupational therapy to help patients set and achieve goals for social participation as well as treat post-stroke depressive symptoms with or without anxiety (Kootker et al. 2017). Another individual-based intervention study investigated the impact of home visits after discharge, by a stroke care coordinator to facilitate social participation through follow-up referrals to relevant healthcare providers (Fens et al. 2014). One study examined the effectiveness of computer-based training aimed at improving subjective cognitive and executive functioning, as well as addressing participation restriction (van de Ven et al. 2017).

Three studies used group intervention administered at rehabilitation centers (Raghavan et al. 2016; Sathananthan et al. 2021; Tielemans et al. 2015). In one study, participants were guided by a psychologist or occupational therapist to develop proactive coping strategies focused on managing negative emotions, building social support, engaging in social participation and adapting to stroke-related changes (Tielemans et al. 2015). Another study incorporated music therapy and instrument playing, facilitated by occupational therapists to encourage movements, with a feedback session at the end to support social participation (Raghavan et al. 2016). The third group-based intervention integrates cognitive rehabilitation with ACT techniques to improve adjustment following stroke by encouraging

engagement in valued activities including health, work/study, leisure and relationships (Sathananthan et al. 2021).

#### Effectiveness of intervention on participation

Of the nine studies that assessed participation as a secondary outcome, four reported positive results. Three of these studies were randomized controlled trials (RCTs) and one used a pre-post intervention design. Effective interventions included: home visits with multidisciplinary care post-discharge (Fens et al. 2014), CBT combined with occupational therapy (Kootker et al. 2017), a self-management intervention delivered via virtual stroke care services (Hoi et al. 2023), and group music therapy combined with occupational therapy (Raghavan et al. 2016). Improvements in participation outcomes were observed immediately post-intervention and at follow-up intervals of 6 weeks, 4 months, and 6 months. However, long-terms improvements in participation were limited, with no significant changes observed after the intervention at 8 months (Kootker et al. 2017) or 1-year follow-up (Fens et al. 2014; Raghavan et al. 2016). One study lacked follow-up measures (Hoi et al. 2023).

The two articles treating participation as a primary outcome did not yield significant

improvements in participation (Tielemans et al. 2015; van de Ven et al. 2017). Both studies used an RCT study design, with an intervention group and a control group. The intervention protocol of the first study consisted of a group self-management coping program and the other use computer-based cognitive training. Among the other studies with no improvements in participation, interventions included telephone-delivered CBT (Mead et al. 2022), telephone support (Rochette et al. 2013), psychosocial and self-management therapy (Minshall et al. 2020), individual ACT (Rauwenhoff et al. 2022), and group-based ACT (Sathananthan et al. 2021).

In summary, psychological and behavioural interventions such as music therapy, augmented CBT, virtual stroke care services and home visits post-discharge have demonstrated potential for enhancing participation after stroke. Additionally, both music therapy and augmented CBT approach in these studies were combined with occupational therapy, which may have contributed by the physical function improvements. However, further investigation is needed to clarify the effects of these interventions, particularly given the mixed results in studies where participation was assessed as a secondary outcome.

Table 2. Characteristics and intervention information of included studies

Studies	Country	Setting	Participants/ Age	Study design	Intervention	Outcomes of participation
						Positive
Fens et al. (2014)	Netherlands	Home	N = 117 Mean age: 72.7 (SD = 10.0)	Non-RCT	Home visits by a stroke care coordinator, at 1-2 weeks up to 18 months after discharge	Levels of social activities (FAI scores) improved significantly in the intervention group at 6 months and 18 months, whereas the control group showed a significant decrease
Kootker et al. (2017)	Netherlands	Rehabilitation centers	N = 61 Median age: 61 (Range = 45-79)	RCT	1-hour individual CBT session augmented with occupational therapy, for 4 months	Positive USER-P satisfaction subscale increased after the treatment
Hoi et al. (2023)	Hong Kong	Home	N = 335 Mean age: 62.3 (SD = 9.8)	RCT	30-45 minutes virtual consultations with a nurse, follow-up phone calls, monitoring device and hotline access, for 6 months	Positive The intervention group had a significantly greater increment in the RNLI score at 6 months than those in the control group
Mead et al. (2022)	United Kingdom	Home	N = 76 Mean age: 66.7 (SD = 13.3)	RCT	1-hour telephone calls informed by CBT intervention Post Stroke Intervention Trial in Fatigue (POSITIF), for 4 months	Negative No statistically significant difference between groups for all outcome measures including the SIS-social participation item

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Minshall et al. (2020)	Australia	Multi-site (online, face-to-face, telephone)	N = 137 Mean age: 67 (SD = 13.7)	RCT	Stroke Care Optimal Health Program (SCOHP), 1-hour sessions with carers and facilitator provided with a workbook, for 12 months	Negative  No statistically significant differences were found in the WSAS social functioning outcomes between groups
Raghavan et al. (2016)	United States	Rehabilitation centers	N = 13 Mean age: 52 (SD= 14)	Quasi-experimental pre-post design	Music Upper Limb Therapy (MULT-I), 45 minutes in groups with music therapists and OT, for 6 weeks	Positive  Social participation improved from post-intervention to 1-year follow-up
Rauwenhoff et al. (2022)	Netherlands	Hospital	N = 4 Mean age: 50.8 (SD = 12.8)	Non-concurrent multiple baseline randomization	90 minutes BrainACT individual therapy with mindfulness exercise and workbook, for 3.5 months	Negative  No clear improvements in social participation (USER-P)
Rochette et al. (2013)	Canada	Home	N = 186 Mean age: 62.5 (Range = 31-92)	RCT	Multimodal support intervention WE CALL (phone calls, email) from a trained hospital staff, for 6 months	Negative  There were improvements in participation level (LIFE-HI) at baseline and 6 months for both groups but no significant between-group differences
Sathananthan et al. (2021)	Australia	Psychology Clinic	N = 8 Mean age: 44.3 (SD = 12. 4)	Non-concurrent multiple baseline randomization	2-hours weekly group sessions integrating cognitive and ACT techniques consisting of discussion, handouts, in-session practice and homework, for 8 weeks	Mixed  On the CIQ, one stroke participant displayed increases in social integration and daily productivity, whereas the other two stroke participants displayed reductions in home and social integration.
Tielemans et al. (2015)	Netherlands	Rehabilitation centers	N = 113 Mean age: 57.0 (SD = 9.0)	RCT	2-hour group sessions to increase self-management proactive coping and participation, for 10 weeks	Negative  Improvement was found in participants' USER-Participation Restriction subscale at 9 months of follow-up for the intervention group but there were no significant between-group differences
van de Ven et al. (2017)	Netherlands	Rehabilitation centers	Mean age: 57.0 (SD = 9.1)	RCT	1.5-hours computer-based cognitive flexibility training program in the domains of attention, memory and reasoning, for 12 weeks	Negative  There were no significant changes in the level of participation (USER-P) between the intervention group, active control group and waiting list control group

## DISCUSSION

The objective of this review was to conduct a systematic evaluation of the literature on psychological interventions to improve participation among stroke survivors and assess the effectiveness of these interventions in enhancing participation outcomes. The findings reveal evidence that psychological interventions can significantly improve participation among stroke survivors. Specifically, interventions that emphasized home visits and multidisciplinary care after discharge (Fens et al. 2014), CBT concurrent with occupational therapy (Kootker et al. 2017), self-management through virtual stroke care services (Lo et al. 2023) and music therapy combined with occupational therapy (Raghavan et al. 2016) demonstrated positive outcomes. However, it is noteworthy that relatively few studies investigated the effects of psychological interventions on participation as primary outcomes, suggesting a gap in the literature that warrants further exploration.

Based on the findings, although most studies referenced the ICF definition of participation, the measurement instruments used to measure participation differed widely depending on the implementation of the studies, leading to challenges in synthesizing findings. Moreover, variability in sample size, intervention protocol and training duration across the 11 included studies complicates the assessment of the overall effectiveness of psychological interventions on participation. For example, while the majority of studies assessed outcomes at 6 months post-intervention, significant discrepancies in the timing of assessments and the duration of training hindered direct comparisons. Furthermore, the positive effects observed in four studies were largely limited to post-treatment effects, with little evidence of sustained benefits after 1-year follow-up (Fens et al. 2014; Hoi et al. 2023; Kootker et al. 2017; Raghavan et al. 2016).

Several factors may influence the efficacy of psychological interventions on participation outcomes. The observed inconsistencies in measuring participation align with the previous literature (Zhou et al. 2023), which highlights the importance of employing standardized measures to ensure comparability across studies. Different participation measures contribute to varied aspects of participation (Engel-Yeger et al. 2018), as illustrated by the predominance of the Utrecht Scale for Evaluation of Rehabilitation-Participation (USER-P) in this review. A previous study indicated that the components of USER-P such as participation frequency, restriction, and satisfaction, are only partially correlated (Blömer et al. 2015). The strongest independent association was between

participation restriction and frequency in vocational activities, whereas participation frequency in leisure and social activities was not independently associated with participation restriction and satisfaction. This suggests that a comprehensive approach to measuring participation should include discrete scores for different aspects rather than relying on a composite score. Kootker et al. (2017) exemplified this approach by presenting detailed results for each USER-P subscale of participation satisfaction, participation restriction, vocational activities, and leisure activities. The study has found improvement in the USER-P Participation Satisfaction subscale but not in the vocational activities, leisure activities and participation restriction subscales (Kootker et al. 2017).

Another critical factor influencing intervention efficacy is the type of intervention utilized. Current findings from this review indicate that occupational therapy, when combined with music therapy and CBT, can positively impact participation. This aligns with the ICF framework, where occupational therapy is expected to enhance social participation by the improvement in daily activities (Zhou et al. 2023). The advantage of occupational therapy lies in its focus on movements related to the patients' living environment and home-based activities that people carry out daily, extending to leisure and social activities. These findings suggest that the integrated approach of occupational therapy with psychological interventions could significantly help stroke survivors' ability to reintegrate into society.

Psychological therapies such as CBT and ACT were prominently featured in this review. CBT aims to alter irrational cognition and negative thought pattern to improve treatment adherence and mitigate the recurrence of symptoms, offering advantages over pharmacotherapy (Broomfield et al. 2011). Conversely, ACT aims to help individuals to accept their thoughts and feelings without judgement, rather than changing them. Patients are also encouraged to commit to behaviours aligned with personal values to facilitate meaningful living (Hayes 2016). While both approaches effectively reduce psychological disorders such as depression and anxiety, their direct impact on participation remains inconclusive without the support of complementary therapies such as occupational therapy.

## LIMITATIONS

This review acknowledges several limitations. First, the limited number of studies available for inclusion due to inaccessible full texts may have resulted in an incomplete overview of the literature. Second, the review focused primarily on quantitative data, with only one study utilizing



a mixed-methods approach (Raghavan et al. 2016). Future investigations incorporating participants' subjective experiences post-intervention could yield a more nuanced understanding of the effectiveness of psychological interventions. Third, considerable variation among the included studies regarding sample size, intervention types, training duration, and measurement tools for social participation presents challenges in interpreting the results.

## CONCLUSIONS

As of current knowledge, this is the first systematic review aimed at providing a comprehensive overview of the current literature on psychological interventions and their effects on participation outcomes among stroke survivors. The findings reveal inconsistent effects across different psychological approaches to improve participation. Therefore, further systematic research and randomized controlled trials are needed to investigate the influence of psychological interventions on participation as primary outcomes. Such efforts will provide evidence-based recommendations for stroke rehabilitation programs, thus, improving the quality of care and outcomes for stroke survivors.

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