Do self-management interventions improve self-efficacy and health-related quality of life after stroke? A systematic review

Elizabeth A Lynch[1] (iD), Katie Nesbitt[1], Aarti Gulyani[1],
Raymond J Chan[1], Niranjan Bidargaddi[2],
Dominique A Cadilhac[3,4] (iD), Billie Bonevski[5], Fiona Jones[6],
Liam P Allan[3,7] (iD), Erin Godecke[8,9], Rebecca Barnden[10,11,12],
Emily Brogan[13], Thoshenthri Kandasamy[1], Stacy Larcombe[1],
Lemma N Bulto[1] and Coralie English[14,15,16] (iD)

Abstract

Introduction: Self-management interventions are recommended after stroke in many international guidelines to improve health-related quality of life (HRQoL). Self-efficacy, a person's confidence in their abilities, is widely considered to underpin individuals' abilities to self-manage their health.

Aims: To synthesize evidence on the effectiveness of self-management programs for improving self-efficacy or HRQoL in stroke survivors.

Summary of Review: The protocol was registered with the International Prospective Register of Systematic Reviews (CRD42023440168). We searched databases including Medline, Emcare, Scopus, Cochrane Library, CINAHL, and trial registries from inception to 13/12/2024. Only randomized controlled trials (RCTs) comparing the effect of a self-management intervention to no/another intervention for survivors of stroke on self-efficacy or HRQoL were included. Risk of bias was assessed using the Cochrane Collaboration criteria. Meta-analyses for self-efficacy and HRQoL were performed using random effect model. From 13,608 abstracts screened, 44 randomized controlled trials involving 5931 participants were included. Median time post-stroke of recruited participants ranged from 14 days to 3 years. Time required to deliver the interventions ranged from 45 min to 72 h. Self-management interventions in all included trials had multiple components, predominantly education (N = 40, 91%) and goal setting (N = 39, 89%). Interventions were delivered to individual survivors of stroke (N = 18, 41%), groups of survivors (N = 15, 34%), both individual and group delivery to survivors (N = 5, 11%) and individually to survivor-carer dyads (N = 6, 14%). Interventions were delivered entirely face-to-face (N = 28, 64%), entirely by phone or video-conferencing (N = 7, 16%) or a combination of these delivery modes (N = 9, 20%). There was low certainty evidence that self-management programs compared to no intervention did not significantly improve self-efficacy on pooled effect sizes (SMD 0.08, 95%CI -0.02 to 0.18). There was moderate certainty evidence that self-management programs had a marginal significant effect on HRQoL (SMD 0.07, 95% CI 0.01 to 0.13). Limitations to the review include marked variation between included studies in the interventions delivered, and outcome measures used, targeted behaviors and time since stroke.

Conclusion: Self-management programs varied markedly in content and dose. There is low-certainty evidence that currently designed self-management programs do not significantly improve self-efficacy. There is moderate certainty evidence that self-management programs have a small effect on HRQoL after stroke.

Introduction

Disability is common after stroke and leads to reduced health-related quality of life (HRQoL).[1] Post-stroke disability can be long-standing, so stroke requires long-term management. Accordingly, self-management interventions are recommended in many international stroke clinical guidelines, including those from Australia/New Zealand,[2] Canada[3] and United Kingdom/Ireland.[4]

Self-management interventions are designed to support people to make informed decisions[5] and effectively manage health and recovery challenges,[6] which contrasts with rehabilitation interventions which are typically designed to increase independence and reduce disability.[4] Self-management interventions tend to be multi-component, incorporating strategies such as information provision, problem-solving, goal-setting, decision-making, self-monitoring, coping and activities to maintain or improve function.[7,8] Accordingly, self-management interventions may improve health-related quality of life (HRQoL) through increased autonomy, enhanced coping strategies, and improved symptom management. Peer support networks have also been identified as important.[9]

Self-efficacy is a key construct underpinning many self-management interventions.[10] Self-efficacy is an individual's belief in their capability to accomplish specific tasks or overcome challenges,[11] and is considered the major mechanism by which self-management skills are transformed into self-management actions.[5] Following stroke, self-efficacy is essential for survivors' active engagement in problem solving, making informed decisions and taking control of their health.[6,12] Further, higher self-efficacy after stroke is associated with a range of outcomes, including less depression, more functional independence and lower risk of falling,[6] so can be viewed as an important outcome as well as a mediator of self-management behaviors.

Given the increasing awareness of the importance of self-management after stroke, as demonstrated by inclusion in international clinical guidelines and an increasing volume of research trials, it is important to have up-to-date knowledge (a Cochrane review was published on this topic in 2016).[7] The aim of this review is to update the evidence regarding the effectiveness of self-management interventions for improving self-efficacy and HRQoL in survivors of stroke.

Methods

Search strategy

The protocol was registered with the International Prospective Register of Systematic Reviews (CRD42023440168). We searched databases Medline, Emcare, CINAHL, Web of Science, Scopus, Cochrane Library, and trial registries from inception to 13/12/2024. (see Supplementary Table 1)

Study selection

Randomized controlled trials (RCTs), comparing the effect of a self-management intervention to no intervention (or other intervention) for survivors of stroke on self-efficacy or HRQoL were included. We used the definition of self-management interventions reported in the 2016 Cochrane review by Fryer,[7] wherein at least one of the following components was included: problem-solving, goal-setting, decision-making, self-monitoring, coping with the condition, or an alternative method designed to facilitate behavior change and improvements in physical and psychological functioning. Exclusion criteria: trials where <75% of participants were survivors of stroke and authors were unable to provide data for survivors of stroke only; self-management intervention was provided in conjunction with another

[1]Caring Futures Institute, College of Nursing and Health Sciences, Flinders University, Adelaide, SA, Australia

[2]Flinders Digital Health Research Centre, College of Medicine and Public Health, Flinders University, Adelaide, SA, Australia

[3]Stroke and Ageing Research, Department of Medicine, School of Clinical Sciences, Monash University, Clayton, VIC, Australia

[4]Stroke Theme, Public Health and Health Services Research Group, The Florey, Heidelberg, VIC, Australia

[5]Flinders Health and Medical Research Institute, College of Medicine and Public Health, Flinders University, Adelaide, SA, Australia

[6]Population Health Research Institute, St George's School of Health and Medical Sciences, King's College London, London, UK

[7]Australian e-Health Research Centre, Commonwealth Scientific and Industrial Research Organisation, Perth, WA, Australia

[8]Stroke Recovery and Rehabilitation, Perron Institute for Neurological and Translational Science, Perth, WA, Australia

[9]Allied Health Research, Sir Charles Gairdner Osborne Park Health Care Group, Nedlands, WA, Australia

[10]Peninsula Clinical School, School of Translational Medicine, Monash University, Melbourne, VIC, Australia

[11]Peninsula Health, Frankston, VIC, Australia

[12]National Centre for Healthy Ageing, Monash University, Melbourne, VIC, Australia

[13]Faculty of Health Sciences, Curtin University, Perth, WA, Australia

[14]School of Health Sciences, University of Newcastle, Callaghan, NSW, Australia

[15]Heart and Stroke Program, Hunter Medical Research Institute, New Lambton Heights, NSW, Australia

[16]Centre of Research Excellence to Accelerate Stroke Trial Innovation and Translation, University of Sydney, Sydney, NSW, Australia

Corresponding author:

Elizabeth A Lynch, Caring Futures Institute, College of Nursing and Health Sciences, Flinders University, GPO Box 2100, Adelaide, SA 5001, Australia.

Email: elizabeth.lynch@flinders.edu.au

intervention and the effects of interventions could not be separated; only carers or health providers recruited.

Titles and abstracts were exported to Covidence (https://www.covidence.org/), where they were screened independently by two reviewers. Full-text articles were reviewed independently by two reviewers. Disagreements were resolved through discussions.

Data extraction

Two authors independently extracted data including descriptions of self-management interventions including components of self-management (problem-solving, goal setting, decision-making, self-monitoring, social networks, and coping strategies), theoretical rationale, mode of delivery, duration and frequency, and description of the comparator intervention. In RCTs with more than two arms, we classified the routine care arm as control and the most intensive self-management intervention arm as the intervention.

We extracted self-efficacy and HRQoL outcomes at baseline, 3-, 6-, and 12-month timepoints. Where multiple measures for one outcome were presented within a study, we selected EuroQol (EQ5-D) utility score as the HRQoL outcome measure and Stroke Self-Efficacy Questionnaire (SSEQ) as the self-efficacy measure.

We extracted outcome data as means and standard deviations for each time point. When necessary, we calculated means and standard deviations from reported data by multiplying the standard error with the square root of the number of participants, or by using mean, 95% confidence interval (CI) and sample sizes. We contacted trial authors if data were not published on relevant time points (baseline and 3 months), or when we were unable to calculate means and standard deviations for key outcomes.

Assessment of risk of bias

Two reviewers independently assessed the risk of bias using the Cochrane Collaboration criteria.[13] We evaluated heterogeneity by observing forest plots, calculating the I^2 statistic and using Cochrane Q-test, with $I^2 > 75\%$ deemed considerable heterogeneity.[14] We tested publication bias and small study effects by using regression based Egger's test and funnel plots.

Measures of treatment effects

Data analyses were conducted using Stata (SE Version 18.0) for each outcome. Meta-analyses were performed to compare the estimates from baseline to each time point (3, 6, 12 months) using random effect model to consider random variability within studies and calculate differences between studies.[15] Because different outcome measures were used for self-efficacy and HRQOL across trials, we estimated standardized mean differences (SMD) between groups using Cohens' d formula. The results of the meta-analyses are presented as forest plots with effect sizes as SMDs and their 95% CIs. Sensitivity analyses were conducted by removing studies with high risk of bias from more than one source to check inconsistencies in the estimates.

We used meta-regressions to explore associations between effectiveness of the intervention and delivery method (face-to-face only versus element of telehealth); format (individual only versus element of groupwork); and duration of intervention ($\leq 7\,h$ versus $>7\,h$).

Assessing certainty of evidence

Two authors independently assessed the certainty of the evidence for each outcome at each time point using the five GRADE considerations (study limitations, consistency, imprecision, indirectness, and publication bias).[16]

Results

Study selection and characteristics

After removing duplicates, 13,608 titles and abstracts were screened and 156 full text articles were reviewed. Two cluster-RCTs[17,18] and 38 RCTs (44 trials, 46 publications)[19–63] published in 15 countries (most commonly the United Kingdom, Australia and United States) between 2007 and 2024 were included (See Figure 1). There were 5931 participants (36% female) across all included trials, with a mean age of 64 years. Time since stroke varied from 14 days to 3 years, See Table 1. Most studies were funded by government agencies, healthcare or academic institutions and reported no conflicts of interest (Supplementary Table 2).

In all trials, self-management interventions contained multiple components. Education (N=40, 91%) and goal setting (N=39, 89%) were the most common components, and over half of the trials included the components of self-monitoring (N=30, 68%) and problem-solving (N=26, 59%). See Supplementary Table 3 for intervention components. Social cognitive theory[64] (N=9, 20%) or the principles of self-efficacy, a construct within social cognitive theory[64] (N=8, 18%) was the most cited theoretical rationale for the included interventions. Nearly half (N=20, 45%) of the trials did not present a theoretical foundation for the intervention.

Self-management interventions were delivered to individual survivors of stroke (N=18, 41%), groups of survivors (N=15, 34%), combination of individual and group delivery to survivors (N=5, 11%) and individually to survivor-carer dyads (N=6, 14%). Interventions were delivered entirely face-to-face (N=28, 64%), entirely by phone or video-conferencing software (N=7, 16%) or using a

Figure 1. PRISMA flow diagram of search process.
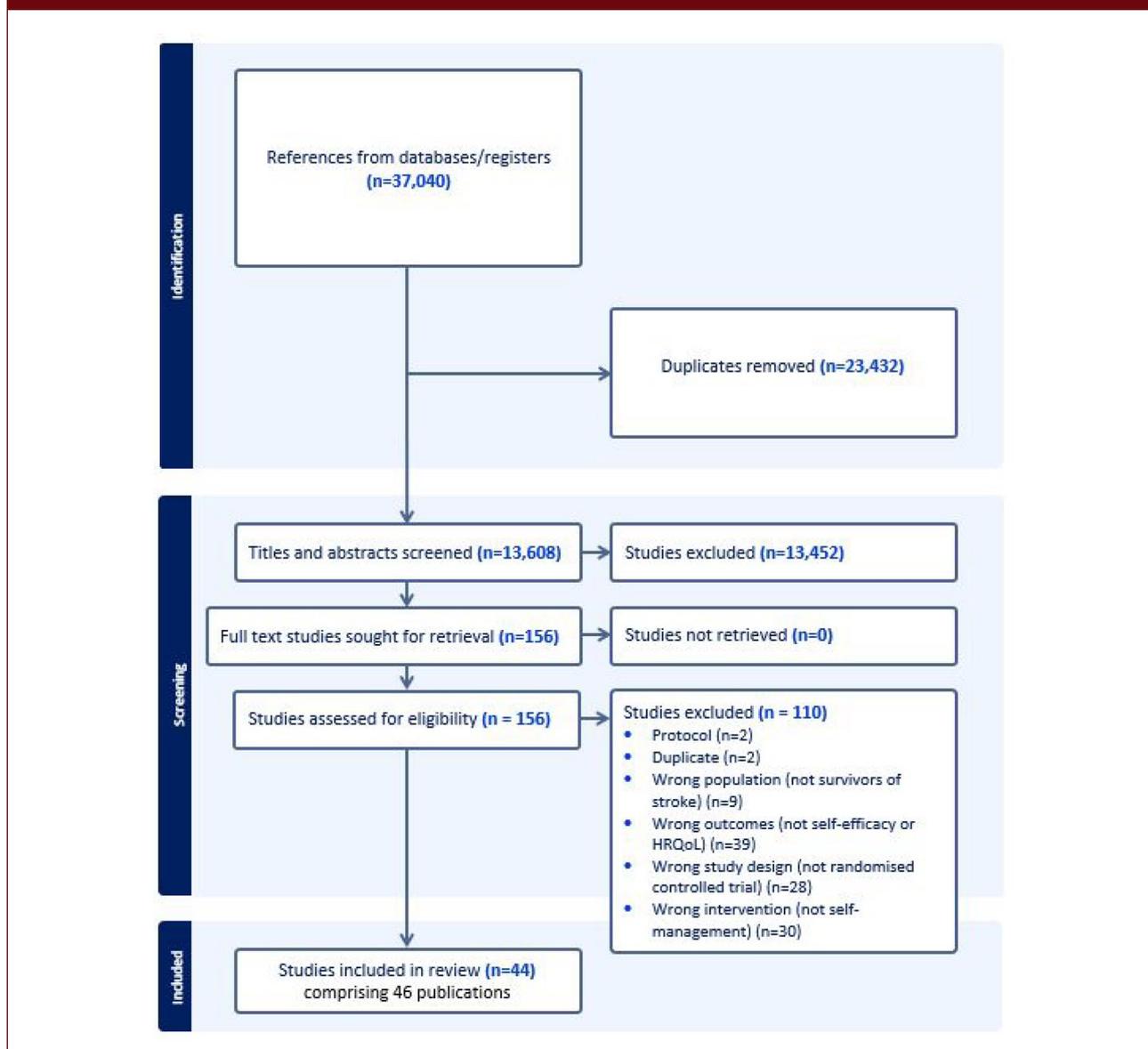
combination of face-to-face and virtual delivery (N=9, 20%). Resources such as workbooks, videos/DVDs and self-monitoring tools such as diaries, pedometers or blood pressure monitors were provided in 16 (36%) trials. Health professionals (most often nurses or allied health professionals) delivered interventions in all trials except three, which used trained research assistants[23,33] and recreation and exercise therapists.[47] Total intervention time ranged from 45 min to 72 h (median 7.5 h), and intervention durations ranged from a single session to 18 months (median 8 weeks) (Supplementary Table 4).

Self-management was compared to attention control (education,[19,29,30,50,54] memory training[51] or cardiorespiratory training)[18] in seven trials, to written education or a single education session in three trials[31,33,60] and to usual or routine care in the remaining 34 trials. Routine care was variable and poorly defined.

Risk of bias

All trials had a high risk of bias due to not blinding participants or personnel, which is not possible in the design of these trials (Supplementary Table 5). One trial had high risk of bias as outcome data were collected by non-blinded assessors.[49] Ten trials[21,27,32,34,37,41,48,59,60,62] were deemed to have "other" source of bias due to small sample size (<62 participants, based on sample size power calculation using SSEQ).[38]

Table 1. Participant characteristics.

Author Year (Country)	Population, n (%)			Age, mean (SD)		Gender, female, n (%)		Time since stroke	Outcome measure (scale)	Timepoints
	Total	I	C	I	C	I	C			
Aben 2013 (Netherlands)	153	77	76	57.9 (9)	58.3 (10.4)	33 (42.8)	36 (47.4)	53.9 (37.2) months	HRQoL (EQ5D; WHOQoL)	Baseline ≤10 days post-intervention 6, 12 months
Adamit 2023 (Israel)	49	33	33	64.6 (8.2)	64.4 (10.8)	11 (33.3)	15 (45.5)	>3 years	Self-efficacy (NGSE)	Baseline 10 weeks 3 months
Amiri 2022 (Iran)	72	36	36	69.1 (8.6)	67.7 (8.3)	14 (38.9)	19 (52.8)	NR	Self-efficacy (SSES)	Post-intervention 3 months
Barker-Collo 2015 (New Zealand)	386	193	193	NR	NR	NR	NR	≤28 days	HRQoL(SF-36)	28 days 3, 6, 12 months
Bragstad 2020 (Norway)	322	166	156	66.8 (12.1)	65.7 (13.3)	67 (40.4)	65 (41.7)	4–8 weeks	HRQoL(SAQoL-39 g)	4–6 weeks 6, 12 months
Brauer 2022 (Australia)	119	52	49	62 (11)	64 (9)	12 (20)	13 (22)	I: 28 (15) C: 27 (16)	HRQoL (EQ-5D) Self-efficacy (Ambulatory self-confidence questionnaire)	Baseline 2 months, 6 months
Brouwer-Goossensen 2022 (Netherlands)	136	68	68	64 (13)	62 (14)	22 (32.3)	29 (42.6)	NR	Self-efficacy (SES)	Baseline 6 months
Cadilhac 2011 (Australia)	143	47[a] 48	48	68 (12)	69 (11) 71 (12)	27 (56)	29 (60)[a] 29 (62)	12 months	HRQoL(AQoL)	Baseline 6 months
Cadilhac 2020 (Australia)	54	25	29	69 (11)	68 (10)	10 (40)	11 (38)	2–24 months	HRQoL(EQ-5D-3 L)	Baseline 1 month
Chen 2019 (China)	144	72	72	65.9 (12.8)	64.8 (9.9)	20 (27.8)	18 (25)	3 months after discharge	Self-efficacy (SSEQ)	Baseline Discharge 1, 3 months
Damush 2011 (USA)	63	30	33	67.3 (12.4)	64 (8.4)	-	1 (3)[b]	≤1 month	HRQoL(SSQoL)	Baseline 3, 6 months
Damush 2016 (USA)	174	86	88	62.1 (9.4)	60.4 (9.5)	3 (3.4)	2 (2.3)	≤12 months	HRQoL(SSQoL) Self-efficacy (GSES)	Baseline 6 months
Devasahayam 2024 (Canada)	57	29	28	61.7 (13.5)	59.9 (13.6)	12 (41)	14 (50)	I:106 (66) days, C:129 (83) days	Self-efficacy (Short Self-Efficacy for Exercise Scale)	Baseline

(Continued)

Table 1. (Continued)

Author Year (Country)	Population, n (%)			Age, mean (SD)		Gender, female, n (%)		Time since stroke	Outcome measure (scale)	Timepoints
	Total	I	C	I	C	I	C			
Fu 2020 (New Zealand)	400	270	130	71.4 (12.6)[a] 71.7 (12.6)	73 (12.2)	58 (44)[a] 53 (38.4)	55 (42.3)	45.5 (25.8) days	HRQoL(SF-36, SF-12, EQ5D)	Baseline 6 months
Harel-Katz 2020 (Israel)	60	31	29	65.5 (52.7)	66 (45.9)	5 (25)	4 (21)	I:113.1 (68.3) days C:147.6 (156.7) days	Self-efficacy (SEMCD)	Baseline 6, 12 months
Harwood 2012 (New Zealand)	172	94	78	61.4 (13.6)	61.3 (14.8)	49 (52.1)	41 (52.5)	6-12 weeks	HRQoL(SF-36)	Baseline 6 months
Heron 2019 (UK)	40	14[a] 14	12	65.7 (13)[a] 63.3 (9.6)	69.7 (14.7)	16 (40)[b]	-	≤4 weeks	HRQoL(EQ-5D-5L)	Baseline 3 months
Hoffmann 2015 (Australia)	36	11[a] 12	10	63.6 (13)[a] 60.8 (11.7)	57 (14.2)	4 (36.4)[a] 3 (25)	4 (14)	NR	HRQoL (SAQoL-39 g) Self-efficacy (SSES)	Baseline I: 1 week, 3 months C: 2 months 5 months.
Jones 2016 (UK)	78	40	38	61.8 (16)	68.8 (10.3)	20 (50)	13 (34.2)	I:76(45-131 days), C: 116(46-171 days)	HRQoL(SAQoL-39 g; SF-12) Self-efficacy (SSES)	Baseline 6 weeks, 3 months
Kalav 2021 (Turkey)	68	34	34	55.9 (11.4)	58.9 (13.8)	12 (35.3)	12 (35.3)	NR	HRQoL(SSQoL) Self-Efficacy (SSES)	Baseline 3 months
Kendall 2007 (Australia)	100	42	58	66 (10.7)[c]	-	33 (33)[b]	-	NR	HRQoL(SSQoL) Self-efficacy (SES)	Baseline 3, 6, 9, 12 months
Kessler 2017 (Canada)	21	10	11	71 (13.2)	64.9 (16.3)	5 (50)	5 (45.4)	C:60.6(87.6) weeks I:29.2(18.2) weeks	Self-efficacy (GSAB–DFI)	Baseline Post-intervention 6 months
Lee 2023 (USA)	15	8	7	55 (44-76)[d]	53.5 (46-71)[d]	1 (12.5)[b]	-	I:4.6 (4.6) days C:4.3(1.9) days	Self-efficacy (PS-SES)	Baseline 3 months
Li 2024 (USA)	24	11	13	62 (11)	57 (12)	5 (45)	5 (38)	1245(1079) days	Self-efficacy (PS-SES and Patient-Reported Outcomes Measurement Information System's Self-Efficacy)	Baseline 3 months

Table 1. (Continued)

Author Year (Country)	Population, n (%) Total	I	C	Age, mean (SD) I	C	Gender, female, n (%) I	C	Time since stroke	Outcome measure (scale)	Timepoints
Lin 2022 (China)	70	35	35	60.8 (11)	62.5 (10.9)	16 (22.9)	18 (25.7)	NR	HRQoL(SSQoL-12) Self-efficacy (SSES)	Baseline 3, 6 months
Lo 2018 (Hong Kong)	128	64	64	67.5 (11.9)[c]	-	53 (41)[b]	-	45(26.2) days	HRQoL(SSQoL) Self-efficacy (SSES)	Baseline 2 months
Lo 2023a (Hong Kong)	335	169	166	62.5 (9.9)	63.1 (9.8)	64 (38.6)	66 (39.1)	C: 1.4 months (0.3–7.0) I: 1.33 months (0.3–7.5)	Self-efficacy (SSEQ)	Baseline 3, 6 months
Lo 2023b (Hong Kong)	134	67	67	63.4 (14.1)	64.8 (11.2)	27 (40.3)	29 (43.3)	4.2(5.1) years	Self-efficacy (SSEQ) HRQoL(SSQoL)	Baseline 8 weeks
Lund 2011 (Norway)	99	48	51	75 (7.2)	79 (6.5)	17 (43.6)	27 (57.4)	I: 161(178) days C; 137(124) days	HRQoL(SF-36)	Baseline 9 months
Mayo 2015 (Canada)	186	93	93	61 (12)	65 (11)	36 (38.7)	37 (39.8)	I:2.5(2.2) years C:3.1(3.1) years	HRQoL(EQ-5D)	Baseline 3 months
McKenna 2015 (UK)	25	12	13	62.2 (13.6)	67.4 (10.6)	4 (36.4)	7 (53.8)	NR	HRQoL(EQ-5D) Self-efficacy (SES; SSES)	Baseline 6 weeks 3 months
Minshall 2020 (Australia)	89	50	39	67 (13.7)	69 (11.9)	22 (52)	11 (35)	NR	HRQoL(AQoL, EQ-5D) Self-efficacy (GSES)	Baseline 3, 6, 12 months
Palleson 2024 (Denmark)	69	36	33	75 (6)	76 (6)	19 (56)	14 (44)	I:68(90) days, C:60(34) days	Self-efficacy (SSEQ) HRQoL(SSQoL-12)	Baseline 3, 9 months
Sabariego 2013 (Germany)	260	130	130	55.3 (12.6)	59.3 (12.7)	41 (37.3)	57 (44.3)	150.4(519.7) days	Self-efficacy (LSES) HRQoL(WHO-QoL, EQ5D-VAS)	Baseline, post-intervention, 6 months
Sahely 2024 (UK)	24	12	12	63 (16.53)	71 (13.04)	6 (50)	4 (33)	4.3(1.57) months	Self-efficacy (SSEQ)	Baseline 3, 6 months
Sakakibara 2022 (Canada)	126	64	62	69.1 (10.2)	62.7 (9.2)	26 (40.6)	13 (21)	217(108) days	HRQoL(SF-36)	Baseline 6, 12 months
Shaw 2020 (UK)	573	285	288	71 (60-77)[d]	71 (62-79)[d]	111 (39)	120 (41.7)	C:71.70(10.8) days I:77.5(12.7) days	HRQoL(EQ5D)	Baseline 12, 24 months

(Continued)

Table 1. (Continued)

Author Year (Country)	Population, n (%)			Age, mean (SD)		Gender, female, n (%)		Time since stroke	Outcome measure (scale)	Timepoints
	Total	I	C	I	C	I	C			
Sit 2018 (Hong Kong)	210	105	105	67.8 (14.2)	70.7 (16.9)	50 (47.6)	50 (47.6)	NR	Self-efficacy (SSES, Self-efficacy in illness management)	Baseline 1 week, 6 weeks 3 Months
Tielemans 2015 (Netherlands)	113	55	58	55.2 (8.9)	58.8 (8.7)	22 (40)	32 (55.2)	18.8(28.4) months	HRQoL (SSQoL) Self-efficacy (GSES)	Baseline 3, 9 months
Towfighi 2020 (USA)	100	49	51	60 (7)	57 (10)	20 (40.8)	18 (35.3)	≤3 months	HRQoL(SF-6D)	Baseline 6 months
Tsai 2024 (Taiwan)	82	40	42	59.3 (14.1)	61.8 (14.5)	20 (50)	13 (31)	I:3.9 (1.8) months, C:3.6 (1.8) months	Self-efficacy (SEMCD) HRQoL(SF-12)	Baseline 1 month
Visser 2014 Netherlands and (Belgium)	166	88	78	52.2 (9.7)	54.1 (10.7)	33 (37.5)	45 (57.7)	7.3(1.1) months	HRQoL(SSQoL; EQ-5D-5L)	Baseline 10 days post-intervention 6, 12 months
Wolf. 2016 (USA)	185	99	86	57 (10)	59 (7.7)	35 (53)	16 (51.6)	I:54(66.4), C:50(58) months	Self-efficacy (CDSES) HRQoL(WHOQoL-bref)	
Wolf 2017 (USA)	71	35	36	57.7 (11.6)	60.6 (10.6)	9 (25)	14 (38.9)	17.1(15.2)	Self-efficacy (CDSES) HRQoL(WHOQoL-bref)	Baseline Post intervention 6 months

[a]Two intervention streams.
[b]Total female population (groups not reported).
[c]Total age population (groups not reported).
[d]Interquartile range reported.

AQoL: Assessment of Quality of Life; C: Control; CDSES: Chronic Disease Self-Efficacy Scale; EQ-5D-3L: EuroQol-5 dimension-3 level; EQ-5D: EuroQol-5 dimension; GSES: General self-efficacy scale; GSAB–DFI: Goals Systems Assessment Battery–Directive Functions Indicators I: Intervention; LSES: Liverpool Self-Efficacy Scale; NGSE: New General Self-Efficacy Scale; NR: Not reported; PS-SES: Participation strategies self-efficacy scale; SAQoL-39 g: Stroke and Aphasia Quality of Life scale-39 g; SEMCD: Self-efficacy for Managing Chronic Disease scale; SES: Self-efficacy Scale; SF-12: 12-Item Short-Form Health Survey; SF-36: 36-Item Short-Form Health Survey; SF-6D: Short form-6D; SSES: Stroke self-efficacy scale; SSQoL: Stroke-Specific Quality of Life Scale; UK: United Kingdom; USA: United States of America; VAS: Visual Analog Scale.

Table 2. Summary of findings.

Self-management interventions compared with no intervention or another intervention for survivors of stroke			
Population: survivors of stroke **Setting:** hospital or community **Intervention:** self-management intervention[a] **Comparison:** no intervention, "usual" care, or another intervention			
Outcomes	Relative effect: Standard mean difference (95% CI)	Number of participants (studies)	Certainty of the evidence (GRADE)
Self-efficacy at 3 months	0.15 (–0.04 to 0.33)	1263 (17 trials)	⊕⊕⊖⊖Low[b,c]
Self-efficacy (pooled)	0.08 (–0.02 to 0.18)	1761 (20 trials)	⊕⊕⊖⊖Low[c,d]
HRQoL at 3 months	0.10 (–0.00 to 0.20)	1613 (14 trials)	⊕⊕⊕⊖Moderate[c]
HRQoL (pooled)	0.07 (0.01 to 0.13)	3268 (22 trials)	⊕⊕⊕⊖Moderate[e]

[a.] Self-management interventions varied, but contained at least one of the following: problem-solving, goal-setting, decision-making, self-monitoring, coping or an alternative method designed to facilitate behavior change.
[b.] Serious unexplained inconsistency (moderate heterogeneity $I^2 = 59\%$).
[c.] Serious imprecision (95% CI cross the decision-making threshold).
[d.] Serious unexplained inconsistency (moderate heterogeneity $I^2 = 53\%$).
[e.] Serious unexplained inconsistency (moderate heterogeneity $I^2 = 42\%$).

Outcome measures

Twenty-seven trials included a measure of self-efficacy, 30 trials included a measure of HRQoL, and 14 trials included both outcomes (Table 1).

Effectiveness of self-management interventions

Self-efficacy. Twenty trials were included in the meta-analyses to investigate the effect of self-management interventions on self-efficacy (Figure 2). Groups were similar at baseline. There were no significant differences between groups in self-efficacy scores at 3 months (SMD = 0.15, 95%CI: -0.04 to 0.33, 17 trials, n = 1263), 6 months (SMD = 0.15, 95%CI: -0.08 to 0.38, seven trials, n = 948), 12 months (SMD = 0.22, 95%CI -0.32 to 0.77, two trials, n = 150) or when data from all timepoints were pooled (SMD 0.08, 95%CI -0.02 to 0.18) (See Table 2). Moderate heterogeneity (I^2 between 59-65% at the different time points) was observed, indicating variability in effect-sizes estimates.

Regression-based test of small study effects (Egger's test: z = 0.57, p = 0.57) and symmetrical shape of Funnel plots (Supplementary Figure 1) indicated no significant effect of publication bias in the analyses. The results from sensitivity analyses where data from trials with a high risk of bias from more than one source were removed, showed similar results at all time points as the initial analyses (Supplementary Figure 2) except for self-efficacy at

12 months, which only included data from one trial, and indicated a significant benefit for the treatment group (SMD = 0.47, 95%CI 0.07 to 0.87, one trial, n = 100).

Quality of life. Twenty-two trials were included in the meta-analyses comparing the effect of self-management intervention compared to control on HRQoL (Figure 3). Intervention and control groups were similar at baseline. No significant differences in standardized HRQoL scores were observed between groups at 3 months (SMD 0.10, 95% CI -0.00 to 0.20, p = 0.05, 14 trials, n = 1613), 6 months (SMD 0.11, 95% CI -.0.03 to 0.24, 11 trials, n = 1913) or 12 months (SMD 0.11, 95% CI -0.04 to 0.26, eight trials, n = 1878), but there was a small effect when data across timepoints were pooled (SMD 0.07, 95% CI 0.01 to 0.13) (see Table 2). Heterogeneity was not apparent at 3 months ($I^2 = 4.16\%$) but medium heterogeneity was observed at 6 and 12 months ($I^2 = 58\%$ and 57% respectively).

The symmetrical funnel plot Supplementary (Figure 3) and test of small study effects (Egger's test: z = 0.99, p = 0.32) demonstrated no signs of publication bias in HRQoL analyses. The sensitivity analyses which only included data from trials with high risk of bias from one source only (non-blinding of participants and personnel) similarly indicated no significant difference between groups at the three timepoints, and a marginal benefit in favor of the intervention group in the pooled analysis (Supplementary Figure 4).
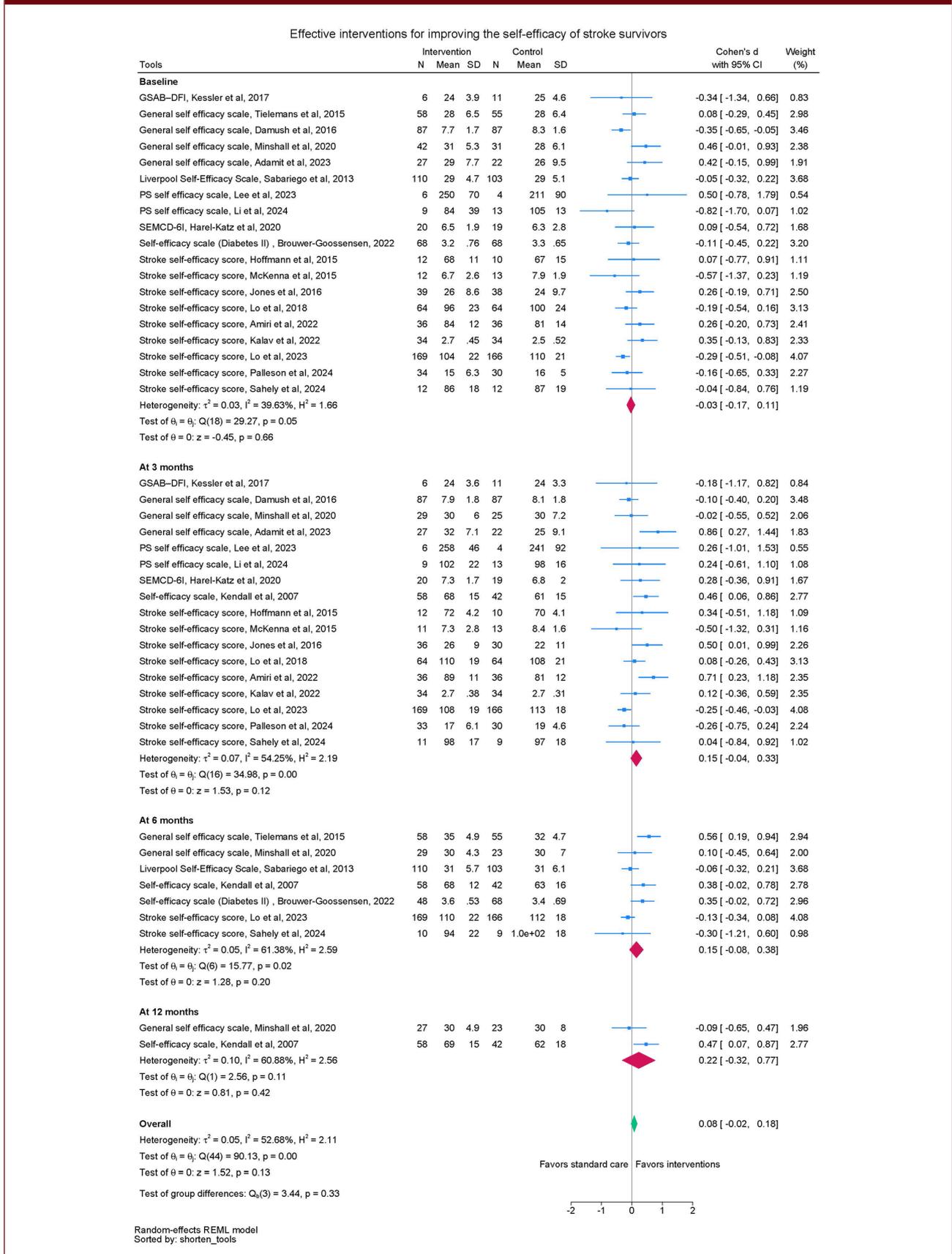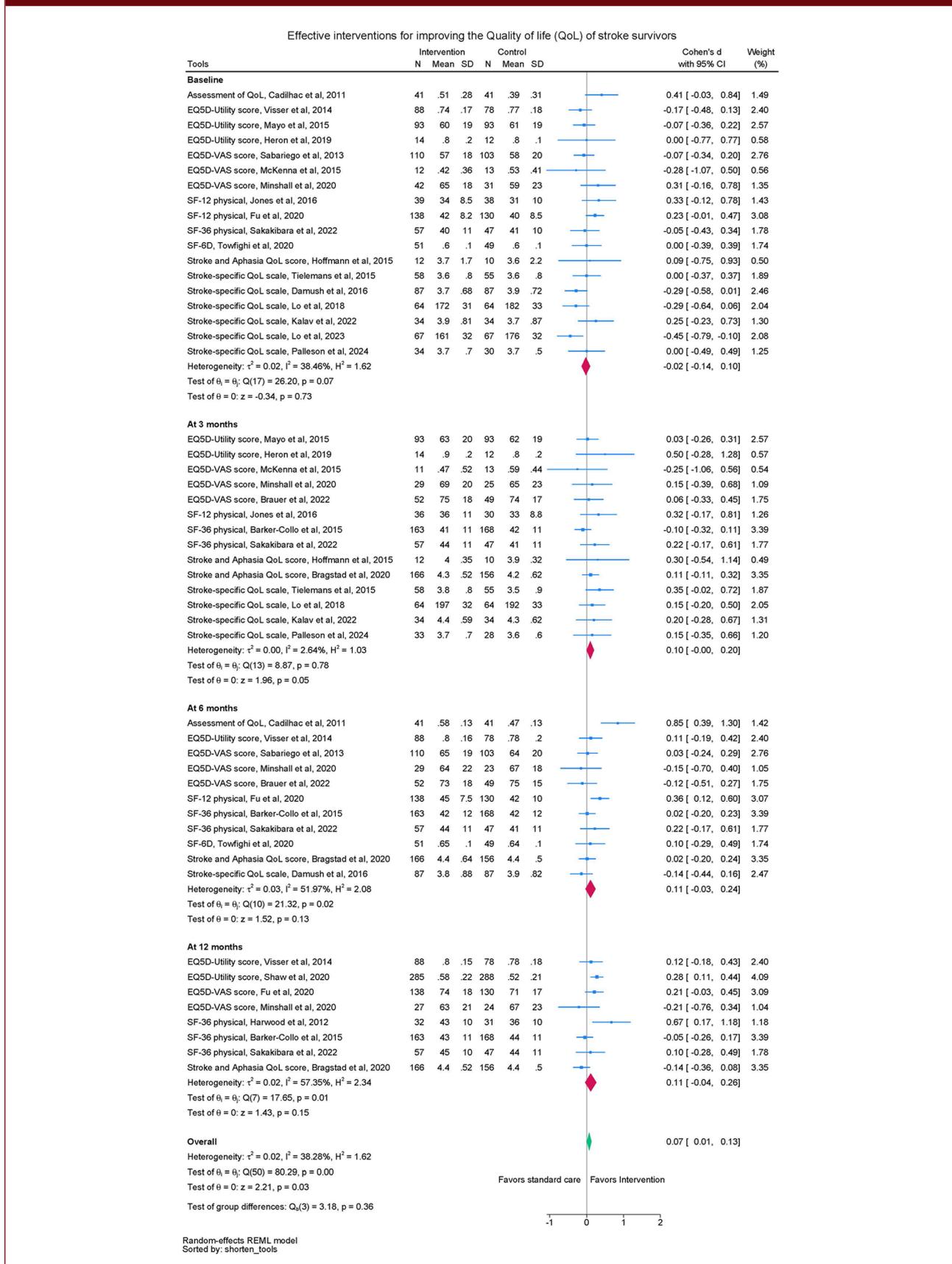
Figure 2. Self-efficacy meta-analysis.

Effective interventions for improving the self-efficacy of stroke survivors

Tools	Intervention			Control			Cohen's d with 95% CI	Weight (%)
	N	Mean	SD	N	Mean	SD		
Baseline								
GSAB–DFI, Kessler et al, 2017	6	24	3.9	11	25	4.6	-0.34 [-1.34, 0.66]	0.83
General self efficacy scale, Tielemans et al, 2015	58	28	6.5	55	28	6.4	0.08 [-0.29, 0.45]	2.98
General self efficacy scale, Damush et al, 2016	87	7.7	1.7	87	8.3	1.6	-0.35 [-0.65, -0.05]	3.46
General self efficacy scale, Minshall et al, 2020	42	31	5.3	31	28	6.1	0.46 [-0.01, 0.93]	2.38
General self efficacy scale, Adamit et al, 2023	27	29	7.7	22	26	9.5	0.42 [-0.15, 0.99]	1.91
Liverpool Self-Efficacy Scale, Sabariego et al, 2013	110	29	4.7	103	29	5.1	-0.05 [-0.32, 0.22]	3.68
PS self efficacy scale, Lee et al, 2023	6	250	70	4	211	90	0.50 [-0.78, 1.79]	0.54
PS self efficacy scale, Li et al, 2024	9	84	39	13	105	13	-0.82 [-1.70, 0.07]	1.02
SEMCD-6I, Harel-Katz et al, 2020	20	6.5	1.9	19	6.3	2.8	0.09 [-0.54, 0.72]	1.68
Self-efficacy scale (Diabetes II) , Brouwer-Goossensen, 2022	68	3.2	.76	68	3.3	.65	-0.11 [-0.45, 0.22]	3.20
Stroke self-efficacy score, Hoffmann et al, 2015	12	68	11	10	67	15	0.07 [-0.77, 0.91]	1.11
Stroke self-efficacy score, McKenna et al, 2015	12	6.7	2.6	13	7.9	1.9	-0.57 [-1.37, 0.23]	1.19
Stroke self-efficacy score, Jones et al, 2016	39	26	8.6	38	24	9.7	0.26 [-0.19, 0.71]	2.50
Stroke self-efficacy score, Lo et al, 2018	64	96	23	64	100	24	-0.19 [-0.54, 0.16]	3.13
Stroke self-efficacy score, Amiri et al, 2022	36	84	12	36	81	14	0.26 [-0.20, 0.73]	2.41
Stroke self-efficacy score, Kalav et al, 2022	34	2.7	.45	34	2.5	.52	0.35 [-0.13, 0.83]	2.33
Stroke self-efficacy score, Lo et al, 2023	169	104	22	166	110	21	-0.29 [-0.51, -0.08]	4.07
Stroke self-efficacy score, Palleson et al, 2024	34	15	6.3	30	16	5	-0.16 [-0.65, 0.33]	2.27
Stroke self-efficacy score, Sahely et al, 2024	12	86	18	12	87	19	-0.04 [-0.84, 0.76]	1.19
Heterogeneity: $\tau^2 = 0.03$, $I^2 = 39.63\%$, $H^2 = 1.66$							-0.03 [-0.17, 0.11]	
Test of $\theta_i = \theta_j$: Q(18) = 29.27, p = 0.05								
Test of $\theta = 0$: z = -0.45, p = 0.66								
At 3 months								
GSAB–DFI, Kessler et al, 2017	6	24	3.6	11	24	3.3	-0.18 [-1.17, 0.82]	0.84
General self efficacy scale, Damush et al, 2016	87	7.9	1.8	87	8.1	1.8	-0.10 [-0.40, 0.20]	3.48
General self efficacy scale, Minshall et al, 2020	29	30	6	25	30	7.2	-0.02 [-0.55, 0.52]	2.06
General self efficacy scale, Adamit et al, 2023	27	32	7.1	22	25	9.1	0.86 [0.27, 1.44]	1.83
PS self efficacy scale, Lee et al, 2023	6	258	46	4	241	92	0.26 [-1.01, 1.53]	0.55
PS self efficacy scale, Li et al, 2024	9	102	22	13	98	16	0.24 [-0.61, 1.10]	1.08
SEMCD-6I, Harel-Katz et al, 2020	20	7.3	1.7	19	6.8	2	0.28 [-0.36, 0.91]	1.67
Self-efficacy scale, Kendall et al, 2007	58	68	15	42	61	15	0.46 [0.06, 0.86]	2.77
Stroke self-efficacy score, Hoffmann et al, 2015	12	72	4.2	10	70	4.1	0.34 [-0.51, 1.18]	1.09
Stroke self-efficacy score, McKenna et al, 2015	11	7.3	2.8	13	8.4	1.6	-0.50 [-1.32, 0.31]	1.16
Stroke self-efficacy score, Jones et al, 2016	36	26	9	30	22	11	0.50 [0.01, 0.99]	2.26
Stroke self-efficacy score, Lo et al, 2018	64	110	19	64	108	21	0.08 [-0.26, 0.43]	3.13
Stroke self-efficacy score, Amiri et al, 2022	36	89	11	36	81	12	0.71 [0.23, 1.18]	2.35
Stroke self-efficacy score, Kalav et al, 2022	34	2.7	.38	34	2.7	.31	0.12 [-0.36, 0.59]	2.35
Stroke self-efficacy score, Lo et al, 2023	169	108	19	166	113	18	-0.25 [-0.46, -0.03]	4.08
Stroke self-efficacy score, Palleson et al, 2024	33	17	6.1	30	19	4.6	-0.26 [-0.75, 0.24]	2.24
Stroke self-efficacy score, Sahely et al, 2024	11	98	17	9	97	18	0.04 [-0.84, 0.92]	1.02
Heterogeneity: $\tau^2 = 0.07$, $I^2 = 54.25\%$, $H^2 = 2.19$							0.15 [-0.04, 0.33]	
Test of $\theta_i = \theta_j$: Q(16) = 34.98, p = 0.00								
Test of $\theta = 0$: z = 1.53, p = 0.12								
At 6 months								
General self efficacy scale, Tielemans et al, 2015	58	35	4.9	55	32	4.7	0.56 [0.19, 0.94]	2.94
General self efficacy scale, Minshall et al, 2020	29	30	4.3	23	30	7	0.10 [-0.45, 0.64]	2.00
Liverpool Self-Efficacy Scale, Sabariego et al, 2013	110	31	5.7	103	31	6.1	-0.06 [-0.32, 0.21]	3.68
Self-efficacy scale, Kendall et al, 2007	58	68	12	42	63	16	0.38 [-0.02, 0.78]	2.78
Self-efficacy scale (Diabetes II) , Brouwer-Goossensen, 2022	48	3.6	.53	68	3.4	.69	0.35 [-0.02, 0.72]	2.96
Stroke self-efficacy score, Lo et al, 2023	169	110	22	166	112	18	-0.13 [-0.34, 0.08]	4.08
Stroke self-efficacy score, Sahely et al, 2024	10	94	22	9	1.0e+02	18	-0.30 [-1.21, 0.60]	0.98
Heterogeneity: $\tau^2 = 0.05$, $I^2 = 61.38\%$, $H^2 = 2.59$							0.15 [-0.08, 0.38]	
Test of $\theta_i = \theta_j$: Q(6) = 15.77, p = 0.02								
Test of $\theta = 0$: z = 1.28, p = 0.20								
At 12 months								
General self efficacy scale, Minshall et al, 2020	27	30	4.9	23	30	8	-0.09 [-0.65, 0.47]	1.96
Self-efficacy scale, Kendall et al, 2007	58	69	15	42	62	18	0.47 [0.07, 0.87]	2.77
Heterogeneity: $\tau^2 = 0.10$, $I^2 = 60.88\%$, $H^2 = 2.56$							0.22 [-0.32, 0.77]	
Test of $\theta_i = \theta_j$: Q(1) = 2.56, p = 0.11								
Test of $\theta = 0$: z = 0.81, p = 0.42								
Overall							0.08 [-0.02, 0.18]	
Heterogeneity: $\tau^2 = 0.05$, $I^2 = 52.68\%$, $H^2 = 2.11$								
Test of $\theta_i = \theta_j$: Q(44) = 90.13, p = 0.00								
Test of $\theta = 0$: z = 1.52, p = 0.13								
Test of group differences: Q$_b$(3) = 3.44, p = 0.33								

Favors standard care   Favors interventions

-2   -1   0   1   2

Random-effects REML model
Sorted by: shorten_tools

Figure 3. Quality of life meta-analysis.

Effective interventions for improving the Quality of life (QoL) of stroke survivors

Tools	Intervention N	Mean	SD	Control N	Mean	SD	Cohen's d with 95% CI	Weight (%)
Baseline								
Assessment of QoL, Cadilhac et al, 2011	41	.51	.28	41	.39	.31	0.41 [-0.03, 0.84]	1.49
EQ5D-Utility score, Visser et al, 2014	88	.74	.17	78	.77	.18	-0.17 [-0.48, 0.13]	2.40
EQ5D-Utility score, Mayo et al, 2015	93	60	19	93	61	19	-0.07 [-0.36, 0.22]	2.57
EQ5D-Utility score, Heron et al, 2019	14	.8	.2	12	.8	.1	0.00 [-0.77, 0.77]	0.58
EQ5D-VAS score, Sabariego et al, 2013	110	57	18	103	58	20	-0.07 [-0.34, 0.20]	2.76
EQ5D-VAS score, McKenna et al, 2015	12	.42	.36	13	.53	.41	-0.28 [-1.07, 0.50]	0.56
EQ5D-VAS score, Minshall et al, 2020	42	65	18	31	59	23	0.31 [-0.16, 0.78]	1.35
SF-12 physical, Jones et al, 2016	39	34	8.5	38	31	10	0.33 [-0.12, 0.78]	1.43
SF-12 physical, Fu et al, 2020	138	42	8.2	130	40	8.5	0.23 [-0.01, 0.47]	3.08
SF-36 physical, Sakakibara et al, 2022	57	40	11	47	41	10	-0.05 [-0.43, 0.34]	1.78
SF-6D, Towfighi et al, 2020	51	.6	.1	49	.6	.1	0.00 [-0.39, 0.39]	1.74
Stroke and Aphasia QoL score, Hoffmann et al, 2015	12	3.7	1.7	10	3.6	2.2	0.09 [-0.75, 0.93]	0.50
Stroke-specific QoL scale, Tielemans et al, 2015	58	3.6	.8	55	3.6	.8	0.00 [-0.37, 0.37]	1.89
Stroke-specific QoL scale, Damush et al, 2016	87	3.7	.68	87	3.9	.72	-0.29 [-0.58, 0.01]	2.46
Stroke-specific QoL scale, Lo et al, 2018	64	172	31	64	182	33	-0.29 [-0.64, 0.06]	2.04
Stroke-specific QoL scale, Kalav et al, 2022	34	3.9	.81	34	3.7	.87	0.25 [-0.23, 0.73]	1.30
Stroke-specific QoL scale, Lo et al, 2023	67	161	32	67	176	32	-0.45 [-0.79, -0.10]	2.08
Stroke-specific QoL scale, Palleson et al, 2024	34	3.7	.7	30	3.7	.5	0.00 [-0.49, 0.49]	1.25
Heterogeneity: $\tau^2 = 0.02$, $I^2 = 38.46\%$, $H^2 = 1.62$							-0.02 [-0.14, 0.10]	
Test of $\theta_i = \theta_j$: Q(17) = 26.20, p = 0.07								
Test of $\theta = 0$: z = -0.34, p = 0.73								
At 3 months								
EQ5D-Utility score, Mayo et al, 2015	93	63	20	93	62	19	0.03 [-0.26, 0.31]	2.57
EQ5D-Utility score, Heron et al, 2019	14	.9	.2	12	.8	.2	0.50 [-0.28, 1.28]	0.57
EQ5D-VAS score, McKenna et al, 2015	11	.47	.52	13	.59	.44	-0.25 [-1.06, 0.56]	0.54
EQ5D-VAS score, Minshall et al, 2020	29	69	20	25	65	23	0.15 [-0.39, 0.68]	1.09
EQ5D-VAS score, Brauer et al, 2022	52	75	18	49	74	17	0.06 [-0.33, 0.45]	1.75
SF-12 physical, Jones et al, 2016	36	36	11	30	33	8.8	0.32 [-0.17, 0.81]	1.26
SF-36 physical, Barker-Collo et al, 2015	163	41	11	168	42	11	-0.10 [-0.32, 0.11]	3.39
SF-36 physical, Sakakibara et al, 2022	57	44	11	47	41	11	0.22 [-0.17, 0.61]	1.77
Stroke and Aphasia QoL score, Hoffmann et al, 2015	12	4	.35	10	3.9	.32	0.30 [-0.54, 1.14]	0.49
Stroke and Aphasia QoL score, Bragstad et al, 2020	166	4.3	.52	156	4.2	.62	0.11 [-0.11, 0.32]	3.35
Stroke-specific QoL scale, Tielemans et al, 2015	58	3.8	.8	55	3.5	.9	0.35 [-0.02, 0.72]	1.87
Stroke-specific QoL scale, Lo et al, 2018	64	197	32	64	192	33	0.15 [-0.20, 0.50]	2.05
Stroke-specific QoL scale, Kalav et al, 2022	34	4.4	.59	34	4.3	.62	0.20 [-0.28, 0.67]	1.31
Stroke-specific QoL scale, Palleson et al, 2024	33	3.7	.7	28	3.6	.6	0.15 [-0.35, 0.66]	1.20
Heterogeneity: $\tau^2 = 0.00$, $I^2 = 2.64\%$, $H^2 = 1.03$							0.10 [-0.00, 0.20]	
Test of $\theta_i = \theta_j$: Q(13) = 8.87, p = 0.78								
Test of $\theta = 0$: z = 1.96, p = 0.05								
At 6 months								
Assessment of QoL, Cadilhac et al, 2011	41	.58	.13	41	.47	.13	0.85 [0.39, 1.30]	1.42
EQ5D-Utility score, Visser et al, 2014	88	.8	.16	78	.78	.2	0.11 [-0.19, 0.42]	2.40
EQ5D-VAS score, Sabariego et al, 2013	110	65	19	103	64	20	0.03 [-0.24, 0.29]	2.76
EQ5D-VAS score, Minshall et al, 2020	29	64	22	23	67	18	-0.15 [-0.70, 0.40]	1.05
EQ5D-VAS score, Brauer et al, 2022	52	73	18	49	75	15	-0.12 [-0.51, 0.27]	1.75
SF-12 physical, Fu et al, 2020	138	45	7.5	130	42	10	0.36 [0.12, 0.60]	3.07
SF-36 physical, Barker-Collo et al, 2015	163	42	12	168	42	12	0.02 [-0.20, 0.23]	3.39
SF-36 physical, Sakakibara et al, 2022	57	44	11	47	41	11	0.22 [-0.17, 0.61]	1.77
SF-6D, Towfighi et al, 2020	51	.65	.1	49	.64	.1	0.10 [-0.29, 0.49]	1.74
Stroke and Aphasia QoL score, Bragstad et al, 2020	166	4.4	.64	156	4.4	.5	0.02 [-0.20, 0.24]	3.35
Stroke-specific QoL scale, Damush et al, 2016	87	3.8	.88	87	3.9	.82	-0.14 [-0.44, 0.16]	2.47
Heterogeneity: $\tau^2 = 0.03$, $I^2 = 51.97\%$, $H^2 = 2.08$							0.11 [-0.03, 0.24]	
Test of $\theta_i = \theta_j$: Q(10) = 21.32, p = 0.02								
Test of $\theta = 0$: z = 1.52, p = 0.13								
At 12 months								
EQ5D-Utility score, Visser et al, 2014	88	.8	.15	78	.78	.18	0.12 [-0.18, 0.43]	2.40
EQ5D-Utility score, Shaw et al, 2020	285	.58	.22	288	.52	.21	0.28 [0.11, 0.44]	4.09
EQ5D-VAS score, Fu et al, 2020	138	74	18	130	71	17	0.21 [-0.03, 0.45]	3.09
EQ5D-VAS score, Minshall et al, 2020	27	63	21	24	67	23	-0.21 [-0.76, 0.34]	1.04
SF-36 physical, Harwood et al, 2012	32	43	10	31	36	10	0.67 [0.17, 1.18]	1.18
SF-36 physical, Barker-Collo et al, 2015	163	43	11	168	44	11	-0.05 [-0.26, 0.17]	3.39
SF-36 physical, Sakakibara et al, 2022	57	45	10	47	44	11	0.10 [-0.28, 0.49]	1.78
Stroke and Aphasia QoL score, Bragstad et al, 2020	166	4.4	.52	156	4.4	.5	-0.14 [-0.36, 0.08]	3.35
Heterogeneity: $\tau^2 = 0.02$, $I^2 = 57.35\%$, $H^2 = 2.34$							0.11 [-0.04, 0.26]	
Test of $\theta_i = \theta_j$: Q(7) = 17.65, p = 0.01								
Test of $\theta = 0$: z = 1.43, p = 0.15								
Overall							0.07 [0.01, 0.13]	
Heterogeneity: $\tau^2 = 0.02$, $I^2 = 38.28\%$, $H^2 = 1.62$								
Test of $\theta_i = \theta_j$: Q(50) = 80.29, p = 0.00								
Test of $\theta = 0$: z = 2.21, p = 0.03								
Test of group differences: $Q_b(3) = 3.18$, p = 0.36								

Favors standard care | Favors Intervention

-1   0   1   2

Random-effects REML model
Sorted by: shorten_tools

Meta-regression

Self-efficacy. Inclusion of virtual (telephone or teleconference) intervention delivery was associated with significantly reduced intervention effectiveness on self-efficacy compared to exclusively face-to-face delivery (reduction of 0.33 points in scores, 95%CI -0.56 to -0.11), and interventions with total duration longer than 7h were more effective than shorter interventions (slope 0.34, 95%CI 0.10 to 0.57). Delivery to individuals versus groups was not significantly associated with self-efficacy scores. (Supplementary Table 6).

HRQoL. Inclusion of virtual delivery (versus entirely face-to-face), delivery to individuals versus groups and duration of intervention (≤7h versus >7h) were not significantly associated with HRQOL scores (Supplementary Table 6).

Certainty of evidence

The certainty of evidence when applying the GRADE criteria for the effect of self-management interventions compared to control on self-efficacy was low, due to inconsistency between trial results and imprecision. The certainty of evidence for the effect of self-management interventions compared to control on HRQoL was moderate (downgraded at 3 months due to imprecision, downgraded on pooled results due to inconsistency).

Discussion

In this systematic review with meta-analyses, we found low certainty evidence that self-management interventions after stroke compared to usual care or another intervention did not significantly improve self-efficacy, but pooled effect sizes demonstrated moderate certainty evidence of a marginal significant effect on HRQoL. The evidence for HRQoL was complex to summarize and interpret since it included transformed summary data and raw scores from the trials. We also found that face-to-face interventions, and interventions that took more than 7h to deliver, were associated with better self-efficacy, but not HRQoL outcomes.

Our findings contrast somewhat to those of a Cochrane systematic review published in 2016,[7] which reported low certainty evidence that self-management programs improved self-efficacy and HRQoL. This review, published 9 years ago, included 14 trials with 1863 participants. We were able to upgrade the certainty of evidence for HRQoL due to the proliferation of stroke self-management research; we included a further 36 trials with an additional 4941 participants. Differences may also have arisen due to the different analytical approaches. We analyzed outcome data according to pre-specified time points (3, 6, and 12 months) and combined scores from different self-efficacy and HRQoL outcome measures by standardizing the scores using standardized mean differences so we could report on each concept (self-efficacy, HRQoL) at each time point. In contrast, Fryer and colleagues[7] reported analyses for individual outcome measures with the time point not specified.

The included self-management interventions had different theoretical underpinnings, targeted different behaviors, comprised different strategies and delivered different doses. Despite the interventions in over a third of the included trials reportedly being based on the principles of self-efficacy or Social Cognitive Theory (of which self-efficacy is a key construct),[64] very few included trials reported delivering strategies known to improve self-efficacy, such as reflecting on success (mastery) or learning from other survivors (vicarious modeling).[6] Very few described how the program was designed or the program logic (why the strategies within the program were selected and the anticipated mechanism of action). Instead, there was an apparent over-reliance on education strategies (included in 91% of trials), which on its own, tends not to be effective at changing self-management behaviors or attitudes after stroke.[65] Further, when programs are designed without input from survivors and family members, the potential power of vicarious modeling is absent. Developers of future self-management interventions should build on the current body of evidence, and consider how to incorporate elements that promote self-efficacy (advice from survivors and family members) and support behavior change to promote self-management.

The role of self-management after stroke is becoming increasingly recognized, as demonstrated by inclusion in stroke rehabilitation guidelines from Australia/New Zealand, Canada, and United Kingdom/Ireland. Therefore, having clear evidence regarding which strategies are most effective to optimize self-efficacy and self-management skills is important. Our results indicate a benefit on self-efficacy by including group work and face-to-face delivery in self-management programs. Given the growing popularity and availability of online and virtual resources and programs, developers, deliverers and funders of online or virtual programs should consider incorporating and evaluating features such as emerging immersive virtual and augmented reality options that could replicate the benefits of face-to-face delivery. Other features, such as video stories by survivors about self-managing their health and wellbeing after stroke, have also been perceived as a way to enhance viewers' self-efficacy.[44]

The strengths of this review are that robust methodology was followed, and we have synthesized data from 44 trials. Limitations include heterogeneity of the interventions delivered, outcome measures used, the targeted behaviors, time since stroke, and how and when outcomes were measured. Further, we did not collect data on stroke-related impairments or activity limitations of participants pre- or post-interventions.

Conclusion

Self-management interventions for survivors of stroke do not consistently improve self-efficacy or HRQoL.

Theoretically developed interventions and consensus on outcome measures to use would improve our ability to investigate effectiveness in future.

Data availability

No primary data were collected for this review.

ORCID iDs

Elizabeth A Lynch https://orcid.org/0000-0001-8756-1051
DominiqueACadilhac https://orcid.org/0000-0001-8162-682X
Liam P Allan https://orcid.org/0000-0001-9291-080X
Coralie English https://orcid.org/0000-0001-5910-7927

Supplemental material

Supplemental material for this article is available online.

References

1. Donkor ES. Stroke in the 21(st) century: a snapshot of the burden, epidemiology, and quality of life. *Stroke Res Treat* 2018; 2018: 3238165.
2. Stroke Foundation. Living clinical guidelines for stroke management. https://informme.org.au/guidelines/living-clinical-guidelines-for-stroke-management# (accessed 22 August 2024)
3. Mountain A, Patrice Lindsay M, Teasell R, et al. Canadian stroke best practice recommendations: rehabilitation, recovery, and community participation following stroke. Part two: transitions and community participation following stroke. *Int J Stroke* 2020; 15: 789–806.
4. Intercollegiate Stroke Working Party. *National clinical guideline for Stroke for the UK and Ireland*. London: Intercollegiate Stroke Working Party, 2023.
5. Lorig KR and Holman H. Self-management education: history, definition, outcomes, and mechanisms. *Ann Behav Med* 2003; 26: 1–7.
6. Jones F and Riazi A. Self-efficacy and self-management after stroke: a systematic review. *Disabil Rehabil* 2011; 33: 797–810.
7. Fryer CE, Luker JA, McDonnell MN, et al. Self management programmes for quality of life in people with stroke. *Cochrane Database Syst Rev* 2016; 2016: Cd010442.
8. Lorig KR, Sobel DS, Stewart AL, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Med Care* 1999; 37: 5–14.
9. Ramage ER, Burke M, Galloway M, et al. Fit for purpose. Co-production of complex behavioural interventions. A practical guide and exemplar of co-producing a telehealth-delivered exercise intervention for people with stroke. *Health Res Policy Syst* 2022; 20: 2.
10. Warsi A, Wang PS, LaValley MP, et al. Self-management education programs in chronic disease: a systematic review and methodological critique of the literature. *Arch Intern Med* 2004; 164: 1641–1649.
11. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev* 1977; 84: 191–215.
12. Szczepańska-Gieracha J and Mazurek J. The role of self-efficacy in the recovery process of stroke survivors. *Psychol Res Behav Manag* 2020; 13: 897–906.
13. Higgins J, Page M, Elbers R, et al. *Cochrane handbook for systematic reviews of interventions*. 4 ed. London: Cochrane, 2023.
14. Deeks J, Higgins J and Altman D. *Analysing data and undertaking meta-analyses*. Chichester: John Wiley & Sons, 2019.
15. Dettori JR, Norvell DC and Chapman JR. Fixed-effect vs random-effects models for meta-analysis: 3 points to consider. *Global Spine J* 2022; 12: 1624–1626.
16. Schünemann HJ, Oxman AD, Brozek J, et al. Grading quality of evidence and strength of recommendations for diagnostic tests and strategies. *BMJ* 2008; 336: 1106–1110.
17. Jones F, Gage H, Drummond A, et al. Feasibility study of an integrated stroke self-management programme: a cluster-randomised controlled trial. *BMJ Open* 2016; 6: e008900.
18. Devasahayam AJ, Tang A, Taylor D, et al. Cardiorespiratory exercise and self-management early after stroke to increase daily physical activity: results from a stepped-wedge cluster randomised trial. *Disabil Rehabil* 2025; 47: 3581–3591.
19. Aben L, Heijenbrok-Kal MH, van Loon EM, et al. Training memory self-efficacy in the chronic stage after stroke: a randomized controlled trial. *Neurorehabil Neural Repair* 2013; 27: 110–117.
20. Aben L, Heijenbrok-Kal MH, Ponds RW, Busschbach JJ and Ribbers GM. Long-lasting effects of a new memory self-efficacy training for stroke patients: a randomized controlled trial. *Neurorehabil Neural Repair* 2014; 28: 199–206.
21. Adamit T, Shames J and Rand D. Functional and cognitive occupational therapy (FaC(o)T) improves self-efficacy and behavioral-emotional status of individuals with mild stroke;

analysis of secondary outcomes. *Int J Environ Res Public Health* 2023; 20: 5052.

22. Amiri FS, Abolhassani S, Alimohammadi N, et al. Investigating the effect of self-management program on stroke's patients' self-efficacy. *BMC Neurol* 2022; 22: 360.

23. Barker-Collo S, Krishnamurthi R, Witt E, et al. Improving adherence to secondary stroke prevention strategies through motivational interviewing. *Stroke* 2015; 46: 3451–3458.

24. Brauer SG, Kuys SS, Ada L and Paratz JD. IMproving Physical ACtivity after stroke via Treadmill training (IMPACT) and self-management: a randomized trial. *Int J Stroke* 2022; 17: 1137–1144.

25. Brouwer-Goossensen D, Scheele M, van Genugten L, et al. Motivational interviewing in a nurse-led outpatient clinic to support lifestyle behaviour change after admission to a stroke unit: a randomized controlled trial. *Eur J Cardiovasc Nurs* 2022; 21: 36–45.

26. Cadilhac DA, Hoffmann S, Kilkenny M, et al. A phase II multicentered, single-blind, randomized, controlled trial of the stroke self-management program. *Stroke* 2011; 42: 1673–1679.

27. Cadilhac DA, Andrew NE, Busingye D, et al. Pilot randomised clinical trial of an eHealth, self-management support intervention (iVERVE) for stroke: feasibility assessment in survivors 12-24 months post-event. *Pilot Feasibility Stud* 2020; 6: 172.

28. Chen L, Chen Y, Chen X, Shen X, Wang Q and Sun C. Longitudinal study of effectiveness of a patient-centered self-management empowerment intervention during predischarge planning on stroke survivors. *Worldviews Evid Based Nurs* 2018; 15: 197–205.

29. Damush TM, Myers L, Anderson JA, et al. The effect of a locally adapted, secondary stroke risk factor self-management program on medication adherence among veterans with stroke/TIA. *Transl Behav Med* 2016; 6: 457–468.

30. Damush TM, Ofner S, Yu Z, Plue L, Nicholas G and Williams LS. Implementation of a stroke self-management program: a randomized controlled pilot study of veterans with stroke. *Transl Behav Med* 2011; 1: 561–572.

31. Fu V, Weatherall M, McPherson K, et al. Taking charge after stroke: a randomized controlled trial of a person-centered, self-directed rehabilitation intervention. *Int J Stroke* 2020; 15: 954–964.

32. Harel-Katz H, Adar T, Milman U and Carmeli E. Examining the feasibility and effectiveness of a culturally adapted participation-focused stroke self-management program in a day-rehabilitation setting: a randomized pilot study. *Top Stroke Rehabil* 2020; 27: 577–589.

33. Harwood M, Weatherall M, Talemaitoga A, et al. Taking charge after stroke: promoting self-directed rehabilitation to improve quality of life–a randomized controlled trial. *Clin Rehabil* 2012; 26: 493–501.

34. Heron N, Kee F, Mant J, Cupples ME and Donnelly M. Rehabilitation of patients after transient ischaemic attack or minor stroke: pilot feasibility randomised trial of a home-based prevention programme. *Br J Gen Pract* 2019; 69: e706–e714.

35. Bragstad LK, Hjelle EG, Zucknick M, et al. The effects of a dialogue-based intervention to promote psychosocial well-being after stroke: a randomized controlled trial. *Clin Rehabil* 2020; 34: 1056–1071.

36. Hjelle E, Bragstad L, Kirkevold M, et al. Effect of a dialogue-based intervention on psychosocial wellbeing 6 months after stroke in Norway: a randomized controlled trial. *J Rehabil Med* 2019; 51: 557–565.

37. Hoffmann T, Ownsworth T, Eames S and 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: 116–126.

38. Kalav S, Bektas H and Ünal A. Effects of chronic care model-based interventions on self-management, quality of life and patient satisfaction in patients with ischemic stroke: a single-blinded randomized controlled trial. *Jpn J Nurs Sci* 2022; 19: e12441.

39. Kendall E, Catalano T, Kuipers P, Posner N, Buys N and Charker J. Recovery following stroke: the role of self-management education. *Soc Sci Med* 2007; 64: 735–746.

40. Kessler DE, Egan MY, Dubouloz CJ, Graham FP and McEwen SE. Occupational performance coaching for stroke survivors: a pilot randomized controlled trial protocol. *Can J Occup Ther* 2014; 81: 279–288.

41. Lee D, Fischer H, Yang B, et al. Telehealth self-management support in early stroke rehabilitation: a feasibility randomized controlled trial. *OTJR (Thorofare N J)* 2023; 43: 457–466.

42. Lin S, Xiao LD, Chamberlain D, et al. Nurse-led health coaching programme to improve hospital-to-home transitional care for stroke survivors: a randomised controlled trial. *Patient Educ Couns* 2022; 105: 917–925.

43. Lo SHS, Chau JPC, Lau AYL, et al. Virtual multidisciplinary stroke care clinic for community-dwelling stroke survivors: a randomized controlled trial. *Stroke* 2023; 54: 2482–2490.

44. Lo SHS, Chang AM and Chau JPC. Stroke self-management support improves survivors' self-efficacy and outcome expectation of self-management behaviors. *Stroke* 2018; 49: 758–760.

45. Lo SHS, Chau JPC, Choi KC, et al. Health professional- and volunteer-partnered self-management support (COMBO-KEY) to promote self-efficacy and self-management behaviors in people with stroke: a randomized controlled trial. *Ann Behav Med* 2023; 57: 866–876.

46. Lund A, Michelet M, Sandvik L, Wyller T and Sveen U. A lifestyle intervention as supplement to a physical activity programme in rehabilitation after stroke: a randomized controlled trial. *Clin Rehabil* 2012; 26: 502–512.

47. Mayo NE, Anderson S, Barclay R, et al. Getting on with the rest of your life following stroke: a randomized trial of a complex intervention aimed at enhancing life participation post stroke. *Clin Rehabil* 2015; 29: 1198–1211.

48. McKenna S, Jones F, Glenfield P, et al. Bridges self-management program for people with stroke in the community: a feasibility randomized controlled trial. *Int J Stroke* 2013; 10: 697–704.

49. Minshall C, Castle DJ, Thompson DR, et al. A psychosocial intervention for stroke survivors and carers: 12–month outcomes of a randomized controlled trial. *Top Stroke Rehabil* 2020; 27: 563–576.

50. Sabariego C, Barrera AE, Neubert S, Stier-Jarmer M, Bostan C and Cieza A. Evaluation of an ICF-based patient education programme for stroke patients: a randomized, single-blinded, controlled, multicentre trial of the effects on self-efficacy, life satisfaction and functioning. *Br J Health Psychol* 2013; 18: 707–728.

51. Sakakibara BM, Lear SA, Barr SI, et al. Telehealth coaching to improve self-management for secondary prevention after stroke: a randomized controlled trial of Stroke Coach. *Int J Stroke* 2022; 17: 455–464.

52. Shaw L, Bhattarai N, Cant R, et al. An extended stroke rehabilitation service for people who have had a stroke: the EXTRAS RCT. *Health Technol Assess* 2020; 24: 1–202.

53. Sit JW, Chair SY, Chan Yip CW, et al. Effect of health empowerment intervention for stroke self-management on behaviour and health in stroke rehabilitation patients. *Hong Kong Med J* 2018; 24: 12–15.

54. Tielemans NS, Visser-Meily JM, Schepers VP, et al. Effectiveness of the Restore4Stroke self-management intervention "Plan ahead!": a randomized controlled trial in stroke patients and partners. *J Rehabil Med* 2015; 47: 901–909.

55. Towfighi A, Cheng EM, Hill VA, et al. Results of a pilot trial of a lifestyle intervention for stroke survivors: healthy eating and lifestyle after stroke. *J Stroke Cerebrovasc Dis* 2020; 29: 105323.

56. Visser MM, Heijenbrok-Kal MH, Van't Spijker A, Lannoo E, Busschbach JJ and Ribbers GM. Problem-solving therapy during outpatient stroke rehabilitation improves coping and health-related quality of life. *Stroke* 2016; 47: 135–142.

57. Wolf TJ, Baum CM, Lee D and Hammel J. The development of the improving participation after stroke self-management program (IPASS): an exploratory randomized clinical study. *Top Stroke Rehabil* 2016; 23: 284–292.

58. Wolf TJ, Spiers MJ, Doherty M and Leary EV. The effect of self-management education following mild stroke: an exploratory randomized controlled trial. *Top Stroke Rehabil* 2017; 24: 345–352.

59. Kessler D, Egan M, Dubouloz CJ, et al. Occupational performance coaching for stroke survivors: a pilot randomized controlled trial. *Am J Occup Ther* 2017; 71: 7103190020p1–7103190020p7.

60. Sahely A, Sintler C, Soundy A and Rosewilliam S. Feasibility of a self-management intervention to improve mobility in the community after stroke (SIMS): a mixed-methods pilot study. *PLoS ONE* 2024; 19: e0286611.

61. Tsai SJ, Li CC and Pai HC. Effects of a nurse-led therapeutic conversations intervention in stroke patient–family caregiver dyads: a randomized control trial. *Int J Nurs Pract* 2024; 30: e13257.

62. Li Z, Lei Y, Bui Q, et al. A digital intervention to promote self-management self-efficacy among community-dwelling individuals with stroke: pilot randomized controlled trial. *JMIR Rehabil Assist Technol* 2024; 11: e50863.

63. Pallesen H, Pedersen SKS, Sørensen SL, et al. "Stroke—65 plus. Continued active life." A randomized controlled trial of a self-management neurorehabilitation intervention for elderly people after stroke. *Disabil Rehabil* 2025; 47: 104–113.

64. Bandura A. Social cognitive theory: an agentic perspective. *Annu Rev Psychol* 2001; 52: 1–26.

65. Maasland L, Brouwer-Goossensen D, den Hertog HM, et al. Health education in patients with a recent stroke or transient ischaemic attack: a comprehensive review. *Int J Stroke* 2011; 6: 67–74.