

Interventions for improving psychosocial well-being after stroke: A systematic review

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ABSTRACT

Background: Up to one third of all stroke patients suffer from one or more psychosocial impairments. Recognition and treatment of these impairments are essential in improving psychosocial well-being after stroke. Although nurses are ideally positioned to address psychosocial well-being, they often feel insecure about providing the needed psychosocial care. Therefore, we expect that providing nurses with better knowledge to deliver this care could lead to an improvement in psychosocial well-being after stroke. Currently it is not known which interventions are effective and what aspects of these interventions are most effective to improve psychosocial well-being after stroke.

Objective: To identify potentially effective interventions – and intervention components – which can be delivered by nurses to improve patients' psychosocial well-being after stroke.

Methods: A systematic review and data synthesis of randomized controlled trials and quasi experimental studies was conducted. Papers were included according to the following criteria: 1) before-after design, 2) all types of stroke patients, 3) interventions that can be delivered by nurses, 4) the primary outcome(s) were psychosocial. PubMed, Embase, PsychInfo, CINAHL and Cochrane library were searched (August 2019–April 2022). Articles were selected based on title, abstract, full text and quality. Quality was assessed by using Joanna Briggs Institute checklists and a standardized data extraction form developed by Joanna Briggs Institute was used to extract the data.

Results: In total 60 studies were included, of which 52 randomized controlled trials, three non-randomized controlled trials, four quasi-experimental studies, and one randomized cross-over study. Nineteen studies had a clear psychosocial content, twenty-nine a partly psychosocial content, and twelve no psychosocial content. Thirty-nine interventions that showed positive effects on psychosocial well-being after stroke were identified. Effective intervention topics were found to be mood, recovery, coping, emotions, consequences/problems after stroke, values and needs, risk factors and secondary prevention, self-management, and medication management. Active information and physical exercise were identified as effective methods of delivery.

Discussion: The results suggest that interventions to improve psychosocial well-being should include the intervention topics and methods of delivery that were identified as effective. Since effectiveness of the intervention can depend on the interaction of intervention components, these interactions should be studied. Nurses and patients should be involved in the development of such interventions to ensure it can be used by nurses and will help improve patients' psychosocial well-being.

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What is already known

- Many patients suffer from one or more psychosocial impairments after stroke.
- Although many interventions to improve psychosocial well-being have been studied, no significant decrease in the prevalence of psychosocial impairments after stroke has been observed during the past years.
- Nurses can play an important part in supporting patients suffering from psychosocial impairments after stroke.

What this paper adds

- This review shows that effective intervention components can be divided into intervention topics and methods of delivery.
- Effective intervention topics are mood, recovery, coping, emotions, consequences/problems after stroke, values and needs, risk factors and secondary prevention, self-management, and medication management.
- Effective methods of delivery are active information and physical exercise.

1. Background

Stroke is an important global cause of disability and death (Gbd, 2017), with around 13.67 million new cases per year (183 cases per 100,000 people) (Gbd, 2017). In 2016 around 79.57 million (1066 per 100,000 people) suffered from the consequences of stroke globally (Gbd, 2017). This number will keep increasing in the following years, due to the aging and growth of the population (Gbd, 2017). After a stroke, people can suffer from different consequences, among which are physical impairments, communicative impairments, cognitive impairments, and psychosocial impairments. Previous studies show that about 18–31% of all stroke patients suffer from one or more psychosocial impairments (Knapp et al., 2020; Ferro et al., 2016; Hackett et al., 2014; Hackett and Pickles, 2014). These impairments can lead to several negative outcomes, such as lower quality of life and health-related quality of life (Donnellan et al., 2010; Ayerbe et al., 2013), higher mortality (Jørgensen et al., 2016; Cai et al., 2019), poorer functional outcome (Blöchl et al., 2019), worse recovery after stroke (Ayerbe et al., 2013), less social participation (Tse et al., 2019), and slower rehabilitation (Meadmore et al., 2019). To deal with all these impairments after stroke, psychosocial well-being is of vital importance. In literature many different definitions are available for psychosocial well-being. In this paper we assume that psychosocial well-being is related to a basic positive mood and the absence of negative emotions, social relations, and the ability to live daily life.

Previous research has shown recognition and treatment for a range of psychosocial impairments lead to a decrease in these impairments and as such an increase in psychosocial well-being (Robinson and Jorge, 2016). This makes recognition and treatment essential in stroke care to maintain and improve psychosocial well-being after stroke. Currently, stroke patients receive care via a stroke care pathway. Since stroke care is highly complex and patients often experience complex needs after stroke, care in these pathways is provided by a multidisciplinary team (Clarke and Forster, 2015), consisting of several healthcare professionals, among which nurses, physicians, therapists (for example physical, occupational, speech and language), and psychologists. Because these healthcare professionals are together responsible for the provided care for stroke patients, in practice blurring of role boundaries between healthcare professionals is often observed (Cramm and Nieboer, 2011). This leads to ambiguousness and uncertainties about which healthcare professional has which care responsibilities. As a result, uncertainties often exist in stroke care pathways about which

healthcare professionals should be involved in providing psychosocial care. Nurses play an important part in these multidisciplinary teams (Miller et al., 2010), and thereby they play an important part in the care process after stroke. It is believed that especially nurses are ideally positioned to address psychosocial well-being, because they are present 24/7 in all organizations within the stroke care pathway, they have a close and continued interaction with stroke patients, and they are involved with stroke patients after their discharge (Kirkevold, 2010). Furthermore, nurses are often involved in helping patients with restructuring their daily lives and their coping process, by offering them emotional support, encouragement and consolation/comfort, among other things (Kirkevold, 2010). However, previous studies have shown that even though nurses experience psychosocial well-being as an important aspect that they should pay attention to, they often feel insecure about providing care to improve psychosocial well-being after stroke and are often unsure about how to provide this kind of care (de Man-van Ginkel et al., 2010; de Man-van Ginkel et al., 2013; de Man-van Ginkel et al., 2015; Hirt et al., 2020; van Dijk et al., 2018; van Dijk et al., 2018). Therefore, we expect that providing nurses with better knowledge to deliver psychosocial care could lead to an improvement in psychosocial well-being after stroke.

Nurses could make use of interventions to improve psychosocial well-being after stroke. Because stroke care is often organized in stroke care pathways – including care delivery by multidisciplinary teams in and across different levels of care – such interventions are considered as complex interventions. According to the Medical Research Council (MRC) framework for developing and evaluating complex interventions, both the components and the context and stakeholders of the intervention should be taken into account in all phases of development and evaluation of complex interventions (Skivington et al., 2021). The intervention components can be divided into intervention topics and methods of delivery. The context focuses on the system in which the intervention would be implemented and the involved stakeholders, consisting of the patients who receive the intervention and the multidisciplinary team – including nurses – who provide the intervention.

Although many interventions to improve psychosocial well-being have been studied (Robinson and Jorge, 2016; Baker et al., 2018; Hackett et al., 2008a; Hackett et al., 2008b; Knapp et al., 2000; Turner-Stokes and Hassan, 2002a; Turner-Stokes and Hassan, 2002b), no significant decrease in the prevalence of psychosocial impairments after stroke has been observed during the past years (Knapp et al., 2020; Hackett and Pickles, 2014; Rafsten et al., 2018; Medeiros et al., 2020). Some studies showed positive effects of interventions (Hackett et al., 2008a; Hackett et al., 2008b; Kirkevold et al., 2012), but it is not known what makes these interventions effective and which aspects of these interventions are most effective. Several reviews have been conducted to identify which interventions are effective for psychosocial well-being after stroke. However, most of these reviews focus only on one specific psychosocial impairment (Baker et al., 2018; Starkstein and Hayhow, 2019; Knapp et al., 2017; Zhang et al., 2019), one specific intervention (Zhang et al., 2019; Zou et al., 2018) or one specific subgroup of stroke patients (Baker et al., 2018). Since various psychosocial impairments can occur simultaneously after stroke (Ferro et al., 2016), it is important to identify interventions for this variety of psychosocial impairments instead of focusing on one specific impairment. Furthermore, it has been shown that specific subgroups of stroke patients – such as patients with aphasia or cognitive impairments – are often excluded from reviews (Townend et al., 2007). Excluding such subgroups limits the generalizability of the findings and decreases the probability that these patients receive appropriate care (Townend et al., 2007). Therefore, it can be recommended to study various types of interventions for various types of psychosocial impairments and various types of stroke patients.

We expect that providing nurses with better knowledge on how to deliver psychosocial care could lead to an improvement in psychosocial well-being after stroke. Thus, for nurses to deliver evidence based care

to stroke patients, there is a need for a broad overview of knowledge about interventions that could be used by nurses in their daily practice to improve psychosocial well-being, regardless of if they already use these. Therefore, in this study we perform a systematic review to obtain an extensive overview of the available literature, and thereby the available knowledge. In this systematic review we aim to identify potentially effective interventions – and intervention components – which can be delivered by nurses to improve patients' psychosocial well-being after stroke.

2. Methods

In this review, studies were identified that described interventions to improve psychosocial well-being after stroke. In literature, many different definitions are available to describe psychosocial well-being. In this paper, we interpret psychosocial well-being as including at least: 1) A basic feeling of pleasure, satisfaction and good psychological and social well-being, and the absence of negative emotions; 2) the ability to use coping strategies and continue/resume everyday life, leading to participation and engagements in purposeful activities besides oneself; 3) good social relations and mutual feelings of love in such relations; and 4) a self-concept expressed by the presence of self-esteem, self-acceptance, self-belief, and a feeling of usefulness (Kirkevold et al., 2018).

2.1. Design

A systematic review and data synthesis of randomized controlled trials (RCT) and quasi experimental studies was conducted by: 1) conducting a search to identify articles; 2) selecting articles on title and abstract; 3) selecting articles on full text; 4) quality appraisal; and 5) data synthesis. We applied Joanna Briggs Institute (JBI) critical appraisal checklists for quality appraisal and a standardized data extraction form developed by JBI for data synthesis (Tufanaru et al., 2017) (Aromataris and Munn, 2020).

2.2. Search strategy

Relevant studies were identified by searching the electronic databases PubMed, Embase, PsychInfo, CINAHL and Cochrane library between August 2019 and April 2022. The search strategy was developed by the first author in consultation with a librarian and another researcher (JMG), and was finalized after discussion with the research team. The search strategy included a combination of the following keywords: 1) population: stroke, cerebral hemorrhage; 2) intervention: care program, toolkit, nursing care, therapeutics, patient care, intervention; and 3) outcome: quality of life, depression, mood disorder, anxiety, wellbeing, emotional health, mental health, psychosocial. In this search strategy, the following limits were used: Only articles with publication dates of no more than 15 years previous to the start of this review (August 2019) were included, due to the importance to identify interventions that could be used in the current stroke care pathway. Previous studies have shown that many changes have occurred in stroke care since the beginning of this millennium (Kamal et al., 2015; Edwards et al., 2017). Improvements in prevention and treatment have led to a decrease in mortality after stroke. Conversely, long-term functional recovery did not improve significantly over the previous years, and the need for (institutionalized) rehabilitation even increased (Kamal et al., 2015; Edwards et al., 2017). Due to the changes in stroke care in the last two decades, we expected that interventions presented in articles with older publication dates would probably not fit today's care process. Furthermore, we only included articles written in English, Dutch, Norwegian, Danish and Swedish, since our research team consists of researchers from the Netherlands and Norway. However, with the conducted search we only obtained articles written in English. The conducted search is presented in Table 1.

2.3. Eligibility criteria

We included all papers according to the following criteria:

Inclusion:

- 1) Types of studies: Studies with a before-after design;
- 2) Types of participants: All types of stroke patients. We included papers if stroke patients were the only patient group or if stroke patients were described as a separate group within a mixed population;
- 3) Types of interventions: Interventions for stroke patients that – regardless of the content of the intervention – have a purpose to improve psychosocial well-being and can be delivered by nurses, with or without additional training. Interventions with different types of content – for example psychosocial content, physical exercise, relaxation – were included; and
- 4) Types of outcome measurements: Papers where (one of) the primary outcome(s) was psychosocial. If there was no clear distinction between primary and secondary outcomes we included papers if one or more outcomes were psychosocial.

Exclusion:

- 1) Types of studies: Protocols, pilot studies and feasibility studies. If full-scale trials following pilot and feasibility studies were available, these were included;
- 2) Types of participants: Papers with mixed populations in which stroke patients were not described as a separate group;
- 3) Types of interventions: Interventions which solely contained pharmacological components; and
- 4) Types of outcome measurements: Papers where none of the primary outcomes were psychosocial.

2.4. Selection process

All hits from the different databases were merged into one file in Endnote, and all duplicates were removed from the sample. Then, to determine the level of agreement between the researchers, the first 100 articles were independently screened for title by six researchers (DN, EGH, JMG, LKB, MK, US). On the basis of the level of agreement (substantial agreement; $\kappa = 0.68$), we divided the remaining articles among four researchers (DN, EGH, JMG, LKB) and independently assessed them on title and abstract using the in- and exclusion criteria. The assessments of title and abstract were discussed within the research team until consensus was reached. Next, we divided the remaining articles over three pairs (EGH + MK, LKB + JMG, TH + DN). Within each pair both researchers assessed the relevance of the full text independently. These assessments were discussed within the pair until consensus was reached. If consensus could not be reached, a third researcher was consulted (US). Lastly, the results of the full text assessments of all pairs were combined and discussed within the research team.

2.5. Quality appraisal

The quality of the selected articles was assessed with the Joanna Briggs Institute critical appraisal checklists for Randomized Controlled Trials (RCT) and Quasi Experimental Studies (Tufanaru et al., 2017). Both checklists consist of several items which can be answered with 'yes', 'no', 'unclear' or 'not applicable'. To calculate the score for each article, the proportion of items on the checklist marked with 'yes' was calculated. The cut-off value for inclusion of a study was decided in advance, as was recommended in the Joanna Briggs Institute Manual (Institute TJB, 2014). We expected a significant part of the eligible studies would use a pragmatic study design (for example studies in which blinding is not possible). Because of the pragmatic design these studies cannot always fulfill all criteria on the Joanna Briggs Institute checklist. However, this does not necessarily mean these studies are of lower quality. Therefore, a cut-off value of 50% was used since we believed a higher cut-off value would lead to a too high risk of bias as this would exclude many of the studies with a pragmatic design. Furthermore, we

Table 1
Search string in used databases.

Search string	Hits after filtering on language and publication date
<p>Pubmed "Stroke" [Mesh] OR stroke [tiab] OR strokes [tiab] OR "Cerebral Hemorrhage" [Mesh] OR "cerebral hemorrhage"[tiab] OR "cerebral hemorrhages" [tiab] OR "cerebral haemorrhage" [tiab] OR "cerebral haemorrhages" [tiab] AND "care program" [tiab] OR "care programs" [tiab] OR "care programme" [tiab] OR "care programmes" [tiab] OR toolkit [tiab] OR toolkits [tiab] OR "nursing care" [tiab] OR therapeutics [tiab] OR "patient care" [tiab] OR "intervention" [tiab] OR "interventions" [tiab] AND "quality of life" [Mesh] OR "quality of life" [tiab] OR QoL [tiab] OR "depression" [Mesh] OR depression [tiab] OR depressions [tiab] OR "mood disorder" [tiab] OR "mood disorders" [tiab] OR anxiety [tiab] OR "well being" [tiab] OR "wellbeing" [tiab] OR "well-being" [tiab] OR "emotional health" [tiab] OR "Mental Health"[Mesh] OR "mental health" [tiab] OR psychosocial [tiab] OR psycho-social [tiab]</p>	3.648
<p>PsycInfo DE "Cerebrovascular Accidents" OR TI ("cerebrovascular accident" OR "cerebrovascular accidents" OR stroke OR strokes OR "cerebral hemorrhage" OR "cerebral hemorrhages" OR "cerebral haemorrhage" OR "cerebral haemorrhages") OR AB ("cerebrovascular accident" OR "cerebrovascular accidents" OR stroke OR strokes OR "cerebral hemorrhage" OR "cerebral haemorrhage" OR "cerebral haemorrhages") AND TI ("care program" OR "care programs" OR "care programme" OR "care programmes" OR toolkit OR toolkits OR "nursing care" OR therapeutics OR "patient care" OR "intervention" OR "interventions") OR AB ("care program" OR "care programs" OR "care programme" OR "care programmes" OR toolkit OR toolkits OR "nursing care" OR therapeutics OR "patient care" OR "intervention" OR "interventions") AND (((DE "Quality of Life") OR (DE "Depression (Emotion)") OR (DE "Major Depression") OR (DE "Affective Disorders") OR (DE "Anxiety Disorders")) OR TI ("quality of life" OR QoL OR depression OR depressions OR mood disorder OR mood disorders OR anxiety OR "well being" OR "wellbeing" OR "well-being" OR "emotional health" OR "mental health" OR psychosocial OR psycho-social) OR AB ("quality of life" OR QoL OR depression OR depressions OR mood disorder OR mood disorders OR anxiety OR "well being" OR "wellbeing" OR "well-being" OR "emotional health" OR "mental health" OR psychosocial OR psycho-social)</p>	1.371
<p>CINAHL (MH "Stroke +") OR (TI ("cerebrovascular accident" OR "cerebrovascular accidents" OR stroke OR strokes OR "cerebral hemorrhage" OR "cerebral hemorrhages" OR "cerebral haemorrhage" OR "cerebral haemorrhages") OR AB ("cerebrovascular accident" OR "cerebrovascular accidents" OR stroke OR strokes OR "cerebral hemorrhage" OR "cerebral haemorrhage" OR "cerebral haemorrhages") AND TI ("care program" OR "care programs" OR "care programme" OR "care programmes" OR toolkit OR toolkits OR "nursing care" OR therapeutics OR "patient care" OR "intervention" OR "interventions") OR AB ("care program" OR "care programs" OR "care programme" OR "care programmes" OR toolkit OR toolkits OR "nursing care" OR therapeutics OR "patient care" OR "intervention" OR "interventions") AND ((MH "Quality of Life") OR (MH "Depression") OR (MH "Affective Disorders") OR (MH "Anxiety") OR (MH "Mental Health")) OR TI ("quality of life" OR QoL OR depression OR depressions OR mood disorder OR mood disorders OR anxiety OR "well being" OR "wellbeing" OR "well-being" OR "emotional health" OR "mental health" OR psychosocial OR psycho-social) OR AB ("quality of life" OR QoL OR depression OR depressions OR mood disorder OR mood disorders OR anxiety OR "well being" OR "wellbeing" OR "well-being" OR "emotional health" OR "mental health" OR psychosocial OR psycho-social)</p>	2.409
<p>Cochrane (stroke OR strokes OR "cerebrovascular accident" OR "cerebrovascular accidents" OR "cerebral hemorrhage" OR "cerebral hemorrhages" OR "cerebral haemorrhage" OR "cerebral haemorrhages"):ti,ab,kw AND ("care program" OR "care programs" OR "care programme" OR "care programmes" OR toolkit OR toolkits OR "nursing care" OR therapeutics OR "patient care" OR "intervention" OR "interventions"):ti,ab,kw AND ("quality of life" OR QoL OR depression OR depressions OR "mood disorder" OR "mood disorders" OR anxiety OR "well being" OR "wellbeing" OR "well-being" OR "emotional health" OR "mental health" OR psychosocial OR psycho-social):ti,ab,kw</p>	4.083
<p>Embase ('cerebrovascular accident'/exp) OR ((stroke OR strokes OR "cerebrovascular accident" OR "cerebrovascular accidents" OR "cerebral hemorrhage" OR "cerebral hemorrhages" OR "cerebral haemorrhage" OR "cerebral haemorrhages"):ab,ti) AND ("care program" OR "care programs" OR "care programme" OR "care programmes" OR toolkit OR toolkits OR "nursing care" OR therapeutics OR "patient care" OR "intervention" OR "interventions"):ab,ti AND (('depression'/de) OR ('quality of life'/de) OR ('mood disorder'/de) OR ('anxiety'/de) OR ('wellbeing'/de) OR ('mental health'/de)) OR ('quality of life':ab,ti OR qol:ab,ti OR depression:ab,ti OR depressions:ab,ti OR 'mood disorder':ab,ti OR 'mood disorders':ab,ti OR anxiety:ab,ti OR 'well being':ab,ti OR 'wellbeing':ab,ti OR 'well-being':ab,ti OR 'emotional health':ab,ti OR 'mental health':ab,ti OR psychosocial:ab,ti OR 'psycho social':ab,ti)</p>	7.097 ('only Pubmed' excluded)

also expected a value smaller than 50% would lead to a too high risk of bias, as too many included articles would be of low quality.

To determine for each article which criteria were fulfilled, the articles were divided between the three pairs of researchers. Within each pair, both researchers determined if criteria had been fulfilled by marking them as "yes", "no", or "uncertain". Hereafter, all markings were discussed within the pair until consensus was reached. If items were marked as "uncertain" the pair discussed the items until consensus was reached whether the item was fulfilled or not. If no consensus could be reached within a pair, a third researcher solved the discrepancy. Finally, we calculated what proportion of the criteria was fulfilled for each article.

2.6. Data extraction and synthesis

The data were extracted from the final sample of articles by using the standardized data extraction form developed by Joanna Briggs Institute (Aromataris and Munn, 2020). Within the same pairs we independently extracted data of a subset of the selected papers about: first author, publication year, country of origin, design, participants, setting,

primary objectives, intervention (content, interventionist and training), control (content, interventionist and training), outcome measures (primary and secondary outcomes), instruments (primary and secondary outcomes), method of data collection, analysis, results and significance.

The included studies varied on most characteristics (see Table 2). Therefore, the results are described narratively. The included articles were discussed within the research team to divide them into categories. Furthermore, we used the extracted data to determine the key components of the included interventions.

3. Results

A total of 18.608 records were identified by the first search. After removing duplicates ($n = 9.088$) and screening for title and abstract, 246 articles remained. Screening of the full text articles resulted in 153 articles not meeting our inclusion criteria, leading to a selection of 93 studies. Based on quality assessment 33 articles were excluded, resulting in a final sample of 60 articles.

The quality rating varied over this selection of studies (see Table 2). Nine studies had a quality rating between 53% and 56% (Smith et al.,

Table 2
 Characteristics of included studies Δ – Change in value; AAP – Adelaide Activities Profile; AHS – Adult Hope Scale; AQoL – Australian Quality of Life questionnaire; AQoL-6D – Australian Assessment of Quality of Life-6 Dimensions; B-COPE – Brief COPE Inventory; BDI – Beck Depression Inventory; BDI-II – Beck Depression Inventory II; CD-RISC10 – Connor-Davidson Resilience Scale; CES-D – Center for Epidemiological Studies Depression Scale; CG – Control group; DISH – Diagnostic Interview and Structured Hamilton; EQ-5D – EuroQol 5D; EQ-5D-3L – 3-level EuroQol-5-dimensions; EQ-5D-5L – EuroQol 5-level EQ-5D version; EQ-VAS – EuroQol Visual Analogue Scale; EQ-2 – Fatigue Questionnaire-2; GAD-7 – Generalized Anxiety Disorder-7; GDS – Geriatric Depression Scale; GDS-15 – Geriatric Depression Scale – 15 items; GHQ-12 – General Health Questionnaire-12; GHQ-28 – General Health Questionnaire-28; GSES – General Self-Efficacy Scale; HADS – Hospital Anxiety and Depression Scale; HADS-A – Hospital Anxiety and Depression Scale – Anxiety subscale; HADS-D – Hospital Anxiety and Depression Scale – Depression subscale; HAM-A – Hamilton Rating Scale for Anxiety; HAM-D – Hamilton Depression Rating Scale; HRQoL: Health related quality of life; HRSD – Hamilton Rating Scale for Depression; IG – Intervention group; LIFE-H – Assessment of Life Habits; LS2 – Life satisfaction questionnaire; MOS SF-36 – Medical Outcomes Study 36-item short form health survey; Neuro-QoL anxiety – Quality of life in neurological disorders – anxiety; NHP – Nottingham Health Profile; PACIC – Patient Assessment of Chronic Illness Care; PHQ-9 – Patient Health Questionnaire-9; PROMIS-CMH – Patient-Reported Outcomes Measurement Information System – Global Mental Health; PSDKS – Post Stroke Depression Rating Scale; PSE – Present State Examination; short form; PSS – Pound Satisfaction Scale; PSQ-HK – Patient Satisfaction Questionnaire; QoL – Quality of Life; RCT – Randomized controlled trial; RNLI – Reintegration to Normal Living Index; RS – Resilience Scale; SAQoL-39 g – The Stroke and Aphasia Quality of Life Scale-39; SAS – Self-rating Anxiety Scale; SAS-19 – Satisfaction With Stroke Care questionnaire; SASIP-30 – Stroke Adapted Sickness Impact Profile-30; SDS – Self-rating Depression Scale; SE – Self-efficacy questionnaire; SF-12 – The Short Form Health Survey-12; SF-36 – The Short Form Health Survey-36; SOC-13 – Sense of Coherence 13-item scale; SSEQ – Stroke Self-Efficacy Questionnaire; SSQoL-12 – Stroke-specific quality of life 12-item scale; STAI – State-Trait Anxiety Inventory; TIA – Transient Ischemic Attack; UPPCC – Utrecht Proactive Coping Competence scale; USERP – Utrecht Scale for Evaluation of Rehabilitation-Participation; WEMWBS – Warwick and Edinburgh Mental Well-being Scale; WHO-QoL-SRPB – The World Health Organization – Quality of Life – Spirituality, Religion and Personal Beliefs; YALE – The Yale Brown single-item questionnaire.

References Country	Intervention Control	Design Quality score	Participants n (per group), Condition and Time after stroke	Setting of delivery Time measurements	Interventionist	Psychosocial outcomes	Findings
Interventions with clear psychosocial content							
Bragstad et al. (2020)	IG: Dialog-based intervention CG: Care as usual	RCT 77%	n = 322 (166 IG/156 CG) Patients with acute stroke recruited from hospital, with sufficient cognitive functioning Within four weeks after stroke	In community, primarily at home T1: 4-6 weeks after stroke T2: 6 months T3: 12 months	Specially trained nurses, occupational therapists	Primary outcomes: 1. Psychosocial well-being (GHQ-28) Secondary outcomes: 2. HRQoL (SAQoL-39 g) 3. Sense of coherence (SOC-13) 4. Depression (Yale) 5. Fatigue (FQ-2)	Psychosocial well-being: No statistically significant improvement. HRQoL: No statistically significant improvement. Sense of coherence: No statistically significant improvement. Depression: No statistically significant improvement. Fatigue: No statistically significant improvement.
Chen et al. (2020)	IG: Comprehensive nursing care program CG: Care as usual	RCT 54%	n = 98 (49 IG/49 CG) Patients with hemorrhagic or ischemic stroke recruited from hospital, without aphasia or comprehension disorder	At hospital T0: before intervention T1: after intervention	Nursing staff	Primary outcomes: 1. Depression (HAM-D) 2. QoL (SSQoL)	Depression: Improvement at T1: Δ-4.18 IG vs Δ-1.27 CG (p < 0.001). QoL: Improvement at T1: Δ + 44.99 IG vs Δ + 8.78 CG (p < 0.001).
Cheng et al. (2021)	IG: Reminiscence therapy + cognitive rehabilitation training CG: Cognitive rehabilitation training	RCT 62%	n = 115 (59 IG/56 CG) Patients with acute ischemic stroke recruited from hospital, without aphasia or severe cognitive impairment	In rehabilitation center of a hospital T0: at baseline T1: 3 months T2: 6 months T3: 9 months T4: 12 months	Trained nurses	Primary outcomes: 1. Anxiety (HADS-A + SAS) 2. Depression (HADS-D + SDS) 3. Patient satisfaction	Anxiety: Lower in IG vs CG at T3 based on SAS (p = 0.048) and at T4 based on HADS-A (p = 0.027) and on SAS (p = 0.002). Depression: No statistically significant improvement. Patient satisfaction: Higher in IG vs CG at T1 (p = 0.005), at T2 (p = 0.015), and at T4 (p = 0.036). Mood: Improvement at T1: Δ-3.50 IG vs Δ + 0.10 CG (p = 0.002). Improvement at T2: Δ-3.90 IG vs Δ + 0.90 CG (p < 0.001). Improvement at T3: Δ-4.01 IG vs Δ + 0.50 CG (p = 0.001).
Golding et al. (2016)	IG: Relaxation CD CG: Not presented	Randomized two group design 62%	n = 21 (11 IG/10 CG) Stroke survivors recruited from community, with anxiety, without moderate to severe cognitive or communicative problems	In community T1: 1 month after screening T2: 2 months T3: 3 months	Not presented	Primary outcomes: 1. Mood (HADS)	HRQoL (EQ-VAS): Higher in IG (Minshall et al., 2020) vs CG (Langhammer et al., 2008) at T1 (p = 0.020). HRQoL (EQ-5D): No statistically significant improvement.
United Kingdom	IG: Prevent 2nd Stroke (P2S) intervention CG: Links to internet addresses with generic online health programs	RCT 62%	n = 356 (171 IG/185 CG) Patients with acute stroke or TIA; cognitive or communicative problems not described Between 6 and 36 months after stroke	At home T0: at baseline T1: 6 months	Not presented	Primary outcomes: 1. HRQoL (EQ-VAS) Secondary outcomes: 2. HRQoL (EQ-5D)	

(continued on next page)

Table 2 (continued)

References Country	Intervention Control	Design Quality score	Participants n (per group), Condition and Time after stroke	Setting of delivery Time measurements	Interventionist	Psychosocial outcomes	Findings
Hill et al. (2019) United Kingdom	IG1: Problem-solving therapy IG2: Non-specific support by volunteers CG: Care as usual	3-group parallel RCT 92%	n = 450 (151 IG1/149 IG2/150 CG) Stroke patients recruited from hospital, without cognitive or communicative problems Within one month of hospital admission n = 322 (166 IG/156 CG) Patients with acute stroke recruited from acute stroke or rehabilitation unit, with sufficient cognitive functioning Within one month after stroke	At home T1: 6 months after stroke T2: 12 months	Community psychiatric nurses, volunteers Registered nurses, occupational therapists (GHQ-28)	Primary outcomes: 1. Mood disorder (PSE and GHQ-28) Secondary outcomes: 2. Presence or absence of depression (Yale) 3. Stroke-specific HRQoL (SAQoL-39 g) 4. Sense of coherence (SOC-13)	Mood disorder: No statistically significant improvement. Psychosocial well-being: No statistically significant improvement. Depression: No statistically significant improvement. HRQoL: No statistically significant improvement. Sense of coherence: No statistically significant improvement.
Hjelte et al. (2019) Norway	IG: Dialog-based intervention CG: Care as usual	Multicenter, prospective, RCT 77%	n = 68 (34 IG/34 CG) Ischemic stroke patients recruited as in-patients at hospital, without disability of verbal communication n = 100 (37 IG1/35 IG2/28 CG) Stroke patients, cognitive and communicative problems not described Within 4 months after stroke	At hospital + at home T0: at baseline T1: 12 weeks	Researchers with experience in working in intensive care unit and teaching in nursing faculty Advanced practice nurses or at study offices T0: at entry T1: after intervention T2: 21 weeks T3: 12 months	Primary outcomes: 1. Self-efficacy (SSEF) 2. QoL (SSQoL) 3. Patient satisfaction (PACIC) Primary outcomes: 1. Post-stroke depression (HRSD)	Self-efficacy: No statistically significant improvement. QoL: No statistically significant improvement. Patient satisfaction: Higher care-related satisfaction in IG (3.24 ± 0.92) vs CG (1.95 ± 0.55) (p < 0.001). Depression: No statistically significant improvement.
Kirkness et al. (2017) United States of America	IG1: Psychosocial intervention via telephone IG2: Psychosocial intervention in person CG: Care as usual, with follow-up visits by RN IG: Social support and health education CG: Care as usual	Single-blinded RCT 53% RCT 69% RCT 54%	n = 62 (31 IG/31 CG) Patients with ischemic or hemorrhagic stroke recruited as outpatients at rehabilitation department, without impaired cognition or language disorder Within 6 months after stroke n = 53 (26 IG/27 CG) Stroke survivors recruited from municipality, without cognitive or communicative problems	Outpatient rehabilitation department + at home T0: 1 week (before intervention) T1: 2 weeks T2: 4 weeks T3: 8 weeks T4: 12 weeks In community venue T0: before intervention T1: after treatment T2: after 2 months	Functional therapists Clinical psychologists, assistant psychologists, stroke care coordinators	Primary outcomes: 1. Depression (CES-D)	Depression: Difference between IG and CG only reached statistical significance at T3 compared to T0 (IG: Δ-2.13 ± 3.49; CG: Δ + 0.26 ± 2.66, p = 0.02).
Majumdar and Morris (2019) United Kingdom	IG: ACTivate Your Life after Stroke intervention. CG: Care as usual	RCT 69%	n = 53 (26 IG/27 CG) Stroke survivors recruited from municipality, without cognitive or communicative problems	In community venue T0: before intervention T1: after treatment T2: after 2 months	Primary outcomes: 1. Depression (PHQ-9) Secondary outcomes: 2. Anxiety (GAD-7) 3. Hope (AHS) 4. HRQoL and self-rated status (EQ-5D-5L) 5. Mental well-being (WEMWBS)	Depression: Improvement at T3: Δ-4.19 IG vs Δ-1.11 CG. Anxiety: No statistically significant improvement. Hope: Improvement at T3: Δ + 5.61 IG vs Δ + 1.19 CG. HRQoL: No statistically significant improvement. Mental well-being: No statistically significant improvement.	

Minshall et al. (2020) Australia	IG: Stroke Care Optimal Health Program (SCOHP) CG: Care as usual	RCT 69%	n = 73 (42 IG/31 CG) Stroke patients recruited from hospital and community referrals, without severe aphasia or cognitive impairment	At hospital or at home T0: at baseline T1: 3 months T2: 6 months T3: 12 months	Psychologists	Primary outcomes: 1. QoL (AQoL-6D + EQ-5D-3L) 2. Self-efficacy (GSES) Secondary outcomes: 3. Depression (HADS) 4. Anxiety (HADS) 5. Coping (B-COPE) Primary outcomes: 1. QoL	QoL: No statistically significant improvement. Self-efficacy: No statistically significant improvement. Depression: No statistically significant improvement. Anxiety: No statistically significant improvement
Orman et al. (2022) Australia	IG: Tailored management program CG: Care as usual	Cluster RCT 85%	n = 563 (283 IG/280 CG) Patients with stroke or TIA recruited from hospital; cognitive or communicative problems not described	At hospital + at home T0: at baseline T1: 3 months T2: 12 months T3: 24 months	Intervention nurses neurologists, geriatricians	Primary outcomes: 1. QoL	QoL: No statistically significant improvement.
Smith et al. (2012) United States of America	IG: 5 components to enable caregivers to provide optimal emotional care to the stroke survivor CG: Access to resource room and weekly caregiving tip; no overlap in content with intervention IG: Problem-solving therapy CG: Care as usual	Two groups RCT 54%	After discharge n = 38 (19 IG/19 CG) Caregiver-stroke survivor dyads recruited from community, without cognitive problems	At home T0: baseline T1: posttest T2: 1 month	Not presented	Primary outcomes: 1. Depression (CES-D and PHQ-9) Secondary outcomes: 2. Mastery (Mastery Scale) 3. Self-esteem (Self-esteem Scale) 4. Social support (MOS Social Support Survey) Primary outcomes: 1. HRQoL – psychosocial (SSQoL-12 and EQ-5D-5L) Secondary outcomes: 2. Depression (CES-D)	Depression: No statistically significant improvement. Self-esteem: No statistically significant improvement.
Visser et al. (2016) The Netherlands & Belgium	IG: Problem-solving therapy CG: Care as usual	Multicenter RCT 85%	n = 166 (88 IG/78 CG) Stroke patients recruited from outpatient rehabilitation center, without moderate/severe cognitive or communicative problems	In community T0: within 3 weeks before intervention T1: within 10 days after intervention T2: 6 months T3: 12 months	Trained neuropsychologists	Primary outcomes: 1. HRQoL – psychosocial (SSQoL-12 and EQ-5D-5L) Secondary outcomes: 2. Depression (CES-D)	HRQoL – Psychosocial: No statistically significant improvement. Depression: No statistically significant improvement.
Watkins et al. (2007) United Kingdom	IG: Motivational interviewing and usual care CG: Care as usual	Single-center open RCT 77%	MED. 7.29 months after stroke n = 411 (204 IG/207 CG) Stroke patients recruited from stroke unit of hospital, without severe cognitive or communicative problems	At stroke unit of hospital T1: 3 months	Therapists with background in nursing and psychology	Primary outcomes: 1. Proportion of patients with normal mood at 12 months (GHQ-28) Secondary outcomes: 2. Depression (Yale)	Mood: Improvement at T1: More normal mood in IG (54.7%) than CG (41.9%) (p = 0.03). Depression: Improvement at T1: Higher levels of not feeling sad or depressed in IG (52.9%) than CG (42.5%) (p = 0.03).
Watkins et al. (2011) United Kingdom	IG: Motivational interviewing and usual care CG: Care as usual	Single-center open RCT 69%	5-28 days after stroke n = 411 (204 IG/207 CG) Stroke patients recruited from stroke unit of hospital, without severe cognitive or communicative problems	At stroke unit of hospital T1: 3 months T2: 12 months	Therapists with background in nursing and psychology	Primary outcomes: 1. Proportion of patients with normal mood at 12 months (GHQ-28) Secondary outcomes: 2. Depression (Yale)	Mood: Improvement at T2: More normal mood in IG (54.3%) than CG (42.6%) (p = 0.020). Depression: No statistically significant improvement at T2.
Wichowicz et al. (2017) Poland	IG: Solution Focused (Brief) Therapy (SFBT) CG: No psychotherapeutic interventions	RCT 85%	5-28 days after stroke n = 62 (30 IG/32 CG) Stroke patients recruited from clinic of adult neurology, without cognitive or communicative problems 14 days after discharge from hospital	Not clearly described T0: baseline T1: 7 weeks T2: 12 weeks	Therapists	Primary outcomes: 1. Symptoms of depression and anxiety (HADS)	Depression: Improvement at T2: Δ -5.0 IG vs Δ + 1.0 CG (p < 0.01). Anxiety: Improvement at T2: Δ -6.0 IG vs Δ + 0.5 CG (p < 0.01).

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References Country	Intervention Control	Design Quality score	Participants n (per group), Condition and Time after stroke	Setting of delivery Time measurements	Interventionist	Psychosocial outcomes	Findings
Williams et al. (2007) United States of America	IG: Activate-Initiate-Monitor Intervention CG: Care as usual	Prospective, randomized, outcome-blinded trial 77%	n = 188 (94 IG/94 CG) Stroke patients recruited from hospital, without severe cognitive or communicative problems 1–2 months after stroke	Not clearly described T0: baseline T1: 6 weeks T2: 12 weeks	Nurse case managers (supervised by study physicians)	Primary outcomes: 1. Proportion of patients who had achieved significant depression response (HAM-D) Secondary outcomes: 2. Depression remission (HAM-D and PHQ-9) 3. Reduction in depression severity (HAM-D and PHQ-9)	Depression response: Higher in IG (45%) than CG (28%) (HAM-D) at T2 (p = 0.005). Depression remission: Higher in IG (35% HAM-D; 43% PHQ-9) than CG (21% HAM-D; 24% PHQ-9) at T2 (p = 0.01 HAM-D; p = 0.002 PHQ-9). Depression severity: Improvement at T2 (PHQ-9): Δ -8.0 (6.2) IG vs Δ -5.0 (6.4) CG (p = 0.002).
Interventions with partly psychosocial content							
Boter (2004) The Netherlands	IG: Outreach care program CG: not presented	Multicenter RCT 85%	n = 536 (263 IG/273 CG) Stroke patients recruited from university and general hospitals; cognitive or communicative problems not described	At home T1: 6 months after discharge	Stroke nurses	Primary outcomes: 1. Dissatisfaction with care (SASC-19) 2. QoL (SF-36) Secondary outcomes: 3. Anxiety (HADS) 4. Depression (HADS)	Dissatisfaction with care: No statistically significant improvement. QoL: IG has higher score on "Role Emotional" domain of SF-36 (60.1 ± 43.2) than CG (52.3 ± 43.8). Anxiety: Statistically significantly lower anxiety in IG (4) compared to CG (5) at T1. Depression: No statistically significant improvement. Depression: No statistically significant improvement.
Burton and Gibbon (2005) United Kingdom	IG: Follow-up visit by stroke nurse about future follow-up and assessment CG: Care as usual	Pragmatic RCT 62%	6 months after stroke n = 176 (87 IG/89 CG) Stroke patients recruited from district general hospital or generic rehabilitation unit; cognitive or communicative problems not described	In a variety of clinical settings T0: at entry T1: at 3 months T2: at 12 months	Stroke nurses	Primary outcomes: 1. QoL, mental component (SF-12) 2. Negative emotions (HADS)	QoL: Improvement at T2: Δ + 8.28 IG vs Δ + 3.57 CG (p = 0.02).
Chen et al. (2019a, 2019b) Taiwan	IG: Qigong group and body-mind interactive exercises CG: care as usual	RCT 69%	n = 68 (33 IG/35 CG) Patients after ischemic stroke recruited from medical teaching hospital, without cognitive or communicative problems	At medical teaching hospital T0: baseline T1: 5 days T2: 10 days	Researchers certified for teaching medications and exercises for qi-related healing	Primary outcomes: 1. Social recovery (AAP) 2. Depression (GDS-15) 3. Anxiety (HADS-A) 4. Mastery (Mastery Scale)	Social recovery: Improvement in domestic chores at T1: Δ -14.9 IG vs Δ -25.2 CG (p < 0.05). Improvement in household maintenance at T1: Δ -17.9 IG vs Δ -30.7 CG (p < 0.01). Improvement in social activities at T1: Δ -2.7 IG vs Δ -10.9 CG (p < 0.05). Depression: No statistically significant improvement. Anxiety: No statistically significant improvement. Mastery: No statistically significant improvement. QoL: No statistically significant improvement. Depressive symptoms: Improvement at T1: Δ -8.6 IG vs Δ -1.5 CG (p = 0.01).
Clark et al. (2003) Australia	IG: Information and visits from social worker CG: No intervention	RCT 77%	n = 62 (32 IG/30 CG) Stroke patients recruited from general and rehabilitation hospital, without cognitive or communicative problems	After discharge from hospital T0: baseline T1: 6 months after discharge	Social workers	Primary outcomes: 1. Perceived well-being and symptoms of distress (General Well-Being Schedule) 2. Depressive symptoms (CES-D) 3. HRQoL (SASIP-30)	
Desrosiers et al. (2007) Canada	IG: Program to optimize leisure experiences CG: visit by recreational therapist (not about leisure)	RCT 69%	n = 56 (29 IG/27 CG) Stroke patients recruited from stroke rehabilitation or acute care facility, without cognitive or communicative problems	At home and in community T0: baseline T1: follow up (moment not presented)	Occupational therapists, recreational therapists		

Author (Year)	Study Design	Setting	Participants	Intervention	Comparison	Outcomes	Statistical Results
Dharma et al. (2018)	Quasi experimental design with pre- and post-test control group	At home	n = 80 (40 IG/40 CG)	Stroke patients recruited from hospital, without complex stroke conditions or severe disability, cognitive or communicative problems not described	Stroke patients recruited from hospital, without complex stroke conditions or severe disability, cognitive or communicative problems not described	1. QoL (SSQoL-12)	QoL: Improvement at T3: Δ + 3.02 IG vs Δ + 0.12 CG (p < 0.05).
Faulkner et al. (2015)	Single center, randomized parallel-group clinical trial	At hospital neurology department	1 month after discharge n = 60 (30 IG/30 CG)	Patients with TIA or non-disabling stroke recruited from hospital neurology department; cognitive or communicative problems not described	Patients with TIA or non-disabling stroke recruited from hospital neurology department; cognitive or communicative problems not described	1. Psychosocial health (SF-36) Secondary outcomes: 2. HRQoL (SF-36) 3. Anxiety and depression (HADS) 4. Mood (Profile of Mood States)	Psychosocial health: No statistically significant improvement. HRQoL: No statistically significant improvement. Anxiety and depression: No statistically significant improvement. Mood: Improvement only in fatigue at T2: Δ-1.4 IG vs Δ + 2.4 CG (p < 0.05).
Fens et al. (2014)	Non-randomized controlled trial	At regional stroke service	n = 117 (62 IG/55 CG)	Stroke patients recruited at discharge from hospital or inpatient rehabilitation; cognitive or communicative problems not described	Stroke patients recruited at discharge from hospital or inpatient rehabilitation; cognitive or communicative problems not described	1. QoL (SASIP-30) Secondary outcomes: 2. Depression and anxiety (HADS)	QoL: No statistically significant improvement. Anxiety: No statistically significant improvement. Depression: Statistically significant improvement at T2: Δ 3 IG vs Δ-6 CG (p = 0.048).
Forster et al. (2015)	Pragmatic, multicenter, cluster RCT	In community	n = 800 (401 IG/399 CG)	Stroke patients recruited via community-based stroke care coordinators, regardless of cognitive or communicative problems	Stroke patients recruited via community-based stroke care coordinators, regardless of cognitive or communicative problems	1. Psychosocial well-being at 6 months post stroke (GHQ-12) Secondary outcomes: 2. Psychosocial well-being at 12 months (GHQ-12)	Psychosocial well-being at 6 months: No statistically significant improvement. Psychosocial well-being at 12 months: No statistically significant improvement. Unmet stroke needs: No statistically significant improvement
Graven et al. (2016)	RCT	At home	n = 110 (56 IG/54 CG)	Stroke patients recruited from inpatient rehabilitation hospital sites, regardless of cognitive and communicative problems	Stroke patients recruited from inpatient rehabilitation hospital sites, regardless of cognitive and communicative problems	1. Level of severity of depressive symptoms (GDS-15)	Depression: The proportion of caseness with depression was statistically significantly lower in the IG (7) than in the CG (16) at T2 (p = 0.023).
Hackett et al. (2013)	Randomized trial	At home	n = 201 (100 IG/101 CG)	Stroke patients recruited from stroke units, with HADS-D ≥ 8; cognitive or communicative problems not described	Stroke patients recruited from stroke units, with HADS-D ≥ 8; cognitive or communicative problems not described	1. Depression (HADS-D and PHQ-9) Secondary outcomes: 2. Anxiety (HADS-A) 3. Common psychopathology symptoms (HADS) 4. HRQoL (AQoL)	Depression: No statistically significant improvement. Anxiety: No statistically significant improvement. HRQoL: No statistically significant improvement.

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References Country	Intervention Control	Design Quality score	Participants n (per group), Condition and Time after stroke	Setting of delivery Time measurements	Interventionist	Psychosocial outcomes	Findings
Harwood et al. (2012) New Zealand	IG1: DVD with inspirational stories IG2: Take Charge Sessions (TCS) IG3: DVD + TCS CG: Written information	Prospective, multicenter randomized parallel group 2 × 2 intervention trial 62%	n = 172 (48 IG/146 CG) Stroke patients recruited from hospital; cognitive or communicative problems not described	In community T0: baseline T1: 6 months T2: 12 months	Research assistants	Primary outcomes: 1. Self-rated HRQoL after 12 months (SF-36)	HRQoL at 12 months: No statistically significant improvement. HRQoL at 6 months: No statistically significant improvement.
Hoffmann et al. (2007) Australia	IG: 'What you need to know about stroke' system CG: Usual education practice and 3 stroke fact sheets	RCT 85%	n = 138 (69 IG/69 CG) Patients with stroke or TIA recruited from acute stroke unit of metropolitan hospital, with adequate communication status; cognitive problems not described	At acute stroke unit of metropolitan hospital T0: baseline T1: 3 months after discharge	Research nurses	Primary outcomes: 1. Anxiety and depression (HADS)	Anxiety: Improvement for CG at T1; Δ-0.1 IG vs Δ-1.5 CG (p = 0.03). Depression: No statistically significant improvement.
Kim et al. (2020) Korea	IG: Smart Aftercare (mobile health care system) CG: Usual education practice and 3 stroke fact sheets	Single-arm interventional study 55%	n = 99 Patients with ischemic or hemorrhagic stroke recruited from a university medical center; cognitive or communicative problems not described	At a clinic T0: baseline T1: 4 weeks T2: 12 weeks	Clinicians	Primary outcomes: 1. Depression (BDI) 2. HRQoL (EQ-5D)	Depression: Improvement at T1; Δ-1.57 (p = 0.01). Improvement at T2; Δ-2.07 (p < 0.001). HRQoL: No statistically significant improvement.
Koortker et al. (2017) The Netherlands	IG: Augmented cognitive behavioral therapy intervention and goal-directed real-life activity training CG: Computerized cognitive training	Multicenter RCT 85%	n = 61 (31 IG/30 CG) Stroke patients recruited from rehabilitation center or hospital rehabilitation departments, with HADS ≥ 7, only mild cognitive problems and no communicative problems 3 months after stroke	At rehabilitation center/hospital rehabilitation departments T0: baseline T1: 4 months after intervention T2: 8 months	Certified health care psychologists	Primary outcomes: 1. Severity of depressive symptoms (HADS-D) Secondary outcomes: 2. Symptoms of anxiety (HADS-A) 3. Aspects of mood (PSDRS) 4. Coping (UPCC) 5. QoL (SSQoL) 6. Social participation (USERP) 7. Subjective well-being (LS2)	All outcomes: No statistically significant improvement.
Li and Liu (2022) China	IG: Reminiscence therapy CG: Care as usual	RCT 76%	n = 216 (108 IG/108 CG) Patients with acute ischemic stroke recruited from hospital, without cognitive impairment 6 months after stroke	At rehabilitation center T0: baseline T1: 3 months T2: 6 months T3: 9 months T4: 12 months	Trained nurses	Primary outcomes: 1. Anxiety (HADS + SAS) 2. Depression (HADS + SDS)	Anxiety (HADS): No statistically significant improvement. Anxiety (SAS): Lower anxiety in IG vs CG at T4 (p = 0.014). Depression (HADS): Lower depression in IG vs CG at T4 (p = 0.020). Depression (SDS): Lower depression in IG vs CG at T3 (p = 0.008) and T4 (p < 0.001). Mood: No statistically significant improvement. QoL: No statistically significant improvement. Satisfaction with knowledge on stroke/stroke care: Improvement for satisfaction with emotional support at T1; Median 3 IG vs Median 2 CG (p = 0.02).
Lincoln et al. (2004) United Kingdom	IG: Coordinated multidisciplinary rehabilitation care by the community stroke team CG: Care as usual	RCT 54%	n = 421 (188 IG/232 CG) Stroke patients recruited from community stroke services; cognitive or communicative problems not described 6 months after stroke	At community stroke services T1: 6 months	Multidisciplinary team (occupational therapists, physiotherapists, speech and language therapists, mental health nurses, rehabilitation support workers)	Primary outcomes: 1. Mood (GHQ-12) 2. QoL (Euroqol thermometer) 3. Satisfaction with care (rating)	Mood: No statistically significant improvement. QoL: No statistically significant improvement. Satisfaction with knowledge on stroke/stroke care: Improvement for satisfaction with emotional support at T1; Median 3 IG vs Median 2 CG (p = 0.02).

Messina et al. (2020) Italy	IG: The Look After Yourself (LAY) intervention CG: Care as usual	Two-arm quasi experimental study 67%	n = 146 (56 IG/90 CG) Patients with first ever stroke recruited from a rehabilitation unit of a hospital, without severe cognitive impairment or severe communication disability	At inpatient rehabilitation unit of a hospital T0: within a week from enrolment T1: within a week before discharge T2: 2 months after discharge In community or hospital	Physiotherapists, psychiatrists, nurses	Primary outcomes: 1. Self-efficacy (SSEQ) Secondary outcomes: 2. HRQoL (SF-12) 3. Depression (GDS)	Self-efficacy: No statistically significant improvement. HRQoL: Higher score on mental component in IG vs CG (p = 0.045). Depression: No statistically significant improvement.
Mitchell et al. (2009) United States of America	IG: Psychosocial-behavioral intervention CG: Care as usual	Randomized treatment efficacy study with control 69%	n = 101 (48 IG/53 CG) Stroke patients recruited from acute care hospital, cognitive or communicative problems not described Within 4 months after stroke	In community or hospital T0: at entry T1: after intervention (at 9 weeks) T2: at 21 weeks T3: 12 months T4: 24 months In rehabilitation center	Nurses	Primary outcomes: 1. Severity of depression/depressive symptoms at 12 months (GDS and DISH and HRSD)	Severity of depression: Improvement at T1: Δ -9.8 (\pm 4.9) IG vs Δ -3.6 (\pm 5.6) CG (p < 0.001). Improvement at T3: Δ -9.2 (\pm 5.7) IG vs Δ -6.2 (\pm 6.4) CG (p = 0.023). Participation: No statistically significant improvement.
Mohammadi et al. (2022) Iran	IG: Partnership Care Model (PCM) CG: Care as usual	Single-blinded RCT 69%	n = 67 (31 IG/36 CG) Stroke patients at least 2 weeks after stroke recruited from a neurology clinic, without aphasia n = 80 (41 IG/39 CG) Acute ischemic stroke patients recruited from hospital, less than a week after stroke, without aphasia or cognitive decline	At hospital T0: baseline T1: 3 months T2: 6 months At hospital T0: baseline T1: 2 weeks T2: 1 month T3: 3 months	Physicians, nurses Psychological therapists, research assistants, nurses	Primary outcomes: 1. QoL (SS-QOL) Primary outcomes: 1. Depression (HAM-D)	QoL: Improvement at T1: Δ + 41.39 IG vs Δ -5.14 CG (p < 0.05). Improvement at T2: Δ + 74.49 IG vs Δ + 10.66 CG (p < 0.05). Depression: Improvement at T2: Δ -7.34 IG vs Δ -5.18 CG (p = 0.018). Improvement at T3: Δ -8.37 IG vs Δ -6.25 CG (p = 0.001).
Peng et al. (2015) China	IG: Neuro-Linguistic Programming CG: Care as usual	RCT 69%	n = 180 (90 IG/90 CG) Stroke patients recruited from hospital, without cognitive or communicative problems Within 3 months after stroke	At hospital T1: after intervention T2: after 6 months	Not presented	Primary outcomes: 1. Prevalence of depression (HAM-D) 2. Prevalence of anxiety (HAM-A)	Depression: Improvement at T1: Δ -36% IG vs Δ -19% CG (p = 0.003). No statistically significant improvement at T2. Anxiety: Improvement at T1: Δ -34% IG vs Δ -9% CG (p = 0.016). No statistically significant improvement at T2.
Reeves et al. (2019) United States of America	IG1: Home-based social worker-led case management (SWCM) program IG2: SWCM + information website CG: Care as usual IG: WE CALL multimodal support intervention CG: YOU CALL	Open, unblinded, 3-group parallel-design clinical trial 69%	n = 256 (88 IG1/90 IG2/87 CG) Acute stroke patients recruited from stroke centers, regardless of cognitive and communicative problems n = 186 (92 IC/94 CG) Stroke patients recruited from acute care hospital, without moderate to severe cognitive problems Within 6 months after stroke	At home and via telephone T1: 7 days after return to home T2: after 90 days In community T0: baseline T1: 6 months after stroke T2: 12 months	Trained social workers Trained healthcare professionals	Secondary outcomes: 2. Depression (PHQ-9) 3. Anxiety (Neuro-QoL anxiety) Primary outcomes: 1. QoL (Quality of Life Index and EQ-5D) Secondary outcomes: 2. Depressive symptoms (BDI-II) 3. Participation (LIFE-H)	QoL: Improvement: higher QoL in IG vs CG (Z = 2.58, p = 0.010) at T1 and (Z = -3.24, p < 0.001) at T2. PROMIS-GMH: No statistically significant improvement. Depression: No statistically significant improvement. Anxiety: No statistically significant improvement.

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Table 2 (continued)

References Country	Intervention Control	Design Quality score	Participants n (per group), Condition and Time after stroke	Setting of delivery Time measurements	Interventionist	Psychosocial outcomes	Findings
Tilling et al. (2005) United Kingdom	IG: Employment of Family Support Organizer (FSO) CG: Care as usual	Single-blind RCT 69%	n = 340 (170 IG/170 CG) Patients with first stroke recruited from hospitals and community care; cognitive or communicative problems not described	Not clearly described T1: at 3 months T2: at 12 months	Family support organizers	Primary outcomes: 1. Patient satisfaction with services (PSS) Secondary outcomes: 2. Depression (HADS) 3. Impact of stroke on everyday life (modified RNLJ) 4. Satisfaction with stroke care (PSS)	Patient satisfaction and satisfaction with stroke care: No statistically significant improvement. Depression: No statistically significant improvement. Impact on everyday life: No statistically significant improvement.
Tsai et al. (2022) Taiwan	IG: Specific Thematic Nursing Care Action Modules (STNC-AM) CG: Care as usual	Non-randomized controlled trial 78%	n = 44 (20 IG/24 CG) Stroke patients with ischemic or hemorrhagic stroke recruited from a rehabilitation ward of a hospital, who are able to communicate verbally	At a rehabilitation ward of a hospital T0: baseline T1: 1 month after discharge T2: 2 months after discharge	Nurses	Primary outcomes: 1. Depression (HADS) 2. Anxiety (HADS) 3. Resilience (RS)	Depression: Lower depression in IG (Hackett and Pickles, 2014) vs CG (Cai et al., 2019) at T1 (p = 0.038) and in IG (Hackett and Pickles, 2014) vs CG (Jørgensen et al., 2016) at T2 (p = 0.033). Anxiety: No improvement. Resilience: Higher in IG 141(122–159) vs CG 118 (98–136) at T2 (p = 0.029).
Wong and Yeung (2015) China	IG: Transitional care programme (TCP) CG: Usual hospital-based physical training programme	RCT 85%	Within 6 months after stroke, while hospitalized n = 108 (54 IG/54 CG) Stroke patients recruited from hospital, with slight to moderate neurological deficits and disability, without cognitive or communicative problems	During and after hospital stay T0: baseline T2: 4 weeks after discharge T3: after intervention T4: 8 weeks after discharge	Nurses with experience in stroke care and in the community	Primary outcomes: 1. QoL (SF-36 and WHO-QOL-SRPB) 2. Patient satisfaction (PSQ-HK) 3. Depressive symptoms (CES-D)	QoL: Statistically significant differences between groups on Mental Components (p = 0.005). Patient satisfaction: At T2 (p < 0.001) and T4 (p < 0.001) statistically significant difference between groups. Depressive symptoms: At T2 (p < 0.001) and T4 (p < 0.001) statistically significant difference between groups.
Xu et al. (2021) China	IG: Mobile phone app-based continuing nursing care CG: Care as usual	Non-randomized controlled trial 67%	After discharge n = 101 (51 IG/50 CG) Stroke patients with cerebral infarction or cerebral hemorrhage recruited in community, without cognitive or communicative disorders	In community T0: baseline T1: after intervention (3 months)	Senior nurses, supervisor nurses, rehabilitation therapists, physicians, researchers	Primary outcomes: 1. Self-efficacy (SE) 2. QoL (SF-36)	Self-efficacy: Improvement at T1: Δ + 29.96 IG vs Δ + 14.48 CG (p < 0.05). QoL: Higher on all components in IG vs CG (p < 0.05).
Yu et al. (2019) China	IG: Psychoeducation and psychonursing: cognitive rehabilitation training; mobile communication application. CG: Care as usual	RCT 77%	n = 242 (121 IG/121 CG) Acute ischemic stroke patients recruited from medical center, without cognitive or communicative problems	At rehabilitation unit T0: baseline T1: at 3 months T2: at 6 months T3: at 12 months 7 days after stroke	Trained nurse team, including rehabilitation specialist	Primary outcomes: 1. Anxiety (HADS-A) 2. Depression (HADS-D)	Anxiety: Improvement from T0 to T3 in change of HADS score: Δ + 0.4 IG vs Δ-0.4 CG (p < 0.001). Depression: Improvement from T0 to T3 in change of HADS score: Δ-1.3 IG vs Δ-0.02 CG (p < 0.001).
Interventions with no psychosocial content Chaiyawat et al. (2009) Thailand	IG: Individual home-based exercise program via CD CG: Care as usual	RCT 69%	n = 60 (30 IG/30 CG) Stroke patients recruited from inpatient wards of university hospital, without cognitive problems	At home T1: 1 month after discharge T2: 2 months T3: 3 months 3 days after stroke	Physical therapists	Primary outcomes: 1. HRQoL (EQ-5D) 2. Depression (HADS)	HRQoL: In IG statistical significantly better at T3 than for CG (p = 0.001). Depression: Improvement at T3: Δ-1.1 IG vs Δ-7.33 CG.

Chou et al. (2009) Taiwan	IG: Electroacupuncture and continuation of rehabilitation CG: Care as usual	RCT single blinded 62%	n = 33 (17 IG/16 CG) Stroke patients recruited from department of rehabilitation medicine with some cognitive impairments, no communicative problems 24–25 months after stroke (range 13–33) n = 26 (14 group A/12 group B) Stroke survivors; recruited from day service for home dwelling stroke survivors T1: at 6 months T2: at 12 months cognitive or communicative problems not described n = 128 (64 IG/64 CG) Stroke patients recruited from hospital, without cognitive problems 6–24 months after stroke n = 75 (35 IG/40 CG) Stroke patients recruited from acute primary hospital; cognitive or communicative problems not described 3, 6 and 12 months after stroke n = 50 (22 IG/22 CG) Stroke patients recruited from inpatient rehabilitation center; cognitive and communicative problems not described n = 145 (38 IG/107 CG) Patients with acute infarction recruited from a neurological ward of a hospital, without aphasia Within 4 h after hospital admission n = 41 (13 IG/13 IG2/15 CG) Patients with chronic stroke recruited from an association for people with acquired brain injury, without cognitive impairment or the inability to follow verbal instructions At least one year after stroke	At department of rehabilitation medicine T0: at baseline T1: 8 weeks At day service for home dwelling stroke survivors T1: at 6 months T2: at 12 months In community T0: baseline T1: at 6 weeks T2: at 3 months Not presented T1: 3 months T2: 6 months T3: 12 months At inpatient rehabilitation center T1: end of intervention At hospital T0: baseline T1: on the day of discharge (7 to 21 days) Not presented T0: baseline T1: after intervention T2: 1 month	Healthcare professionals with experience with stroke and Traditional Chinese medicine Paid employees, organizers, volunteers Trained instructors Physiotherapists Not presented Stroke care nurses, researchers Expert physiotherapists trained in clinical Ai Chi	Primary outcomes: 1. HRQoL (MOS SF-36 and SSQoL) Primary outcomes: 1. QoL (SF-36) 2. Mood (HADS) Primary outcomes: 1. HRQoL (SF-36) Primary outcomes: 1. HRQoL (NHP)	HRQoL: Improvement at T1: $\Delta + 10.65$ IG vs $\Delta - 0.87$ CG ($p = 0.005$). QoL: No statistically significant improvement. Mood: No statistically significant improvement. HRQoL: No statistically significant improvement. HRQoL: No statistically significant improvement. Anxiety: Improvement at T1 in STAI: $\Delta + 3.14$ IG vs $\Delta - 0.1$ CG ($p < 0.0001$). Difference between IG and CG at T1 in HADS-A: 4.7 (3.6) IG vs 8.1 (4.8) CG ($p = 0.02$). Depression: Improvement at T1: $\Delta - 2.8$ IG vs $\Delta - 0.3$ CG ($p < 0.001$). Anxiety: Improvement at T1: $\Delta - 1.8$ IG vs $\Delta - 0.2$ CG ($p < 0.001$). Resilience: Higher resilience in IG1 (143.77 (15.2)) and IG2 (145.87 (9.8)) vs CG (105.59 (9.3)) at T2 ($p < 0.001$). QoL: Higher increase in IG1 and IG2 vs CG.
Gordon et al. (2013) Jamaica	IG: Aerobic exercise program CG: Light massage of affected limbs	Single-blind RCT 62%					
Langhammer et al. (2008) Norway	IG: Intensive physiotherapy CG: Care as usual	Longitudinal randomized controlled stratified trial 77%					
Le Dansour et al. (2019) United States of America	IG: Listening to music CG: Normal routine	Prospective, non-blinded, randomized study 54%					
Lin et al. (2020) Taiwan	IG: Supervised virtual reality (VR) training CG: Care as usual	RCT 62%					
Pérez-de la Cruz (2020) Spain	IG1: Ai Chi aquatic therapy IG2: Dry land therapy + Ai Chi aquatic therapy CG: Dry land therapy	Single-blinded RCT 67%					

Table 2 (continued)

References Country	Intervention Control	Design Quality score	Participants n (per group), Condition and Time after stroke	Setting of delivery Time measurements	Interventionist	Psychosocial outcomes	Findings
Rodríguez-Hernández et al. (2021)	IG: Motor training with virtual reality devices CG: Care as usual	RCT 54%	n = 43 (23 IG/20 CG) Stroke patients recruited from hospital rehabilitation unit; cognitive or communicative problems not described Within 6 months after stroke	Hospital rehabilitation unit T0: baseline T1: after intervention (3 weeks) T2: 3 months	Physiotherapists, occupational therapists	Primary outcomes: 1. HRQoL (EQ-5D-5L + EQ-VAS)	HRQoL (EQ-5D-5L): Improvement at T1 and T2 in IG vs CG for all components, except pain/discomfort. Pain and anxiety increased between T1 and T2 for IG. HRQoL (EQ-VAS): Improvement at T1: Statistically significant improvement in IG ($\Delta + 57.4$) vs CG ($\Delta + 31.5$) ($p = 0.000$). Improvement at T2: Significant improvement in IG ($\Delta + 49.2$) vs CG ($\Delta + 33.0$) ($p = 0.000$). Mood: Improvement at T1: $\Delta - 0.84$ (1.65) in IG ($p = 0.002$). Depression: No statistically significant improvement.
Rushing et al. (2022) United States of America	IG: Active Music Therapy (AMT) treatment	Single-arm repeated measures design 67%	n = 44 Patients with first-time acute ischemic stroke recruited from hospital; cognitive or communicative problems not described	University-affiliated teaching hospital T0: hospital admission T1: after treatment T2: at discharge	Music therapists	Primary outcomes: 1. Change in mood (Faces Scale) Secondary outcomes: 2. Depression (PHIQ-9)	
Soh et al. (2020) Korea	IG: Skater exercises CG: Care as usual	Single-blinded RCT 62%	Within two weeks after hospital admission n = 36 (18 IG/18 CG) Patients with minor stroke recruited from outpatient rehabilitation clinic of a hospital, without cognitive deficits or aphasia n = 24 (12 IG/12 CG)	Outpatient rehabilitation clinic of a hospital T0: baseline T1: 12 weeks T2: 16 weeks Not presented	Skilled physical therapists, physiatrists	Primary outcomes: 1. Change in HRQoL (EQ-5D)	HRQoL: Improvement at T1: Statistically significant improvement in IG ($\Delta + 12$) vs CG ($\Delta + 1.0$) ($p < 0.001$). Improvement at T2: Statistically significant improvement in IG ($\Delta + 13.4$) vs CG ($\Delta + 1.7$) ($p < 0.001$).
Verna et al. (2020) Italy	IG: Listening to music with mismatches to identify mismatches CG: Listening to music without mismatches	Two-arm, single-blinded RCT 62%	Stroke patients with unilateral hemiplegia recruited from an institute for research and health care, without cognitive deficits At most 6 months after stroke	T0: baseline T1: 4 weeks Not presented	Not presented	Primary outcomes: 1. QoL (SSQoL)	QoL: Improvement at T1: Statistically significant improvement in IG ($\Delta + 25.16$) vs CG ($\Delta + 7.08$) ($p = 0.017$).

2012; Lincoln et al., 2004; Le Danseur et al., 2019; Fens et al., 2014; Chen et al., 2020; Kalav et al., 2022; Lin et al., 2019; Kim et al., 2020; Rodríguez-Hernández et al., 2021), forty-two studies had a quality rating between 62% and 78% (Golding et al., 2016; Forster et al., 2015; Harwood et al., 2012; Burton and Gibbon, 2005; Gordon et al., 2013; Chou et al., 2009; Corr et al., 2004; Majumdar and Morris, 2019; Kirkness et al., 2017; Watkins et al., 2007; Watkins et al., 2011; Peng et al., 2015; Rochette et al., 2013; Mitchell et al., 2009; Reeves et al., 2019; Chen et al., 2019a; Desrosiers et al., 2007; Tilling et al., 2005; Chaiyawat et al., 2009; Hjelle et al., 2019; Williams et al., 2007; Faulkner et al., 2015; Hackett et al., 2013; Yu et al., 2019; Clark et al., 2003; Langhammer et al., 2008; Dharma et al., 2018; Bragstad et al., 2020; Cheng et al., 2021; Guillaumier et al., 2022; Minshall et al., 2020; Li and Liu, 2022; Messina et al., 2020; Mohammadi et al., 2022; Niu et al., 2022; Tsai et al., 2022; Xu et al., 2021; Lin et al., 2020; Pérez-de la Cruz, 2020; Rushing et al., 2022; Soh et al., 2020; Verna et al., 2020), and nine studies had a quality rating between 85% and 92% (Visser et al., 2016; Wichowicz et al., 2017; Wong and Yeung, 2015; Hoffmann et al., 2007; Boter, 2004; Kootker et al., 2017; Graven et al., 2016; Hill et al., 2019; Orman et al., 2022). Fig. 1 illustrates the process of article selection.

3.1. Study characteristics

The study characteristics are presented in Table 2. Of the included studies 52 were randomized controlled trials (RCT), three were non-randomized controlled trials (Fens et al., 2014; Tsai et al., 2022; Xu

et al., 2021), four were quasi-experimental studies (Kim et al., 2020; Dharma et al., 2018; Messina et al., 2020; Rushing et al., 2022), and one a randomized cross-over study (Corr et al., 2004).

In total, 9,808 patients participated in the 60 included studies, with sample sizes ranging from 21 (Golding et al., 2016) to 800 participants (Forster et al., 2015). In the majority of the studies a description was given of the type of stroke (80%), patients were recruited at hospital (67%), and the intervention was delivered in hospital (33%). In most studies (60%) patients with (severe) cognitive and/or communicative impairments were excluded; in five articles (8%) patients were included regardless of (some) cognitive and/or communicative impairments.

The most frequently used psychosocial outcome – primary or secondary – was depression (65%) (Smith et al., 2012; Fens et al., 2014; Chen et al., 2020; Lin et al., 2019; Kim et al., 2020; Burton and Gibbon, 2005; Majumdar and Morris, 2019; Kirkness et al., 2017; Watkins et al., 2007; Watkins et al., 2011; Peng et al., 2015; Rochette et al., 2013; Mitchell et al., 2009; Reeves et al., 2019; Desrosiers et al., 2007; Tilling et al., 2005; Chaiyawat et al., 2009; Hjelle et al., 2019; Williams et al., 2007; Faulkner et al., 2015; Hackett et al., 2013; Yu et al., 2019; Clark et al., 2003; Bragstad et al., 2020; Cheng et al., 2021; Minshall et al., 2020; Li and Liu, 2022; Messina et al., 2020; Niu et al., 2022; Tsai et al., 2022; Lin et al., 2020; Rushing et al., 2022; Visser et al., 2016; Wichowicz et al., 2017; Wong and Yeung, 2015; Hoffmann et al., 2007; Boter, 2004; Kootker et al., 2017; Graven et al., 2016), followed by quality of life (30%) (Lincoln et al., 2004; Fens et al., 2014; Chen et al., 2020; Kalav et al., 2022; Corr et al., 2004; Peng et al., 2015; Rochette et al., 2013; Chen et al., 2019a; Dharma et al., 2018; Minshall et al., 2020; Mohammadi et al., 2022; Xu et al., 2021; Pérez-de la Cruz, 2020; Verna et al., 2020; Wong and Yeung, 2015; Boter, 2004; Kootker et al., 2017; Orman et al., 2022), anxiety (28%) (Le Danseur et al., 2019; Fens et al., 2014; Majumdar and Morris, 2019; Peng et al., 2015; Reeves et al., 2019; Faulkner et al., 2015; Hackett et al., 2013; Yu et al., 2019; Clark et al., 2003; Cheng et al., 2021; Minshall et al., 2020; Li and Liu, 2022; Lin et al., 2020; Wichowicz et al., 2017; Hoffmann et al., 2007; Boter, 2004; Kootker et al., 2017), health-related quality of life (28%) (Kim et al., 2020; Rodríguez-Hernández et al., 2021; Harwood et al., 2012; Gordon et al., 2013; Chou et al., 2009; Majumdar and Morris, 2019; Desrosiers et al., 2007; Chaiyawat et al., 2009; Hjelle et al., 2019; Faulkner et al., 2015; Hackett et al., 2013; Yu et al., 2019; Clark et al., 2003; Cheng et al., 2021; Minshall et al., 2020; Li and Liu, 2022; Lin et al., 2020; Wichowicz et al., 2017; Hoffmann et al., 2007; Boter, 2004; Kootker et al., 2017), patient satisfaction (12%) (Lincoln et al., 2004; Kalav et al., 2022; Tilling et al., 2005; Cheng et al., 2021; Tsai et al., 2022; Wong and Yeung, 2015; Boter, 2004), and mood (10%) (Golding et al., 2016; Watkins et al., 2007; Watkins et al., 2011; Faulkner et al., 2015; Rushing et al., 2022; Kootker et al., 2017). Other psychosocial outcomes reported were self-efficacy (Kalav et al., 2022; Minshall et al., 2020; Messina et al., 2020; Xu et al., 2021), impact of stroke on everyday life (Mitchell et al., 2009; Tilling et al., 2005; Tsai et al., 2022; Hill et al., 2019), psychosocial well-being (Forster et al., 2015; Hjelle et al., 2019; Bragstad et al., 2020), mood disorder (Lincoln et al., 2004; Corr et al., 2004; Hill et al., 2019), participation (Rochette et al., 2013; Mitchell et al., 2009; Graven et al., 2016), coping (Minshall et al., 2020; Kootker et al., 2017), sense of coherence (Hjelle et al., 2019; Bragstad et al., 2020), mastery (Smith et al., 2012; Clark et al., 2003), fatigue (Faulkner et al., 2015; Bragstad et al., 2020), resilience (Tsai et al., 2022; Pérez-de la Cruz, 2020), psychosocial health (Faulkner et al., 2015), global mental health (Reeves et al., 2019), negative emotions (Chen et al., 2019a), perceived well-being and symptoms of distress (Desrosiers et al., 2007), mental well-being (Majumdar and Morris, 2019), common symptoms of psychopathology (Hackett et al., 2013), hope (Majumdar and Morris, 2019), self-esteem (Smith et al., 2012), social support (Smith et al., 2012), and social recovery (Clark et al., 2003). In twenty-one of the studies (35%), no clear

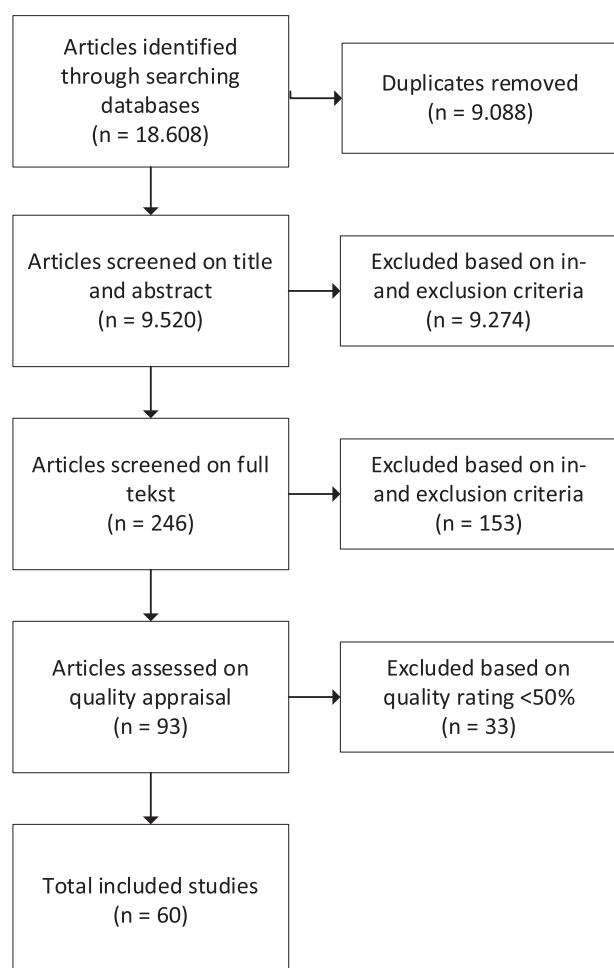


Fig. 1. Flowchart of selection of articles.

Table 3

Components of included interventions *Study shows positive effect on one or more psychosocial outcomes; **Study shows no effect or negative effect on psychosocial outcomes; + Reminiscence therapy, music therapy, or sending a postcard.

	Topics									
	Consequences/problems after stroke	Risk factors and secondary prevention	Recovery	Medication management	Emotions	Mood	Coping	Self-management	Values and needs	
Interventions with clear psychosocial content										
Bragstad et al. (2020)**					X		X	X	X	X
Chen et al. (2020)*					X	X				X
Cheng et al. (2021)*							X			
Golding et al. (2016)*										
Guillaumier et al. (2022)*					X	X				
Hill et al. (2019)**	X						X			
Hjelle et al. (2019)**					X		X	X		X
Kalav et al. (2022)*	X	X								
Kirkness et al. (2017)**						X				
Lin et al. (2019)*										
Majumdar & Morris (2019)*							X	X		X
Minshall et al. (2020)**			X	X				X		X
Orman et al. (2022)**		X		X		X				
Smith et al. (2012)**					X		X	X		X
Visser et al. (2016)**	X									
Watkins et al. (2007)*			X				X	X		X
Watkins et al. (2011)*			X				X	X		X
Wichowicz et al. (2017)*										
Williams et al. (2007)*						X				
Interventions with partly psychosocial content										
Boter (2004)*	X	X					X	X		X
Burton and Gibbon (2005)**	X	X		X			X			
Chen et al. (2019a, 2019b)*										
Clark et al. (2003)*	X	X					X			
Desrosiers et al. (2007)*								X		X
Dharma et al. (2018)*	X	X					X			
Faulkner et al. (2015)*		X		X	X		X	X		
Fens et al. (2014)*	X	X			X					
Forster et al. (2015)**	X									
Graven et al. (2016)*			X					X		X
Hackett et al. (2013)**										
Harwood et al. (2012)**		X	X		X		X			
Hoffmann et al. (2007)**	X	X	X							
Kim et al. (2020)*				X						
Kootker et al. (2017)**										
Li and Liu (2022)*										
Lincoln et al. (2004)*										
Messina et al. (2020)*			X	X	X			X		
Mitchell et al. (2009)*			X	X		X				
Mohammadi et al. (2022)*	X		X	X						
Niu et al. (2022)*					X		X			X
Peng et al. (2015)*	X	X			X	X				
Reeves et al. (2019)**				X	X			X		
Rochette et al. (2013)**		X								
Tilling et al. (2005)**		X								
Tsai et al. (2022)*		X	X	X	X		X	X		
Wong and Yeung (2015)*	X	X		X	X		X	X		
Xu et al. (2021)*	X	X		X	X		X	X		
Yu et al. (2019)*			X			X	X	X		
Interventions with no psychosocial content										
Chaiyawat et al. (2009)*										
Chou et al. (2009)*										
Corr et al. (2004)**										
Gordon et al. (2013)**										
Langhammer et al. (2008)**										
Le Danseur et al. (2019)*										
Lin et al. (2020)*										
Pérez-de la Cruz (2020)*										
Rodríguez-Hernández et al. (2021)*										
Rushing et al. (2022)*										
Soh et al. (2020)*										
Verna et al. (2020)*										

distinction was made between primary and secondary outcomes (Lincoln et al., 2004; Chen et al., 2020; Lin et al., 2019; Kim et al., 2020; Burton and Gibbon, 2005; Chou et al., 2009; Corr et al., 2004; Chaiyawat et al., 2009; Clark et al., 2003; Langhammer et al., 2008; Dharma et al., 2018; Cheng et al., 2021; Li and Liu, 2022; Mohammadi et al., 2022; Niu et al., 2022; Tsai et al., 2022; Xu et al., 2021; Lin et al., 2020; Pérez-de la Cruz, 2020; Verna et al., 2020; Hoffmann et al., 2007).

3.2. Intervention characteristics of all articles included

Almost all included articles described different interventions (see Table 2). A thorough description of the interventions is given in Table 3, which illustrates the intervention components. By intervention components we mean intervention topics – those topics of content that are included in each separate intervention – and methods of delivery – the way the topics of each intervention are delivered to

Goals	Participation	Mindfulness	Life after stroke	Social support	Problem-solving	Methods							
						Active information	Passive information	Physical (exercise)	Coordination of care	Relaxation	Pharmaceutical treatment	Other methods ⁺	
X			X	X X	X	X X		X					X
X X X			X	X X	X X	X X X			X				
X				X X	X X	X X		X			X		
X X		X	X		X	X X		X					
				X	X	X X				X			
X X X			X			X X X X						X	
				X	X	X X		X X	X X				
			X	X		X X X		X X		X			
X X	X X		X		X	X X			X				X
X	X		X X			X X	X	X					
X	X		X			X		X		X			X
X	X		X		X	X X X X X		X X X X	X X		X X	X	
		X		X X		X X X X X		X X X X	X X				
			X	X X		X X X X X		X X X X	X				
X								X X					X
								X X X X		X			
								X					X

stroke patients. The presented topics were: consequences/problems after stroke, risk factors and secondary prevention, recovery, medication management, emotions, mood, coping, self-management, values and needs, goals, participation, mindfulness, life after stroke, social support, and problem-solving. The methods of delivery used in the included interventions were: active information, where information is given in interaction between provider and patient, with focus on clarification and/or reinforcement of information (Forster

et al., 2012); passive information, where information is given only once, without further interaction between provider and patient (Forster et al., 2012); physical (exercise); coordination of care, where participants are referred to the appropriate care; relaxation, pharmaceutical treatment, and other methods (i.e. reminiscence therapy, music therapy, and sending a postcard).

All included interventions can be divided over three categories based on the focus of their content. Nineteen of the included

interventions had a clear psychosocial content (Smith et al., 2012; Chen et al., 2020; Kalav et al., 2022; Lin et al., 2019; Golding et al., 2016; Majumdar and Morris, 2019; Kirkness et al., 2017; Watkins et al., 2007; Watkins et al., 2011; Hjelle et al., 2019; Williams et al., 2007; Bragstad et al., 2020; Cheng et al., 2021; Guillaumier et al., 2022; Minshall et al., 2020; Visser et al., 2016; Wichowicz et al., 2017; Hill et al., 2019; Orman et al., 2022), as indicated by the sole presence of topics mentioned above. Twenty-nine interventions had a partly psychosocial content (Lincoln et al., 2004; Fens et al., 2014; Kim et al., 2020; Forster et al., 2015; Harwood et al., 2012; Burton and Gibbon, 2005; Peng et al., 2015; Rochette et al., 2013; Mitchell et al., 2009; Reeves et al., 2019; Chen et al., 2019a; Desrosiers et al., 2007; Tilling et al., 2005; Faulkner et al., 2015; Hackett et al., 2013; Yu et al., 2019; Clark et al., 2003; Dharma et al., 2018; Li and Liu, 2022; Messina et al., 2020; Mohammadi et al., 2022; Niu et al., 2022; Tsai et al., 2022; Xu et al., 2021; Wong and Yeung, 2015; Hoffmann et al., 2007; Boter, 2004; Kootker et al., 2017; Graven et al., 2016), since these contain both topics from Table 3 and other content – such as physical exercise. Twelve interventions barely contained the described topics, but only consisted of physical exercise or relaxation (Le Danseur et al., 2019; Rodríguez-Hernández et al., 2021; Gordon et al., 2013; Chou et al., 2009; Corr et al., 2004; Chaiyawat et al., 2009; Langhammer et al., 2008; Lin et al., 2020; Pérez-de la Cruz, 2020; Rushing et al., 2022; Soh et al., 2020; Verna et al., 2020). These twelve interventions were considered not to have a psychosocial content.

Of the included interventions, twenty-four (40%) were delivered by nurses. Mostly interventions with a clear psychosocial content or partly psychosocial content were delivered by nurses. Of the interventions without psychosocial content one was provided by nurses. In other interventions the interventionists were other healthcare professionals or a multidisciplinary team, or the interventionist was not clearly presented.

3.3. Intervention characteristics of effective interventions

All of the intervention topics that are described in Table 3 were represented in the effective interventions. Although 40 articles showed positive effects, here we describe the intervention topics of 39 effective interventions since the two articles Watkins et al. (2007) and Watkins et al. (2011) both presented the same intervention. Intervention topics that were most frequently included in interventions that showed positive effects on psychosocial outcomes were coping ($n = 12$, 31%), risk factors and secondary prevention ($n = 10$, 26%), and emotions ($n = 10$, 26%). This was followed by consequences after stroke ($n = 9$, 23%), self-management ($n = 9$, 23%), recovery ($n = 9$, 23%), values and needs ($n = 8$, 21%), goals ($n = 7$, 18%), mood ($n = 7$, 18%), social support ($n = 6$, 15%), medication management ($n = 6$, 15%), life after stroke ($n = 5$, 13%), problem-solving ($n = 3$, 8%), participation ($n = 3$, 8%), and mindfulness ($n = 2$, 5%). Furthermore, the most commonly used methods of delivery in effective interventions were active information ($n = 23$, 59%), followed by physical (exercise) ($n = 17$, 44%), coordination of care ($n = 7$, 18%), passive information ($n = 6$, 15%), relaxation ($n = 6$, 15%), other methods ($n = 4$, 10%), and pharmaceutical treatment ($n = 2$, 5%).

3.4. Outcomes of the effective interventions

Of the 60 included studies, 39 interventions showed a positive effect on psychosocial outcomes, one showed a negative effect on psychosocial outcomes, and nineteen showed no effect on psychosocial outcomes. Positive effects were found on the following outcomes: depression, quality of life, anxiety, health-related quality of life, patient satisfaction, mood, resilience, social recovery, fatigue, hope, and self-efficacy. Negative effects were found for anxiety.

3.4.1. Depression

Twenty interventions (33%) showed a statistically significant decrease in severity of depression. Of all interventions with a clear psychosocial content 32% showed a positive effect on depression (Chen et al., 2020; Lin et al., 2019; Majumdar and Morris, 2019; Watkins et al., 2007; Williams et al., 2007; Wichowicz et al., 2017), followed by 41% of the interventions with a partly psychosocial content (Fens et al., 2014; Kim et al., 2020; Peng et al., 2015; Mitchell et al., 2009; Desrosiers et al., 2007; Yu et al., 2019; Li and Liu, 2022; Niu et al., 2022; Tsai et al., 2022; Wong and Yeung, 2015; Graven et al., 2016), and 17% of the interventions without a psychosocial content (Chaiyawat et al., 2009; Lin et al., 2020).

3.4.2. Quality of life

Ten interventions (17%) showed a positive effect on quality of life. Of all interventions without a psychosocial content 25% showed a positive effect (Chaiyawat et al., 2009; Pérez-de la Cruz, 2020; Verna et al., 2020), followed by 21% of the interventions with a partly psychosocial content (Peng et al., 2015; Chen et al., 2019a; Dharma et al., 2018; Mohammadi et al., 2022; Xu et al., 2021; Boter, 2004). Only one intervention with a clear psychosocial content showed a positive effect on quality of life (Chen et al., 2020).

3.4.3. Anxiety

Nine interventions (15%) showed a statistically significant decrease in severity of anxiety. Of all interventions without a psychosocial content 17% showed a positive effect (Le Danseur et al., 2019; Lin et al., 2020), followed by 16% of the interventions with a clear psychosocial content (Golding et al., 2016; Cheng et al., 2021; Wichowicz et al., 2017) and 14% of the interventions with a partly psychosocial content (Peng et al., 2015; Yu et al., 2019; Li and Liu, 2022; Boter, 2004). One intervention with a partly psychosocial content (3%) showed a negative effect on severity of anxiety, as anxiety decreased more in the control group than in the intervention group (Hoffmann et al., 2007).

3.4.4. Health-related quality of life

Five interventions (8%) showed statistically significant increases in health-related quality of life. Of the interventions without a psychosocial content 25% showed a positive effect (Rodríguez-Hernández et al., 2021; Chou et al., 2009; Langhammer et al., 2008; Soh et al., 2020). Of the interventions with a clear psychosocial content and a partly psychosocial content, positive effects were found for only one intervention each (Guillaumier et al., 2022; Messina et al., 2020).

3.4.5. Patient satisfaction

Four interventions (7%) showed statistically significant higher patient satisfaction, of which two had a clearly psychosocial content (Kalav et al., 2022; Cheng et al., 2021) and two had a partly psychosocial content (Lincoln et al., 2004; Tilling et al., 2005; Wong and Yeung, 2015).

3.4.6. Mood

Two interventions, one with a clearly psychosocial content (Watkins et al., 2011) and one without a psychosocial content (Rushing et al., 2022), showed a statistically significant improved mood.

3.4.7. Resilience

Two interventions showed a positive effect on resilience. One intervention with a partly psychosocial content (Tsai et al., 2022) and one intervention without a psychosocial content (Pérez-de la Cruz, 2020).

3.4.8. Social recovery

Only one intervention with a partly psychosocial content showed improved social recovery (Clark et al., 2003).

3.4.9. Fatigue

One intervention with a partly psychosocial content showed statistically significant decrease in fatigue (Faulkner et al., 2015).

3.4.10. Hope

Only one intervention with a clearly psychosocial content showed higher levels of hope (Majumdar and Morris, 2019).

3.4.11. Self-efficacy

One intervention with a partly psychosocial content showed a statistically significant improvement in self-efficacy (Xu et al., 2021).

4. Discussion

This systematic review combines the available evidence regarding interventions to improve psychosocial well-being after stroke. This evidence is of importance since it can be used to further shape stroke care as provided by multidisciplinary teams in stroke care pathways.

In this systematic review, we identified 39 interventions that show positive effects on psychosocial outcomes of stroke patients that can be delivered by nurses. Most positive effects were found for the outcomes depression, followed by quality of life, anxiety, health-related quality of life, patient satisfaction, mood, and resilience. Positive effects for social recovery, fatigue, hope, and self-efficacy were all found for only one intervention each. We identified effective intervention components by determining the included intervention topics and methods of delivery in effective interventions. The most frequently used intervention topics in effective interventions were coping, risk factors and secondary prevention, and emotions, followed by consequences after stroke, self-management, recovery, values and needs, goals, mood, social support, medication management, life after stroke, problem-solving, participation, and mindfulness. The interventions with positive effects were mostly delivered by active information, followed by physical (exercise), coordination of care, passive information, relaxation, reminiscence therapy, music therapy, or sending a postcard, and pharmaceutical treatment.

The number of times intervention topics are included in the 39 effective interventions may not necessarily be an indication of the effectiveness of these intervention components on psychosocial well-being. Some intervention topics may just be included more often in interventions (both effective and ineffective) regardless of their effect. Therefore, it might be helpful to determine if intervention topics have been included more in effective interventions compared to non-effective interventions to be able to indicate if the topic can be effective in improving psychosocial well-being. Consequently, effective intervention topics could be mood, recovery, coping, emotions, consequences/problems after stroke, values and needs, risk factors and secondary prevention, self-management, and medication management, as these topics are included relatively more often in effective interventions. The need for inclusion of these topics in interventions to improve psychosocial well-being is mostly confirmed by several studies (Connolly and Mahoney, 2018; Wray and Clarke, 2017; Zawawi et al., 2020; Hughes et al., 2020), where most of these topics have been identified as needs of stroke patients. As far as we know, medication management has not been reported as a need in other research. We expect that meeting these needs is what makes these intervention components effective. However, previous studies have also found other needs that do not support our findings for effective intervention components. First of all, although our study suggests that the topic social support might not be effective in improving psychosocial well-being after stroke, several previous studies suggest this is an important need after stroke (Lin et al., 2019; Connolly and Mahoney, 2018; Wray and Clarke, 2017; Zawawi et al., 2020; Hughes et al., 2020; Harrison et al., 2017; McCurley et al., 2019; Wan et al., 2021). Also the topics life after stroke and participation have been reported as needs in several studies (Connolly and Mahoney, 2018; Wray and Clarke, 2017; Zawawi et al., 2020; Guo et al., 2021;

Chen et al., 2019b), while our study does not suggest a positive effect of these intervention components. Other topics that did not show positive effects in our study, but were reported as needs in other studies are goals (Zawawi et al., 2020), mindfulness (McCurley et al., 2019), and problem-solving (McCurley et al., 2019). Thus, inclusion of some needs in interventions might lead to positive effects for psychosocial well-being while others show no effect. This difference in effect might be caused by the fact that there are very many needs after stroke reported in literature (Guo et al., 2021; Chen et al., 2019b; Lin et al., 2021). Our results suggest that some topics might be more prominent influencers of psychosocial well-being than others. This might mean that inclusion of the more prominent influencers leads to more effectiveness of the intervention on psychosocial well-being than inclusion of less prominent influencers.

Besides the intervention topics, we also studied delivery methods of effective interventions to identify effective intervention components. The most frequently applied method of delivery in effective interventions is active information. This corresponds with several previous studies that describe the major need for information among stroke patients (Chen et al., 2019a; Connolly and Mahoney, 2018; Zawawi et al., 2020; Hughes et al., 2020; Harrison et al., 2017; Wan et al., 2021; Lin et al., 2021). Our findings are in line with the Cochrane review of Forster et al. (2012), indicating that interventions using active information are more effective than interventions using passive information (Forster et al., 2012). Positive effects have also been found for interventions that only include physical exercise or combine physical exercise with other components. This also corresponds with previous studies that show the positive effects of physical exercise on psychosocial well-being in patients with different conditions (Kvam et al., 2016; Dauwan et al., 2016; Chekroud et al., 2018). A similar effect has been found on mental health after stroke (Lai et al., 2006). Lai et al. (2006) found that physical exercise has a positive influence on depressive symptoms, regardless of the presence of depressive symptoms at the moment of the physical exercise. They also found that physical exercise positively influences the effect of depressive symptoms on quality of life, leading to better psychosocial well-being. Although most of these studies focus on the effect of physical exercise on depression, we believe similar effects can be expected among other psychosocial outcomes.

Our aim was to identify interventions that could be delivered by nurses. Although some of the interventions with positive effects were originally (partly) delivered by nurses, in the majority of the included studies the intervention was delivered by other healthcare professionals or the interventionist was not described. Furthermore, in most articles, the exact role of the interventionist – either a nurse or another healthcare professional – was not described in detail. Therefore, we critically assessed and discussed all interventions within the research team (DN, EGH, JMG, LKB, MK, TH, US) and decided to include the remaining articles, since the nature of the described interventions was closely related to established nursing domains. This is in line with the Fundamentals of Care Framework (FOC), where it is stated that nurses should address patients' fundamental care needs, including the physical, psychosocial and relational aspects of care in several different settings (Kitson, 2018). Furthermore, Kirkevold (2010) describes the important role nurses have in providing psychosocial care to stroke patients. Nurses are involved during the whole rehabilitation process, in which the focus is mainly on functional rehabilitation at first, and later shifts to a broader focus on recovery of activities in daily life. Overall, nurses are involved in the coping process and adjustments – both physical and psychosocial – in patients' lives (Kirkevold, 2010). Since nurses are involved in all these different aspects, we believe that nurses could deliver interventions with a clear psychosocial content, as well as those interventions with a partly or no psychosocial content. Therefore, we consider that the included interventions could be delivered by nurses, whether or not after additional training. Furthermore, since nurses are involved in so many aspects of the patient's daily life, we believe that nurses are skilled and have the appropriate knowledge to

provide interventions including all discussed intervention topics. We also believe the described methods of delivery are appropriate to be delivered by nurses, as nurses currently already deliver care in similar ways (Clarke and Forster, 2015; Kirkevold, 2010; Parappilly et al., 2018). However, whether interventions could be delivered by nurses may differ between different countries depending on their specific health care system and the education of (registered) nurses. For example, in some countries adding Tai Chi to the provided health care may take less additional training than in other countries. It should be noted that some effective interventions are delivered by a multidisciplinary team. Even though nurses might be able to take on several parts of delivering these interventions, it is not likely they will be able to provide the complete interventions.

4.1.1. Methodological considerations and limitations

In our design, we decided to only include articles in which psychosocial outcomes were the primary outcome. However, some articles did not make a clear distinction between primary outcomes and secondary outcomes. If no clear division was available, we discussed within the research team whether we believed the outcome was used as primary or secondary outcome. This might have led to some articles being included unjustly. This leads to a risk of bias, since other articles in which psychosocial outcomes were secondary outcomes have been excluded. However, including these articles has also led to a lower risk of unjustly excluding articles where the psychosocial outcome might have been a primary outcome.

The design of the study has led to inclusion of a lot of different interventions. Although this has made it difficult to compare the different interventions as a whole with each other, it has provided us with a very broad overview of potentially effective intervention components. Because we were interested in the content of the intervention components and not in effect sizes, we decided to present our results narratively.

To assess the quality of articles we used the JBI critical appraisal tools. However, some articles could not fulfill all criteria due to their design. In particular pragmatic studies did not always fulfill the criteria for blinding. Nevertheless, this does not necessarily mean these articles are of lower quality, although this might seem so based on the JBI quality rating.

Within this systematic review we used a broad definition for psychosocial well-being, because of the large variety in definitions available in literature. Since we found many different psychosocial outcomes were used in the included articles, we believe this confirms the need to use such a broad definition, as otherwise many different psychosocial outcomes would have been missed.

Several included studies have excluded patients with (severe) cognitive and/or communicative impairments from their design. Excluding this group of patients can lead to a lower generalizability of the results. However, we consider it a strength that within our own study design we did include this group of patients. Thereby, we have also obtained several studies in which these patients are included.

4.1.2. Recommendations

Based on our findings, we cannot recommend one or several particular (complete) interventions that could best support nurses in providing psychosocial care to stroke patients. Nevertheless, we can recommend which aspects to take into account in developing and/or using interventions to improve psychosocial well-being after stroke. First of all, we recommend to decide for which psychosocial outcome (s) an intervention should be applicable, as positive effects were only found for a part of the included psychosocial outcomes. Furthermore, based on our findings we would recommend to include the following intervention components: mood, recovery, coping, emotions, consequences/problems after stroke, values and needs, risk factors and secondary prevention, self-management, and medication management, and deliver the intervention by providing active information, potentially in combination with physical exercise. However, according to

Skivington et al. (2021), when developing complex interventions one should not only look at the separate components (i.e. intervention topics and methods of delivery), but also to their interaction, since this interaction can have an influence on the effectiveness of the intervention (Skivington et al., 2021). Therefore, more insight is needed in the way components should be combined to obtain a positive effect on psychosocial well-being. Furthermore, to determine if more intervention topics should be included than mentioned above, more insight is needed into the potential existence of a division between more and less prominent influencers on psychosocial well-being after stroke.

Based on the Medical Research Council (MRC) framework, the context in which an intervention is implemented and the involved stakeholders should be considered in complex interventions (Skivington et al., 2021). Thus, when developing new interventions or adapting existing interventions, the perspectives of the multidisciplinary team – including nurses – that provide the intervention and the perspectives of the stroke patients – and their family/partners – who receive the intervention need to be taken into account. Since the occurrence of psychosocial impairments can differ between patients, the intervention should also be personalized for each patient. Therefore, such interventions could be developed according to the stepped care model, in which all patient start with low intensity psychosocial care and higher intensities of care or referral to other healthcare professionals are only applied if necessary (van Straten et al., 2010). In the development of such interventions, the effect of the intervention should be studied as well.

It can be recommended to study if interventions are effective for stroke patient with cognitive and/or communicative impairments, since most of the included studies excluded patients with these impairments. Therefore, it cannot be concluded with certainty that the described intervention components are also most effective for these patients. Also, it should be tested if developed interventions could indeed be delivered by nurses in their daily practice and if training is needed before usage. Additionally, when interventions can be delivered by nurses, the effects of the interventions when delivered by nurses should be tested. As both the needs of patients and role of nurses can differ over different countries, we recommend to take into account the specific circumstances in the health care system for the readers' country when applying the conclusions of this review. Furthermore, even though in this paper we focused on interventions that could be delivered by nurses, these findings may also apply to other healthcare professionals. Therefore, it can be recommended to decide for each type of healthcare professional separately whether or not specific intervention components can be delivered by this specific healthcare professional as well as by nurses.

5. Conclusions

The aim of this systematic review was to identify potentially effective interventions – and intervention components – which can be delivered by nurses to improve patients' psychosocial well-being after stroke. We identified potentially effective intervention components by identifying the intervention topics and methods of delivery that are used in interventions with positive effects on psychosocial outcomes. The results suggest that interventions to improve psychosocial well-being that can be delivered by nurses should include the topics mood, recovery, coping, emotions, consequences/problems after stroke, values and needs, risk factors and secondary prevention, self-management, and medication management. These interventions should be delivered by combining active information with physical exercise. To advance the positive effects of such interventions on psychosocial well-being, more insight is needed into the interaction between different intervention components and into the context in which the intervention should be applied. Furthermore, it is recommended to study if such interventions are effective for all types of stroke patients and if they can be used by nurses in their daily practice. Additionally, needs of stroke

patients could be further examined to determine if there is a division between topics that influence psychosocial well-being after stroke more or less prominently.

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Registration

This review was not registered.

CRediT authorship contribution statement

Dagmar van Nimwegen: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data Curation, Writing – Original Draft, Writing – Review & Editing, Visualization. **Ellen Gabrielsen Hjelle:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – Original Draft, Writing – Review & Editing, Visualization. **Line Kildal Bragstad:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – Original Draft, Writing – Review & Editing, Visualization. **Marit Kirkevold:** Conceptualization, Methodology, Validation, Writing – Review & Editing. **Unni Sveen:** Conceptualization, Methodology, Validation, Writing – Review & Editing. **Thóra Hafsteinsdóttir:** Methodology, Validation, Writing – Review & Editing. **Lisette Schoonhoven:** Writing – Review & Editing, Supervision, Project administration. **Johanna Visser-Meily:** Writing – Review & Editing, Supervision. **Janneke M. de Man-van Ginkel:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – Original Draft, Writing – Review & Editing, Visualization, Project administration, Funding acquisition.

Data availability

All data are available upon request from the corresponding author.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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