Supporting Family Caregivers in Stroke Care
A Review of the Evidence for Problem Solving
May H.L. Lui, Mphil; Fiona M. Ross, PhD; David R. Thompson, PhD

Background and Purpose—Teaching effective problem-solving skills to family caregivers of patients with chronic disease has been shown to be useful for promoting physical and psychosocial well-being. However, the use and effectiveness of problem solving for supporting caregivers in stroke care has not been reviewed. This article aims to identify and review studies that have examined the effectiveness of teaching problem solving skills to caregivers in stroke care, highlight gaps in the evidence base, and recommend avenues for additional research.

Methods—A structured review of literature identified from nursing, medicine, and psychology databases from 1970 to 2004 was conducted. Eleven articles reporting the development or evaluation of effective problem-solving interventions for caregivers of patients with stroke were critically appraised using recognized quality criteria.

Results—The results of this review show that the strength of evidence for problem-solving interventions for caregivers of stroke patients is limited. Because some studies used small samples and varied methods and interventions, making a comparison was difficult. Caregivers’ problem-solving abilities were rarely measured, and the theoretical concepts and framework underpinning most studies were unclear.

Conclusions—Evidence from the review suggests a need to additionally study the link between theoretical concepts of effective problem solving and outcomes using standardized measures and to examine also the processes involved in implementing the intervention using multimethod designs, including both quantitative and qualitative approaches.

Pt is estimated that >50 million people provide care for a chronically ill or disabled person yearly in the United States.1 Stroke is a common disabling disease requiring the involvement of family caregivers for patients’ successful rehabilitation.2 However, caring for stroke patients can be a stressful task with caregivers reporting a considerable burden for several years after the initial event.3,4 Many encounter a variety of problems including financial difficulties,2,5 social isolation,2,5 lack of information,6–8 and poor physical and mental health.9–11 Teaching family caregivers to cope with these problems and to relieve their own stress is essential, and there is some evidence that their well-being affects the health and recovery of stroke patients.11–13

Problem solving emphasizes the use of a systematic approach toward problems and breaking down problems into smaller ones so that they can be solved in a more manageable way.14 Teaching such skills has been widely used in treating clinical conditions, such as depression, phobias, anxiety, and addiction.15–17 There is evidence supporting its use in reducing anxiety and depression and promoting the well-being of family caregivers of those with chronic illness, such as depression, dementia, cancer, and spinal cord injuries.18–23

Nevertheless, its use in stroke care has not been reviewed, although teaching family caregivers effective problem solving has been apparent since the late 1980s.24 Furthermore, there is little understanding of family caregivers’ problem-solving abilities, the theoretical concepts and frameworks underpinning problem solving, and its effect on caregivers. This article, therefore, aims to identify and describe studies examining the effectiveness of teaching problem solving skills to caregivers in stroke care, to identify any gaps, and to recommend avenues for additional research.

Methods

Search Strategy and Selection Criteria
A literature search from 1970 to 2004 was carried out using the Medline, Cumulative Index to Nursing and Allied Health Literature, PsychLit, and Cochrane databases. The terms used in the search included family caregivers, carers, families, problem solving, problem solving skills, training, education, support, stroke, and cerebrovascular accident. Reference lists of all of the retrieved articles were also searched. Inclusion criteria covered studies that examined the problem-solving skills of family caregivers in stroke care or evaluated educational interventions for family caregivers’ problem-solving skills in stroke care. Exclusion criteria included teaching of...
effective problem solving given to stroke patients only and non-English language articles. However, this search strategy selected may have had the potential to exclude other relevant unpublished studies or gray literature.

**Data Extraction**

The first author conducted the literature search, identified and retrieved relevant articles, and extracted data. Assessments of the quality of studies were undertaken by the first author independently, using a structured approach by adopting the quality criteria used in systematic review methodology.\(^{25,26}\) Decisions were reviewed in a process of critical scrutiny with the other authors. Disagreement was resolved by discussion. Appendix I and II show the items included in the literature review.

**Results**

**Study Design and Focus**

The initial search yielded 34 articles, although only 11 studies were found to meet the inclusion criteria (Table 1). Of the 11 studies, 6 were randomized controlled trials (RCTs) that implemented and evaluated teaching caregivers effective problem-solving skills.\(^{24,27–31}\) Two were qualitative studies that explored the process of goal setting and the views about this from the perspectives of stroke patients, caregivers, and nurses.\(^{32,33}\) Three were nonintervention studies, including a case study that described and illustrated the development of a problem-defined system to help family caregivers cope with their daily problems.\(^{34}\) A correlational study that examined the relationship between caregivers’ problem-solving abilities and their physical and psychological well-being was identified.\(^{35}\) Another study described the framework and concepts supporting the use of a social problem-solving telephone partnership project in the United States.\(^{36}\)

The sample size of caregivers in the RCTs ranged from 30 to 212,\(^{28,30}\) with a mean of 149 and a drop-out rate of 15% to 18%.\(^{24,27–30}\) The sample size for the correlational study was 40,\(^{35}\) whereas the qualitative studies interviewed 30 stroke patients and 15 caregivers,\(^{32}\) as well as 5 nurses who delivered problem-solving interventions.\(^{33}\)

**Findings From the RCTs**

Four studies were carried in the United States, 1 in the Netherlands, and 1 in the United Kingdom.

**Stroke Patient Characteristics**

All of the studies described the ages of stroke patients, but not all reported detailed characteristics. The majority of stroke patients were men (61 to 94 years of age). One study recruited only patients after their first stroke,\(^{27}\) and their functional disability varied from mild to severe.

**Stroke Caregiver Characteristics**

Four RCTs reported the mean age (48 to 64 years of age) and demographic characteristics of caregivers.\(^{24,28–30}\) Caregivers were usually younger than the stroke patients. Most caregivers were female looking after a male stroke patient (Table 1). In 3 of the trials, the average years of formal education received by the majority of family caregivers was \(\geq28,32,28,29\) The length of caring and ethnicity was seldom reported.

**Types of Effective Problem-Solving Skills**

Teaching caregivers effective problem-solving skills was highlighted in all of the interventional studies. Several problem-solving strategies were examined and evaluated, including the use of positive problem orientation (refers to having a positive perception toward the problem),\(^{28,29}\) confronting or facing the problem,\(^{30}\) analyzing the problem and undertaking possible solutions,\(^{28–30}\) and goal setting.\(^{27–30,31}\) Different types of problem-solving skills used in the RCTs are indicated in Table 2.

**Concepts of Effective Problem Solving**

Three studies described the concepts of effective problem solving underpinning their work. The stress and coping theory of Lazarus and Folkman\(^{37}\) was frequently used.\(^{28–30}\) These authors believe that enhancing a positive appraisal of the problem is essential to help caregivers cope better. Three other studies briefly mentioned using the cognitive behavioral and counseling models.\(^{24,27,31}\) Only the work of Grant et al\(^{28,29}\) provided a definition for social problem solving, which refers to the attempt of an individual to identify and effectively cope with and solve daily problems. Table 3 shows the theoretical concepts and outcome measures used in the RCTs.

**Training and Teaching**

The RCTs of teaching and supervision of caregivers using problem-solving skills were delivered by different types of healthcare professionals (Table 4). The qualification for this intervention among the trainers varied, and 3 studies failed to report details of healthcare professional training.\(^{24,28,29}\) Continued coaching by healthcare professionals during the interventions was mentioned in only 1 study,\(^{31}\) whereas keeping a diary or log book of the patients’ and stroke caregivers’ progress was reported in 2 studies.\(^{27,30}\)

**Delivery and Intensity of the Intervention**

The problem-solving interventions were mostly applied in the early poststroke period, although 1 study intervention was 3.5 years after the event.\(^{30}\) The duration of interventions ranged from 2 to 12 months.\(^{27,30}\) The mode of implementation varied encompassing class training,\(^{24}\) home visits,\(^{27–31}\) or telephone contact.\(^{28,29}\) On average, each home visit lasted 1 to 2 hours. Most of the teaching was given to the stroke patients and their caregivers in their home on an individual basis by healthcare professionals (Table 4).

**Outcome Measures**

Among the RCTs, only 1 measured the outcome effects on stroke patients rather than family caregivers. This was done despite teaching problem-solving skills to both the stroke patients and their caregivers.\(^{31}\) The domains of interest were diverse, and a variety of instruments were used to measure outcomes for family caregivers, including their cognitive, physical, and psychosocial well-being (Table 1). Cognitive aspects measured included caregiver problem-solving abilities,\(^{28,29}\) use of coping strategies,\(^{30}\) family functioning including family problem solving,\(^{24}\) and stroke knowledge.\(^{24}\) Physical aspects included perceived health status,\(^{28–30}\) and psychosocial aspects included caregiver assertiveness,\(^{30}\) burden,\(^{28,29}\) depression,\(^{28,29}\) preparedness,\(^{28,29}\) stress,\(^{27}\) satisfaction toward healthcare services,\(^{28,29}\) social
<table>
<thead>
<tr>
<th>Year of Publication, Country</th>
<th>Research Design</th>
<th>Sample Size</th>
<th>Characters of Caregivers</th>
<th>Characters of Stroke Patient</th>
<th>Outcome Measures</th>
<th>Timing of Data Collection</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I) Quantitative 1988, US⁴</td>
<td>Studies: RCT</td>
<td>n=188</td>
<td>Mean age 47.90 8.1% male caregiver Education 11 years</td>
<td>Mean age 61.1 (in counseling group) 0.95% male patient BI score 49.6 (0–100) indicating moderate disability</td>
<td>Family problem solving (FAD) Caregiver stroke knowledge (SCIT) Patient personal adjustment (PARS) Use of social services (ESCRW profile) at 6 and 12 months after stroke</td>
<td></td>
<td>Significant improved eased family problem functioning including family problem solving and stroke knowledge at 6 (P&lt;0.01) and 12 months (P&lt;0.01) after stroke. Better patient adjustment at 12 months (P&lt;0.01) after stroke. Medium effect size of 0.43 at 6 months and 0.63 at 12 months was achieved.</td>
</tr>
<tr>
<td>1996, UK⁷</td>
<td>RCT</td>
<td>n=240</td>
<td>Not reported Age ≥60 months 60–94</td>
<td></td>
<td>Caregivers stress (GHQ-28) Patient social activities (FAI) Patient perceived health (NHP) at 3, 6, and 12 months after stroke</td>
<td></td>
<td>No effect on reduction of carer stress. Only significant improvement in social outcome on patients with mild disability was noted at 6 months (P=0.03) after stroke. Power of 90% at significance levels of 0.05 was not achieved.</td>
</tr>
<tr>
<td>1999, US²⁸</td>
<td>RCT</td>
<td>n=30</td>
<td>Mean age 56 63% female caregivers 60% were black Education 8–12 years</td>
<td>Mean age 71 46% male 54% female 60% were black</td>
<td>Caregivers only: Burden (CBS) Depression (CES-D) Problem solving abilities (PSI) General health (SF-36) Preparedness (PCS) Satisfaction towards service (CSS) Social support (ISEL) before discharge, 2nd, 5th, and 13th week after discharge</td>
<td></td>
<td>Telephone group showed significant improvement in carer depression at 2nd week after discharge (P&lt;0.01) and at 5th week after discharge (P=0.05); more positive problem solving skills at 2nd week after discharge (P&lt;0.01) and at 5th week after discharge (P=0.05); greater caregiver preparedness at 2nd week after discharge (P&lt;0.01) and 5th week after discharge (P=0.04).</td>
</tr>
<tr>
<td>2001, US³⁵</td>
<td>Correlational study</td>
<td>40 family caregivers</td>
<td>Mean age 53 15% male 50% black 50% white Mean education level 13 years</td>
<td>Mean age 72 (ranged from 52–90 years) 47.5% male patients FIM score ranged from 36 to 96 indicating moderate disability</td>
<td>Caregiver problem-solving abilities (PSI) Depression (CES-D) General health (SF-36) Social support (ISEL) Stroke patients’ functional ability (FIM) within 3 months after stroke</td>
<td></td>
<td>Majority of the caregivers perceived themselves as ineffectve problem solvers. Caregiver problem solving abilities was significantly correlated with their depression level and general health status (P&lt;0.05) but not with the stroke patient’s functional recovery.</td>
</tr>
<tr>
<td>2002, US²⁹</td>
<td>RCT</td>
<td>n=740</td>
<td>Mean age 56 9.5% male caregivers Education 82% &gt;high school</td>
<td>Mean age 73 47% male patients With moderate disability</td>
<td>Caregivers only: Burden (CBS) Depression (CES-D) Problem-solving abilities (PSI) General health (SF-36) Preparedness (PCS) Satisfaction towards service (CSS) Before discharge, 5th, 9th, and 13th week after discharge</td>
<td></td>
<td>Caregivers using the telephone social problem partnership had better problem-solving abilities (P&lt;0.01), greater preparedness, less depression, and significant improvements in measures of vitality, social functioning, mental health, and role limitations related to emotional problem at P&lt;0.01.</td>
</tr>
</tbody>
</table>

(Continued)
<table>
<thead>
<tr>
<th>Year of Publication, Country</th>
<th>Research Design</th>
<th>Sample Size</th>
<th>Characters of Caregivers</th>
<th>Characters of Stroke Patient</th>
<th>Outcome Measures Timing of Data Collection</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002, the Netherlands &lt;sup&gt;30&lt;/sup&gt;</td>
<td>RCT</td>
<td>n=212</td>
<td>Mean age 64 26.8% male caregivers 95% spouses Education, not measured</td>
<td>Mean year not reported 70% male Moderate to severe stroke Noninstitutionalized stroke patients Post stroke 3.5</td>
<td>Caregivers’ Assertiveness (self-developed tool) Subjects in the group program and home visit program showed increase in confidence in knowledge (P&lt;0.001) Burden (CSI) Coping strategies (UCL) Confidence in knowledge (self-developed tool) Social support received and satisfaction (SSLI) Health status (SF-36) Patients’ physical, psychological, and behavioral condition after stroke (SIP68) At 1 and 6 months after intervention</td>
<td>No significant differences on carer burden Home visits were found to have significant use of active coping strategies (P&lt;0.001) Female and younger caregivers showed better confidence in knowledge and amount of social support received (P&lt;0.05) Medium effect size of 0.75 was achieved</td>
</tr>
<tr>
<td>2004, US &lt;sup&gt;31&lt;/sup&gt;</td>
<td>RCT</td>
<td>Sample size of caregivers were not reported 266 stroke patients were recruited in the study</td>
<td>Not reported</td>
<td>Mean age 69.3 50.7% male. Mean NIHSS score 6.1 indicating moderate disability</td>
<td>Stroke patients only: Functional recovery (as main outcome measure: BI) Social support (RSS), Depression (CES-D), Sense of control (REFFI). At 6 months post-randomization</td>
<td>No significant differences on the outcomes on stroke patients found (P=0.56)</td>
</tr>
<tr>
<td>(II) Qualitative 1997, UK &lt;sup&gt;32&lt;/sup&gt;</td>
<td>And qualitative</td>
<td>Descriptive n=30 Stroke patients 0.15 Family caregivers</td>
<td>Studies not reported</td>
<td>Not reported</td>
<td>Not applicable</td>
<td>Some good elements of nursing care were identified by the family caregivers and stroke patients</td>
</tr>
<tr>
<td>1999, UK &lt;sup&gt;33&lt;/sup&gt;</td>
<td>Qualitative</td>
<td>5 specialist visit nurses</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Not applicable</td>
<td>Inconsistency on goals setting was found between nurses and subjects</td>
</tr>
<tr>
<td>2000, US &lt;sup&gt;34&lt;/sup&gt;</td>
<td>Case studies</td>
<td>Not reported</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>4 cases were used to illustrate the importance of developing a problem-defined system to help family caregivers to cope their daily problems</td>
</tr>
<tr>
<td>2001, US &lt;sup&gt;35&lt;/sup&gt;</td>
<td>Descriptive study</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Hypothesized that teaching family caregivers problem solving skills via telephone contacts is likely to be effective</td>
</tr>
</tbody>
</table>

<sup>BI</sup> indicates Barthel Index; <sup>CSI</sup>, Caregiver Strain Index; <sup>CES-D</sup>, Center for Epidemiologic Studies Depression Scale; <sup>CBS</sup>, Caregiver Burden Scale; <sup>CSQ</sup>, Client Satisfaction Scale; <sup>FAD</sup>, Family Assessment Device; <sup>FIM</sup>, Functional Independence Measure; <sup>FAI</sup>, Frenchay Activities Index; <sup>GHQ</sup>, General Health Questionnaire; <sup>ISL</sup>, Interpersonal Support Evaluation List; <sup>LSS</sup>, Life Satisfaction Index; <sup>NHP</sup>, Nottingham Health Profile; <sup>NHSS</sup>, National Institute of Health Stroke Severity Scale; <sup>PARS</sup>, Personal Adjustment and Role Skills Scale; <sup>PCS</sup>, Preparedness for Caregiving Scale; <sup>PSI</sup>, Problem Solving Inventory; <sup>RSS</sup>, Received Social Support; <sup>REFFI</sup>, Sense of Control; <sup>SF-36</sup>, Medical Outcomes Study Short-Form Health Survey; <sup>SF-68</sup>, Sickness Impact Profile; <sup>SCIT</sup>, Stroke Care Information Test; <sup>SSLI</sup>, Social Support List-Interaction; <sup>SSLD</sup>, Social Support List; <sup>UCL</sup>, Utrecht Coping List.
support, social support satisfaction, and use of social services. As illustrated in Table 3, not all of the studies made explicit the link between the theoretical concepts underpinning the studies and the outcome measures adopted. Two studies did not measure caregiver outcome, either stress or psychological aspects. Only 3 studies that have highlighted the use of concepts, such as social problem solving, stress, and coping theory, measured caregiver problem-solving abilities, stress level, and coping strategies.

Regarding stroke outcome, the domains covered in the studies were broad, but the common focus was the impact on physical health. Psychosocial outcomes were varied and included stroke patient adjustment, perceived health, social support received, sense of control, and social activity.

### Timing of Data Collection
All of the RCTs used a longitudinal design measuring both short- and long-term outcome effects of the problem-solving interventions from a few weeks to 12 months after stroke.

### Effects on Caregivers

#### Problem-Solving Abilities
Although teaching problem-solving skills was the main component in all of the trials, only 3 studies measured the impact on the level of skills and abilities among family caregivers. When compared with usual care, these studies identified significantly improved family problem solving, positive problem orientation, and knowledge about stroke care at 6 to 12 months after discharge.

#### Physical and Psychosocial Health and Stroke Patient Recovery
Besides having a positive impact on the family caregivers’ problem-solving abilities, the teaching of positive problem-solving skills can also improve physical and psychosocial health for stroke patients. For example, studies measuring changes on caregivers during the intervention and within 1 week after intervention whereas 4 studies measured long-term effects on patients or caregivers 6 to 9 months after intervention.

### TABLE 2. Types of Effective Problem-Solving Skills Used in RCTs

<table>
<thead>
<tr>
<th>Year of Publication</th>
<th>Positive Problem Orientation/Confront Oneself to a Problem</th>
<th>Define/Identify/Analyze the Problem</th>
<th>Goal Setting/Needs to be Accomplished</th>
<th>Generate Alternatives/Test Solutions</th>
<th>Evaluation of Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>198824</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>199627</td>
<td>Not reported</td>
<td>Used</td>
<td>Used</td>
<td>Not reported</td>
<td>Used</td>
</tr>
<tr>
<td>199928</td>
<td>Used</td>
<td>Used</td>
<td>Used</td>
<td>Used</td>
<td>Used</td>
</tr>
<tr>
<td>200229</td>
<td>Used</td>
<td>Used</td>
<td>Used</td>
<td>Used</td>
<td>Used</td>
</tr>
<tr>
<td>200230</td>
<td>Used</td>
<td>Used</td>
<td>Not reported</td>
<td>Used</td>
<td>Not reported</td>
</tr>
<tr>
<td>200431</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Used</td>
<td>Not reported</td>
<td>Used</td>
</tr>
</tbody>
</table>

### TABLE 3. Concepts of Effective Problem Solving and Outcome Domain Used in RCTs

<table>
<thead>
<tr>
<th>Year of Publication</th>
<th>Theoretical Concepts</th>
<th>Effective Problem-Solving Skills Used</th>
<th>Domains Measured: Caregivers</th>
<th>Domains Measured: Stroke Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>198824</td>
<td>Counseling model (no description in the study)</td>
<td>Family problem solving (no description in the study)</td>
<td>Family functioning including family problem solving, caregivers’ stroke knowledge, use of social resources</td>
<td>Personal adjustment</td>
</tr>
<tr>
<td>199627</td>
<td>Counseling and enabling model (no description in the study)</td>
<td>Identify the problems; goal setting; evaluation of outcome</td>
<td>Emotional adjustment</td>
<td>Perceived health; social integration</td>
</tr>
<tr>
<td>199928</td>
<td>Social problem solving; based on stress, appraisal, and coping theory</td>
<td>Positive orientation; identify the problem; set needs to be meet; list possible solution; choose and testing of solution; evaluation of outcome</td>
<td>Burden; depression; preparedness; general health; problem-solving abilities; satisfaction with health care services; social support</td>
<td>Not measured</td>
</tr>
<tr>
<td>200229</td>
<td>Social problem solving; based on stress, appraisal, and coping theory</td>
<td>Positive orientation; identify the problem; set needs to be meet; list possible solution; choose and testing of solution; evaluation of outcome</td>
<td>Burden; depression; preparedness; general health; problem-solving abilities; satisfaction with health care services</td>
<td>Not measured</td>
</tr>
<tr>
<td>200431</td>
<td>Cognitive behavioral therapy (no description in the study)</td>
<td>Goal setting using a team approach; evaluation of outcome</td>
<td>Not measured</td>
<td>Depression; functional recovery; social support; sense of control</td>
</tr>
</tbody>
</table>
orientation also yielded a significant reduction in depression, improvement of preparedness, vitality, and coping with the patients’ labile emotions.28,29 In general, most studies did not show any significant improvement in caregivers’ physical health, stress, or burden27,30 or functional recovery of stroke patients.27,31 Table 1 highlights the positive effects of the intervention on the caregivers.

Effective Mode of Delivery: Telephone Versus Home Visits and Group Versus Individual Visits
Of the 6 trials, 2 examined the delivery of teaching effective problem solving by comparing home visits with telephone contacts,28,29 and 1 examined a group program versus individual home visits.30 The results indicated that teaching of effective problem solving via telephone contacts was more effective than home visits.28,29 There was no significant difference in the outcomes of interventions using a group support program or individual home visits.30

Findings From the Qualitative Studies
Qualitative studies may illuminate and contextualize the process of teaching problem solving that cannot be easily achieved using experimental methods. The review identified 2 studies that had adopted a qualitative approach to explore the process and participant views of effective problem solving in stroke care. Although the findings cannot be generalized, it provides useful information on the views of both caregivers and nurses about the acceptability and relevance of the intervention. Using participants recruited in the study by Young and Forster,27 Dowswell et al32 selected and interviewed 30 stroke patients and 15 stroke caregivers to obtain their views about the role of the nurse teaching them effective problem-solving skills.32 Although the study did not explore caregiver views on using goal setting to target problem solving, the results suggest that both the patients and caregivers appreciated nurses as proactive, friendly, and encouraging.32 Another qualitative study explored the process of goal setting by interviewing 5 specialist nurses and reviewing the nursing records.33 In this study, identification of the caring problem, setting goals, and evaluating the goals and the limitation of goal setting were all investigated. The findings of the study showed that nurses usually identified caring problems by asking the patients and their caregivers general questions rather than using a standardized objective assessment.33 For the goal-setting process, all of the nurses stressed the use of a collaborative approach with the patients and their caregivers. Nevertheless, inconsistencies in goal setting were found among nurses, between nurses and care-givers, as well as between nurses and patients.33

These studies shed light on unrealistic goal setting and help explain discrepancies between caregiver and patient perceptions of outcome; for example, in some cases where caregivers could identify that some goals were met, patients may have focused on what they could not yet do rather than what

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TABLE 4. A Brief Description of the Intervention Evaluated in RCTs

<table>
<thead>
<tr>
<th>Year of Publication</th>
<th>Name of the Intervention and Length of the Intervention Skills</th>
<th>Target Group</th>
<th>Timing of the Intervention</th>
<th>Duration of the Intervention</th>
<th>Mode of Delivery or Teaching Mode</th>
<th>Types of Discipline</th>
<th>Training of the Therapist</th>
</tr>
</thead>
<tbody>
<tr>
<td>198824</td>
<td>Family-focused Counseling</td>
<td>Caregiver and stroke patient</td>
<td>PredischARGE to postdischarge including 7 biweekly problem-solving sessions</td>
<td>3 months</td>
<td>Classroom teaching</td>
<td>Social worker with educational background of cognitive behavioral therapy</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>199627</td>
<td>Specialist nurse visit</td>
<td>Caregiver + stroke patient</td>
<td>PredischARGE 1–2 days to post discharge</td>
<td>12 months</td>
<td>Individual home visit</td>
<td>Nurses with experience in older care and use of problem solving approach in the community</td>
<td>2 days training to improve their counselling and listening skills</td>
</tr>
<tr>
<td>199928</td>
<td>Social problem-solving partnerships</td>
<td>Caregiver</td>
<td>PredischARGE 1 week to postdischarge</td>
<td>3 months</td>
<td>Individual home visit and telephone contact</td>
<td>Nurses</td>
<td>Mentioned with no additional description</td>
</tr>
<tr>
<td>200229</td>
<td>Social problem-solving telephone partnerships</td>
<td>Caregiver</td>
<td>PredischARGE 1 week to postdischarge</td>
<td>3 months</td>
<td>Individual home visit and telephone contact</td>
<td>Nurses</td>
<td>Mentioned with no additional description</td>
</tr>
<tr>
<td>200230</td>
<td>Support group and home visit program</td>
<td>Caregiver</td>
<td>Postdischarge (mean post-stroke of 3.5 years)</td>
<td>2 months</td>
<td>Group support program vs individual home visit</td>
<td>Nurses</td>
<td>2 days training</td>
</tr>
<tr>
<td>200431</td>
<td>Psychosocial intervention</td>
<td>Caregiver, stroke patient, and friends</td>
<td>Within 1 month of hospital admission to postdischarge</td>
<td>6 months</td>
<td>Individual home visit</td>
<td>Mental health workers and clinical psychologist</td>
<td>Mentioned focus of training: family system and cognitive behavioral therapy</td>
</tr>
</tbody>
</table>
they had achieved. This supports the view that the goal-setting process is complex, and there is a need to develop clearer guidelines to help nurses and family caregivers to set realistic and achievable goals.

Findings From the Nonintervention Studies
Based on preliminary findings of previous work using social problem solving, Grant hypothzed in the article that caregivers who use social problem-solving skills can solve problems optimistically and have the essential skills to identify and define the problem, decide what needs to be done, list possible solutions, and, finally, evaluate them. This provides support for additional testing of the use of telephone social problem solving in their subsequent study. Glass et al described the development of a family-focused psychosocial intervention using a problem-defined system using case studies. The first published correlation study examining the relationships between caregiver social problem-solving abilities and their physical and psychosocial well-being in 20 blacks and 20 whites found that these abilities among caregivers were associated with their depression and general health status, but social support did not influence this relationship. This study suggested that the development of an intervention enhancing family caregiver problem-solving abilities may reduce their depression and promote better health.

Discussion
Limitation of Current Studies
Although there were a limited number of studies identified that met the quality criteria, the majority focused on outcome evaluation of problem-solving interventions rather than process. Lack of clarity about the definition of problem solving was reflected in the plethora of terms used to describe various aspects of the process; for example, problem appraisal, problem identification, setting goals or needs to be met, generating alternatives, testing solutions, and evaluating outcomes.

Previous studies have shown that family caregivers learned and used positive coping strategies themselves in caring for stroke patients. Those with a higher education had better problem-solving abilities, and their skills may improve over time. Therefore, it is important to recognize that problem solving needs to be understood as a dynamic and fluctuating process within the context of the caregiving relationship. Assessing caregiver problem-solving abilities before the intervention at baseline is, therefore, necessary to determine whether there is any significant improvement. Proper randomization reduces selection bias, because it is expected to determine comparability of treatment and control groups. However, as shown in this review, all 6 of the RCTs stated that there had been random allocation of subjects, within which 3 studies used block randomization, and none gave details of how this had been done. This raises concern about the comparability of subjects. Comparing baseline data about caregiver problem-solving abilities may give additional information about the comparability among participants.

In addition, attempts to blind those measuring outcomes were only reported in 3 trials. Although loss of subjects was reported in most of the trials, intention-to-treat analysis was used in 2. The sample size in some of the trials was small, compromising their statistical power. This warrants caution in the interpretation of findings.

Mastering effective problem-solving abilities in stroke care is a complex task, and training usually covered different components, including teaching concepts of effective problem solving, common problems in stroke care, and available community resources. It is, therefore, not surprising that the outcomes measured were diverse, including changes in caregiver stroke knowledge, problem-solving abilities, stress level, and coping abilities. Furthermore, there was a lack of standardization of outcome measurement instruments with some studies using newly developed measures with insufficient evidence of validity and reliability, such as the Stroke Care Information Test and the Confidence in Knowledge Scale.

Overall, there was a paucity of studies examining variables associated with caregiver problem-solving abilities. A previous study examining problem solving has shown that female caregivers usually reported a more negative appraisal of their social problem-solving ability. However, this review identified 1 correlation study, and this issue was not examined. Of all the intervention studies, only 1 study examined the characteristics of caregivers who benefited most from the intervention. Findings suggest that female and younger caregivers showed better confidence in knowledge. Measuring the levels of stroke knowledge, caring attitudes and years of experience of family caregivers may also provide useful information about the potential effectiveness of the intervention. Unfortunately, none of the studies reviewed assessed these aspects, and only 3 trials reported the years of formal education received by family caregivers. These studies have not explored whether years of education received by the caregivers is a confounding variable affecting the caregiver outcomes.

Studies have shown that cognitive functioning, presence of poststroke depression, and behavioral abnormalities of stroke patients affect the well-being of family caregivers. Measuring these variables and monitoring their effects on caregiver problem-solving abilities, physical health, and psychosocial health may provide useful information about the potential effectiveness of the intervention.

Although some studies measured caregiver satisfaction with healthcare services, social service utilization, and life in general, these did not appear to have a strong link with the theoretical concepts underpinning the study. The link between caregiver problem-solving abilities and stroke patient functional recovery is not yet established nor explained by the theoretical concepts used. More empirical work in this area is needed to guide the future development of appropriate and targeted interventions.

Summary
Although the number of intervention studies reviewed is small, there is a diversity of theoretical origin and perspective. A striking variety of intervention models and approaches, such as a specialist nurse visit, telephone social problem solving, and psychosocial interventions were found.
Teaching effective problem-solving skills was found to be useful in enhancing caregiver problem-solving abilities and reducing depression. Nevertheless, most intervention studies did not describe the details of the intervention or give sufficient evidence to support the effects of teaching problem solving in reducing caregiver stress or promoting their physical health or the physical recovery of the stroke patients. However, in general, delivering teaching with telephone follow-up contact was found to be more effective than home visits.

**Recommendations for Additional Research**

There is some evidence to suggest that the intervention may increase problem-solving abilities and reduce depression; therefore, sufficiently powered, well-controlled studies using standardized outcome measures are recommended that examine this more systematically. Because the majority of the studies reviewed focused on outcome evaluation, there is a need to conduct more process evaluation studies in parallel to examine the teaching and preparation of the therapist delivering the intervention, as their willingness and readiness to acquire and learn effective problem skills may affect the outcome of caregivers and stroke patients. Interventions should be clearly defined and underpinned by a sound conceptual framework. It would be useful to identify those individuals who are most likely to benefit from this type of intervention, and consideration should be given to the characteristics of caregivers including their gender, education level, caring experience, stroke knowledge, preintervention problem-solving abilities, and acceptability of the problem solving approach.

Findings from the study by Lawler et al indicate that goal setting can be a complex process and indicate a need for setting clear guidelines for healthcare professionals and raising awareness of the potential discrepancy between the goals of healthcare professionals and caregivers.

Because the condition of stroke patients and family caregivers may change across time, longitudinal studies measuring the long-term effects of this intervention are warranted. The stroke patients and caregivers recruited in most of the studies reviewed were mainly older people. With an increasing number of younger people experiencing from stroke, there is a need to study younger people. Neglected groups worthy of study are Asian people, where stroke is also common and family caregivers are the main source of support.

Outcome evaluation using a quantitative approach provides evidence for the effectiveness of an intervention, whereas using qualitative approaches aims to determine the extent, accuracy, and quality of the implementation process. It helps to understand how the effect of an intervention was achieved and may provide useful information to explain why an intervention yielded minimal or no effect. In this review, the majority of the evaluation studies on problem solving focused on outcome measurement. It is recommended that additional research explores problem solving as a complex intervention and investigates the links between the processes and outcomes involved using a mixed quantitative and qualitative design.

**Appendix I**

*Checklist of the CONSORT Statement*

1. Study: year of publication, professional preparation of the first author, country or site where the intervention occurred.
2. Population or subject: planned study population and the main inclusion criteria, sample size, and attrition rate.
3. Design: manner of assignment of subject group.
4. Intervention: content, timing, duration, frequency and mode of delivery, training, and professional preparation of interveners.
5. Outcome measures: timing of measures and selection of instruments.
6. Results: estimated effect of intervention.
7. Comments: source of bias, discussion of external validity, and any protocol deviations from the study as planned.

**Appendix II**

*Qualitative Research Checklist*

1. Was the research question clearly defined?
2. Overall, did the researcher make explicit in the account the theoretical framework and methods used at every stage of the research?
3. Was the context clearly described?
4. Was the sampling strategy clearly described and justified?
5. Was the sampling strategy theoretically comprehensive to ensure the generalizability of the conceptual analysis?
6. How as the fieldwork undertaken? Was it described in detail?
7. Could the evidence (fieldwork notes, interview transcripts, etc) be inspected independently by others?
8. Were the procedures for data analysis clearly described and theoretically justified?
9. Was the analysis repeated by more than 1 researcher to ensure reliability?
10. Did the investigator make use of quantitative evidence to test qualitative conclusions where appropriate?
11. Did the investigator give evidence of seeking out observations that might have contraindicated or modified the analysis?
12. Was sufficient notation of the original evidence presented systematically in the written account to satisfy the skeptical reader of the relation between the interpretation and the evidence (eg, were quotations numbered and sources given)?
References

Supporting Family Caregivers in Stroke Care: A Review of the Evidence for Problem Solving
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