SUPPLEMENTAL MATERIAL

Supplementary Table I. Summary of recommendations for stroke caregiver and dyad interventions.[1]

1. **Target of interventions.** “Stroke caregiver interventions are probably recommended” over dyad interventions for caregiver outcomes; vice versa for survivor outcomes.
2. **Types of interventions.** “Interventions that combine skill building (eg, problem solving, stress management, goal setting) with psycho-educational strategies should be chosen;” “Interventions that involve only psycho-education are not recommended;” “Interventions that consist of support only or a combination of psycho-education and support do not have sufficiently strong evidence.”
3. **Intervention delivery design.** “Interventions that are tailored or individualized on the basis of the needs of stroke caregivers should be chosen;” “Postdischarge assessments with tailored interventions based on changing needs should be performed;” “Individual approaches are probably recommended over group interventions.”
4. **Mode of delivery.** “Interventions that are delivered face to face and/or by telephone are recommended;” “Interventions delivered completely by telephone can be useful;” “Interventions delivered by the Web might be considered for those with computer access.”
5. **Frequency of sessions.** “Interventions consisting of 5 to 9 sessions are recommended;” Those “with a wide range of sessions” “are not as useful.”

Supplementary Table II. Summary of 5 Articles Testing Family Caregiver Interventions.

Author(s) (year)	**Sample**	**Design**	**Skill-building**	**Psycho-education**	**Support**	**Face-to-Face**	**Tele-phone**	**Web**	**Total # ses-sions**	**Survivor outcomes ($p<.05$)**	**Caregiver outcomes ($p<.05$)**
Bakas et al., 2015[2]	N=254 T 123 C 131	RCT	X Problem solving, Stress manage, Asking HP info, skills	X Assess Tailored			9		9	Not applicable	Those with PHQ-9≥5: Depressive symptoms – 8, 24, 52wks Life changes – 12wks Total sample: Unhealthy days – 8wks **NS findings:** Depressive symptoms at 12wks, Life changes 8,24,52 wks Unhealthy days 12,24,52 wks
Cameron et al., 2015[3]	N=31 T_{staff}=11 T_{self}=10 U=10	RCT		X Assess Tailored		1_{staff} 1_{self}	6_{staff}		7_{staff} 1_{self}	Not applicable	From BL to 1,3,6 mo: T_{staff} improved perceived support T_{self} group increased mastery **NS findings**: Depressive symptoms, positive affect, social support at 1,3,6 mo.
Forster et al., 2013[4]	N=928 T=450 U=478	RCT Cluster by unit	X Hands on training	X Assess Tailored		?			?	**NS findings:** ADLs at 6 or 12 mo	**NS findings**: Burden at 6 mo or 12
Hirsch et al., 2014[5]	N=28 T=14 U=14	Quasi (not willing in control)	X Hands on training	X Info in 4 sessions		unlimited			unlimited	**NS Findings:** Rehospitalization	Depressive symptoms at discharge (T2) **NS Findings:** Depressive symptoms at BL (T1), and follow-up 4wks post discharge (T3). Prostration (discomfort) at T1,2,3 Burden at T1,2,3

Author(s) (year)	**Sample**	**Design**	**Skill-building**	**Psycho-education**	**Support**	**Face-to-Face**	**Tele-phone**	**Web**	**Total # ses-sions**	**Survivor outcomes (p<.05)**	**Caregiver outcomes (p<.05)**
Pfeiffer et al., 2014[6]	N=122 T=60 C=62	RCT	X Problem solving	X Card sort (part of problem solving)		2	18		20	Not applicable	Depressive symptoms at 3mo and 12mo Physical complaints at 3 &12 mo Leisure time at 3mo **NS Findings:** Sense of competence (mastery) 3&12mo, Problem solving 3&12mo Leisure Time at 12mo

N = Number of subjects; T = Treatment Group; C = Control Group; U = Usual care; cg = caregiver; pt = patient; NS = Not significant.
All listed outcomes indicate improvement unless listed under NS Findings.

Types of interventions include skill-building, psycho-educational, and support.[1]

“**Skill-building** – strategies that focus on ***processes*** that facilitate problem solving, goal setting, communicating with health care professionals, stress management, and hands on training in such skills as lifting and mobility techniques, assistance with activities of daily living, and communication tailored to the needs of the stroke patient.”[1]

“**Psycho-educational-** provision of ***information*** about (a) warning signs for stroke, lifestyle changes, and general resources, (b) managing survivor emotions and behaviors, (c) managing medications and personal care, (d) managing finances and transportation, and (e) managing one’s own emotions and health care needs.”[1]

“**Support** – engaging in ***interactions with peers*** for support and advice (e.g., support groups, online discussion forums).”[1]

Supplementary Table III. Summary of 5 Articles Testing Dyad Interventions.

Author(s) (year)	Sample	Design	Skill-building	Psycho-education	Support	Face-to-Face	Tele-phone	Web	Total # ses-sions	Survivor outcomes (p<.05)	Caregiver outcomes (p<.05)
Bishop et al., 2014[7]	N=49 dyads T=23 U=26	RCT	X Problem solving	X Assess Tailored			13		13	Global family 6mo Criticism of subj 3mo Criticism by subj 3mo Family functioning (FAD subscales): Problem solving 6mo Communication 3,6mo Roles 3,6mo Affective responsiveness 3,6mo Affective involvement 6mo Behavioral control 3,6mo General functioning 6mo **NS findings:** Global health utilization 3,6mo Global family 3mo Global functioning 3,6mo Physician visits 3,6mo Therapy hours 3,6mo IADLs 3,6mo FIM 3,6mo Depressive symptoms 3,6mo Rehospitalization 3,6mo Criticism of subj 6mo Criticism by subj 6mo Family functioning (FAD subscales): Problem solving 3mo Affective involvement 3mo	Global family 3&6mo Global functioning 3mo IADLs 3mo Criticism of subj 3,6mo **SS+CG (dyad)** SS+CG Global health utilization at 3mo SS+CG Global family 3&6mo SS+CG physical visits 3mo Criticism of subj 3,6mo Criticism by subj 3mo **NS findings (CG):** Global health utilization 3,6mo Global functioning 6mo Physician visits 3,6 Therapy hours 3,6 IADLs 6mo Depressive symptoms 3,6 mo Criticism by subj 3,6mo **NS findings (dyad):** Global health utilization 6mo Global functioning 3,6mo Physician visits 6mo Therapy hours 3,6mo IADLs 3,6mo

Author(s) (year)	Sample	Design	Skill-building	Psycho-education	Support	Face-to-Face	Telephone	Web	Total # sessions	Survivor outcomes (p<.05)	Caregiver outcomes (p<.05)
										General functioning 3mo	Depressive symptoms 3,6mo Criticism by subj 6mo
Chang et al., 2015[8]	N=19 dyads T=19	Quasi (single group)		X Group and Individual Assess Tailored		12			12	Perceived health status pre-post ADL pre-post IADL pre-post **NS findings:** Cost of health services	Caregiving satisfaction pre-post Satisfaction of day care service pre-post
Fens et al., 2014[9]	N=117 pt T=62 U=55 N=74 cg T=41 U=33	Quasi (non-random regional stroke services)		X Assess Tailored		5			5	Frenchay Activities Index- T6,12,18 Depression – T12 **NS findings:** Stroke Sickness Impact (primary)- T6,12,18 Barthel Index – T6,12,18 Anxiety –T6,12,18 Depression -T6	Depression – T6 **NS findings:** Life satisfaction (primary) – T6,12,18 Anxiety – T6,12,18 Depression –T12,18 Caregiver Strain – T6,12,18
Kim et al., 2013[10]	N=36 dyads T=18 U=18	RCT		X Assess Tailored				9	9	Exercise 3mo Salty food 3mo Fruit and vegetable 3mo Sense of control 3mo Health motivation 3mo **NS findings:** Triglyceride 3mo Cholesterol 3mo Smoking 3mo Alcohol 3mo Medication adherence 3mo	Caregiver mastery 3mo **NS findings:**
Ostwald et al., 2014[11]	N=159 dyads T=79 C=80	RCT	X Skill training	X Assess Tailored		16 (average)			16 (average)	Health status – 6mo Cognitive – 6mo **NS findings:** Health status – 12mo Cognitive – 12mo	Health status 6mo Family support 12mo Acquiring social support 12mo **NS Findings:**

Author(s) (year)	**Sample**	**Design**	**Skill-building**	**Psycho-education**	**Support**	**Face-to-Face**	**Tele-phone**	**Web**	**Total # sessions**	**Survivor outcomes (p<.05)**	**Caregiver outcomes (p<.05)**
			Coping strategies							Depression – 6,12mo Stress– 6,12mo SIS Physical– 6,12mo SIS Emotion– 6,12mo SIS Memory– 6,12mo SIS Communication– 6,12mo SIS recovery– 6,12mo FIM– 6,12mo Motor – 6,12mo Mutuality– 6,12mo	Health status 12mo Family support 6mo Social support 6mo Depression – 6,12mo Stress– 6,12mo Burden– 6,12mo Coping– 6,12mo Reframing– 6,12mo Spiritual support– 6,12mo Appraisal– 6,12mo MOS Social support– 6,12mo Tangible– 6,12mo Affectionate– 6,12mo Social interaction– 6,12mo Emotional/info support– 6,12mo # Friends/Relatives – 6,12mo Mutuality– 6,12mo Preparedness– 6,12mo

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“**Psycho-educational-** provision of ***information*** about (a) warning signs for stroke, lifestyle changes, and general resources, (b) managing survivor emotions and behaviors, (c) managing medications and personal care, (d) managing finances and transportation, and (e) managing one’s own emotions and health care needs.”[1]

“**Support** – engaging in ***interactions with peers*** for support and advice (e.g., support groups, online discussion forums).”[1]

Supplementary Table IV. Summary of survivor and caregiver outcomes.

Do family caregiver and dyad interventions improve survivor outcomes?	**Do family caregiver and dyad interventions improve caregiver outcomes?**
Survivor physical functioning. Two dyad studies[8,9] indicated that activities of daily living (ADL) and instrumental activities of daily living (IADL) were significantly improved for stroke survivors at the end of 12 and 18 months respectively. Another dyad study[11] reported rapid improvement in functional independence in the first 6 months, with significant improvement in cognitive ability in the intervention group.	**Caregiver preparedness.** Compared with standard care, two studies reported significant improvements in caregiver mastery at 1, 3, and 6 months post-stroke.[3,10] Other studies reported nonsignificant results with respect to problem-solving,[6] mastery,[6] and preparedness.[11] **Caregiver burden, stress, and strain.** Four interventions reviewed here targeted caregiver burden or strain as an explicit outcome,[4,5,9,11] but none showed significant effects.
Survivor anxiety and depression. One dyad study[9] found a significant reduction in survivor depression at 12 months compared with usual care, although no improvement in anxiety levels at 6, 12, or 18 months. In another dyad study,[11] depression in the intervention verses the control group did not achieve significance at 6 or 12 months.	**Caregiver anxiety and depressive symptoms.** Compared with a control group or usual care, four studies[2,5,6,9] showed significant improvements in depressive symptoms at various timepoints, with two studies sustaining these improvements up to a year.[2,6] One of the studies reported these findings only in a subgroup of caregivers with mild to severe depressive symptoms.[2] Other studies revealed nonsignificant results with respect to depressive symptoms,[3,7,11] possibly due to low baseline depressive symptom scores. Only one study[9] assessed caregiver anxiety, but did not find significant improvements.
Survivor health-related quality of life. Two dyad studies measured perceived health using a single item,[8,11] with one reporting improvement in survivor health within the intervention group over 12 weeks,[8] and the other showing significant improvement in survivor health compared with a control group at 6 months.[11] Kim and colleagues[10] revealed that, compared with a control group at 3 months, there were significant improvements in	**Caregiver health-related quality of life.** Several studies showed improvements in caregiver health-related quality of life.[2,6,11] Unhealthy days,[2] health status,[11] and life changes[2] improved in some studies, with a reduction in physical complaints found in another study.[6] One study reported no significant group differences for life satisfaction.[9]

health behaviors such as exercise, avoidance of salty foods, and increased fruit and vegetable consumption.[10]	
Survivor social functioning. Bishop and colleagues[7] evaluated a telephone intervention with dyads over 6 months. Compared with usual care, stroke survivors exhibited improvement in several aspects of family functioning at either 3 or 6 months, although not all outcomes were significant at all time points. Because of the large number of outcomes, findings were difficult to interpret. Findings do show promise for improving family functioning from the survivor's perspective.	**Caregiver social functioning.** Several interventions showed improvement in perceptions of family or other social support,[3,7,11] and increased leisure time during the early recovery period.[6] One study[7] reported reductions in caregivers' critical attitudes and behavior toward the survivor, but not reductions in caregivers' feelings of receiving criticism. Another study[11] reported nonsignificant findings regarding various social-relational outcomes, including survivor-caregiver relationship quality.
Survivor service use. One dyad study explored service use (global health utilization, physician visits, therapy hours, rehospitalization) and found no significant group differences at 3 or 6 months.[7] Interestingly, when caregiver and survivor scores were summed, they did find decreased global health utilization at 3 months; although, individual caregiver utilization scores were not significant.[7] Another caregiver study found no significant group differences for survivor rehospitalization.[5]	**Caregiver knowledge and satisfaction.** Chang and collagues[8] found significant improvements in caregiver knowledge and satisfaction with services (their primary outcomes) after 12 weeks of receiving the intervention; however, these findings should be interpreted with caution as no comparison group was used.

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