Home or Hospital for Stroke Rehabilitation? Results of a Randomized Controlled Trial

I: Health Outcomes at 6 Months

Craig Anderson, PhD; Sally Rubenach, MSocSc; Cliona Ni Mhurchu, PhD; Michael Clark, PhD;
Carol Spencer, BAppSc (OT); Adrian Winsor, FAFRM

Background and Purpose—We wished to examine the effectiveness of an early hospital discharge and home-based rehabilitation scheme for patients with acute stroke.

Methods—This was a randomized, controlled trial comparing early hospital discharge and home-based rehabilitation with usual inpatient rehabilitation and follow-up care. The trial was carried out in 2 affiliated teaching hospitals in Adelaide, South Australia. Participants were 86 patients with acute stroke (mean age, 75 years) who were admitted to hospital and required rehabilitation. Forty-two patients received early hospital discharge and home-based rehabilitation (median duration, 5 weeks), and 44 patients continued with conventional rehabilitation care after randomization. The primary end point was self-reported general health status (SF-36) at 6 months after randomization. A variety of secondary outcome measures were also assessed.

Results—Overall, clinical outcomes for patients did not differ significantly between the groups at 6 months after randomization, but the total duration of hospital stay in the experimental group was significantly reduced (15 versus 30 days; $P<0.001$). Caregivers among the home-based rehabilitation group had significantly lower mental health SF-36 scores (mean difference, 7 points).

Conclusions—A policy of early hospital discharge and home-based rehabilitation for patients with stroke can reduce the use of hospital rehabilitation beds without compromising clinical patient outcomes. However, there is a potential risk of poorer mental health on the part of caregivers. The choice of this management strategy may therefore depend on convenience and costs but also on further evaluations of the impact of stroke on caregivers. **(*Stroke*. 2000;31:1024-1031.)**

Key Words: caregivers ■ neuropsychological tests ■ randomized controlled trials ■ rehabilitation ■ stroke management

Stroke, with its attendant major mortality and morbidity rates, is a significant healthcare problem in many countries.[1,2] Given increasing demand on health services in aging populations, it is crucial that clinicians, consumers, and policy makers evaluate the most effective, efficient, and acceptable methods of managing patients with stroke.[3] In most developed countries, there is a heavy reliance on hospitals for the acute care and rehabilitation of patients with stroke, whereas the promotion of community services for these purposes is limited.[4,5] A strong argument in favor of admission to hospital after the onset of stroke is the potential benefit for some patients of rapid access to an accurate diagnosis and immediate treatments[6,7] and nursing care and multidisciplinary rehabilitation, which are often more readily available in hospital than at home.

There are, however, disadvantages to the emphasis on hospital services for stroke. Although inpatient care and rehabilitation may meet important clinical, physical, and psychosocial needs during the early crisis of stroke, the needs of patients and family caregivers as they evolve in the longer term may not be addressed in hospital.[8,9] Another issue is that the impact of stroke is perceived too much in terms of physical disability, and the long-term psychosocial aspects of stroke, including effects on caregivers,[10,11] are often overlooked by healthcare professionals.[9] Finally, admission to hospital is a major translocation for many patients, particularly those who are elderly and disabled, and inpatient rehabilitation may foster states of depression and learned dependency that are detrimental to long-term outcome.[12,13]

Advocates of home-based stroke rehabilitation suggest several advantages: satisfying patient choice, reducing the risks associated with inpatient care through reductions in length of hospital stay, the home setting being more focused toward rehabilitation outcomes, and savings in direct costs.[3,8]

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From the Rehabilitation and Ageing Studies Unit, Department of Medicine, Flinders University of South Australia, Daw Park, South Australia (C.A., S.R., M.C.); the Clinical Trials Research Unit, Department of Medicine, University of Auckland, Auckland, New Zealand (C.A., C.N.M.); and the Southern Domiciliary Care and Rehabilitation Service, Adelaide, South Australia (C.S., A.W.).

Correspondence to Professor Craig Anderson, Department of Medicine, University of Auckland, Private Bag 92019, Auckland, New Zealand. E-mail c.anderson@ctru.auckland.ac.nz

***Stroke* is available at http://www.strokeaha.org**

We wished to evaluate the effectiveness of this new model of early hospital discharge and home-based rehabilitation for patients with acute stroke. We postulated that the program would facilitate reintegration into the community and thereby improve health-related quality of life for patients and caregivers. The costs and resource implications of this policy were also investigated.

Subjects and Methods

Subjects

All patients with a clinical diagnosis of stroke (first-ever or recurrent), but excluding subarachnoid hemorrhage, who were admitted to the Flinders Medical Center (400 beds) or Repatriation General Hospital (270 beds) between February 1997 and June 1998 were assessed for participation in the trial. These are 2 affiliated acute-care public teaching hospitals serving a population of 340 000 in the southern metropolitan region of Adelaide, South Australia. All patients with stroke and residual disability who were assessed by the attending medical team as requiring rehabilitation were eligible for the trial according to the following criteria: (1) their hospital consultant agreed that they were medically stable and suitable to be discharged early from hospital to a community rehabilitation scheme, (2) they had sufficient physical and cognitive function for "active" participation in the rehabilitation scheme, (3) their home environment was suitable for simple modifications, (4) the community rehabilitation team was available to provide care, (5) they had a general practitioner who was willing to provide any necessary medical care, and (6) their caregiver (if one was identified) gave consent for participation.

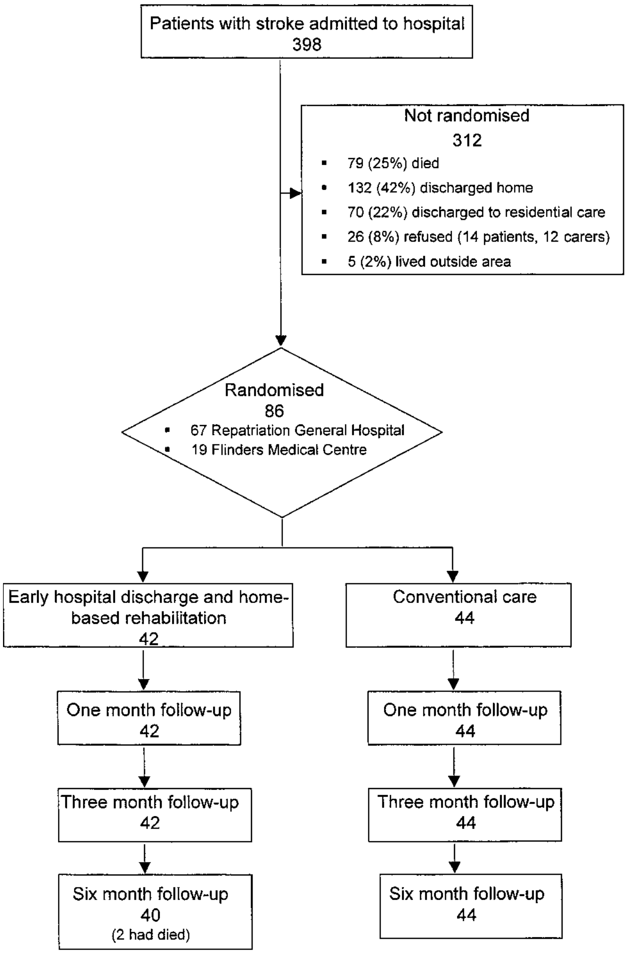
The study was approved by the research ethics committee at each institution, and written informed consent was obtained from all patients.

Intervention

A community rehabilitation team was formed that comprised a full-time program coordinator (an occupational therapist); a consultant in rehabilitation; and physiotherapists, occupational therapists, social workers, speech therapists, and rehabilitation nurses most of whom had experience in community therapy. Their time was contracted by the service according to workload. The role of the coordinator involved development of new interdisciplinary communication systems, close liaison with staff on acute medical and rehabilitation wards to identify potential patients, confirmation of the eligibility of patients, collection of consent and baseline data, setting of each individual patient's rehabilitation goals, organization of all necessary modifications to patients' homes, and coordination of input from therapists and other staff.

For patients randomized to the intervention program, efforts were made for any adaptations to the home, therapy, and other care to be organized so that discharge from hospital could occur within 48 hours of randomization. Therapy sessions were conducted in the patient's home and were individually tailored, with the aim of achieving a set of mutually agreed-upon goals over several weeks. Emphasis was placed on self-learning and adjustment to disability, and structured practice sessions were encouraged between visits. The community rehabilitation team met weekly to discuss each individual patient's progress while on the program. Patients were reviewed separately by the coordinator and the consultant at the time of discharge from the program and were referred to any community agencies for ongoing care as required.

Patients randomized to the control group received conventional care and rehabilitation in hospital, either on an acute-care medical/geriatric ward or in a multidisciplinary stroke rehabilitation unit run by specialists in rehabilitation or geriatric medicine. For these patients, care pathways were used, and discharge planning and follow-up care as an outpatient or in the community was organized according to usual policy.



Flow chart of patient randomization and follow-up, February 1997 to June 1998.

Baseline Assessment

The coordinator collected baseline data before randomization. This included sociodemographic information, clinical features of the current stroke, medical history and risk factors for stroke, details of physical functioning, and use of community services in the premorbid period. The modified Barthel Index[14] was used to assess the patient's level of activities of daily living (ADL), and the Mini-Mental State Examination[15] and 28-item General Health Questionnaire (GHQ-28)[16] were used to assess cognition and emotional state, respectively. The Adelaide Activities Profile (AAP)[17] and the General Functioning Subscale of the McMaster Family Assessment Device (MFAD)[18] were each administered to patients and caregivers to assess their premorbid levels of "non-ADL" activities and family dynamics, respectively. The AAP is a relatively new instrument that was developed from the Frenchay Activities Index[19] for the measurement of activities that focus on the lifestyles of older people across 4 domains: domestic chores, household maintenance, service to others, and social activities.

Randomization

Patients were randomized to a treatment allocation once consent and baseline assessments were complete. The hospital pharmacy department was contacted by telephone for the allocation sequence, which was computer-generated and maintained in sealed opaque envelopes. No stratification was performed.

Follow-Up

All patients (and their caregivers) were followed up at 1, 3, 6, and 12 months after randomization. At each of these assessments, patients

TABLE 1. Baseline Comparisons Between Groups of Patients With Stroke by Treatment Allocation

Variable	Home-Based Scheme (n=42)	Conventional Care (n=44)
Sociodemographic characteristics		
Age, y		
Mean (SD)	72 (11)	71 (11)
Median (interquartile range)	75 (66–78)	74 (66–78)
Male	26 (62)	22 (50)
Partnered	24 (57)	26 (59)
Lives alone	17 (40)	19 (43)
Retired	37 (88)	35 (80)
Identified caregiver	24 (57)	25 (57)
Previous use of community services	12 (29)	9 (20)
Medical history		
Previous stroke	9 (21)	8 (18)
History of myocardial infarction	10 (24)	14 (32)
History of cardiac failure	6 (14)	4 (9)
History of hypertension	29 (69)	19 (43)
History of diabetes mellitus	11 (26)	7 (16)
Current symptomatic arthritis	7 (17)	7 (16)
Details of stroke		
Pathology		
Cerebral infarction	38 (90)	37 (84)
Intracerebral hemorrhage	4 (10)	7 (16)
Site		
Right hemisphere lesion	18 (43)	19 (43)
Left hemisphere lesion	20 (48)	16 (36)
Brain stem/cerebellum lesion	4 (10)	9 (20)
Deficits at randomization		
Abnormal language	8 (19)	10 (23)
Abnormal speech	12 (29)	14 (32)
Abnormal swallow	6 (14)	8 (18)
Visual field loss	11 (26)	5 (11)
Ataxia/imbalance	5 (12)	11 (25)
Arm or leg paresis	39 (92)	35 (80)
Management		
Length of stay to randomization, d, median (interquartile range)	12 (7–21)	13 (7–25)
Stroke onset to randomization, d, median (interquartile range)	13 (7–21)	15 (8–32)
Place of randomization		
Acute medical ward	16 (38)	15 (34)
Stroke rehabilitation ward	26 (62)	29 (66)
Health status at randomization		
Modified Barthel Index,* median (interquartile range)	85 (80–97)	86 (77–95)
Mini-Mental State Examination,† median (interquartile range)	28 (25–29)	28 (26–30)
Adelaide Activities Profile‡		
Domestic chores, median (interquartile range)	53 (36–73)	60 (45–71)
Household maintenance, median (interquartile range)	56 (43–63)	50 (36–63)
Service to others, median (interquartile range)	50 (43–65)	65 (39–80)
Social activities, median (interquartile range)	46 (38–63)	38 (33–51)
General Health Questionnaire§		
Somatic, median (interquartile range)	5 (2–8)	4 (1–9)
Anxiety, median (interquartile range)	4 (2–8)	2 (1–7)
Social, median (interquartile range)	8 (7–12)	8 (7–11)
Depression, median (interquartile range)	0 (0–2)	0 (0–1)
McMaster Family Assessment Device,¶ median (interquartile range)	3 (2–3)	3 (3–3)

Values are numbers (percentages) of patients unless stated otherwise.

*Scale 0–100 (low score=low level of physical function).

†Scale 0–30 (low score=low level of cognitive function). No data for 16 patients due to dysphasia.

‡Scales standardized to mean 50 (low score=low level of activities).

§Scale 0–10 (high score=high level of psychological morbidity).

¶Scale 0–4 (high score=greater level of family pathology). No data from 46 patients who did not nominate a caregiver.

TABLE 2. Healthcare Utilization at 6 Months

Variable	Home-Based Scheme (n=42)	Conventional Care (n=44)	*P*	Mean or Median Difference	95% CI for Difference
Length of hospital stay, d					
From randomization, median (interquartile range)	2.0 (1.0–3.3)	11.5 (6.3–19.8)	<0.001	−9.0	(−13.0, −7.0)
Total bed days, median (interquartile range)	15.0 (8.0–22.0)	30.0 (17.3–48.5)	<0.001	−13.0	(−22.0, −6.0)
Readmission to hospital	15 (36)	11 (27)	0.25	4.0	(−8.8, 29.7)
Readmission stay, d, median (interquartile range)	6.0 (3.0–39.0)	4.0 (1.0–29.0)	0.26	2.0	(−7.0, 18.0)
Admitted to residential care	2 (5)	5 (11)	0.27	−3.0	(−20.0, 6.1)
Use of community services*	28 (67)	30 (68)	1.00	−2.0	(−21.3, 18.3)

*Use of community services includes use of any of the following: day center, outpatient rehabilitation, private therapy sessions, district nursing services, respite care, or meals on wheels.

underwent a face-to-face standardized interview in their own home with a research nurse who was independent of the rehabilitation team and unaware of treatment allocation. The main outcome measure used was health-related quality of life as assessed by the 36-item short-form questionnaire (SF-36),[20,21] which was administered to patients and caregivers. Assessments were also made of the patient's general health by use of the Nottingham Health Profile,[22] as well as of physical function, social activities, family dynamics, emotional state, and general health by use of the same instruments as were used at baseline. In addition, the MFAD, AAP, GHQ-28, and the Caregiver Strain Index[23] were administered to caregivers. Finally, the use of community services, readmissions to hospital, history of falls, place of residence, and patient and caregiver satisfaction with their medical care, rehabilitation, and recovery were assessed with questionnaires developed for the study. Outcomes at 6 months are presented here.

Statistical Analysis

Data were analyzed on the basis of intention to treat. Continuous variables that were approximately normally distributed were compared by independent sample *t* tests, and mean differences were expressed with 95% CIs. When the continuous variables showed evidence of nonnormal distribution, the Mann-Whitney *U* test was used to compare continuous data and 95% CIs calculated for the median difference. Categorical variables were compared by the χ^2 test. The analyses had 80% power to detect a 7-point difference on the physical and mental health summary of the SF-36 (assuming an SD of 10). This difference has been shown to reflect impairment associated with a limitation in the use of an arm or leg.[21] This required a total sample size of 65, but the final number of patients recruited was 86, to take into account a predicted dropout rate of ≈20%. All analyses were performed with SPSS for Windows[24] and Confidence Interval Analysis[25] software.

Results

In all, 398 patients with acute stroke were screened for eligibility for the trial between February 1996 and June 1998. The Figure shows the flow of patients through the trial. Of these 398 patients, 132 (42%) were assessed to have made a good recovery from stroke and were discharged home, 70 (22%) had severe disability and were discharged to a residential or nursing home, 5 (2%) had already lived or had moved out of the area, 79 (25%) died, and 26 (8%) refused to participate in the trial. The remaining 86 patients with residual disability were randomly allocated to treatment, 42 to early hospital discharge and home-based rehabilitation and 44 to conventional hospital and community care.

Table 1 shows the baseline characteristics of the intervention and control patients. More patients in the intervention group had a history of hypertension, but otherwise the sociodemographic, clinical, and functional characteristics of the study groups were similar at baseline. The mean age of the entire group was 75 years, with 56% being male and 57% having an identified partner or other caregiver.

The duration of the home-based intervention varied according to the individual needs of the patient. However, the median duration of home-based rehabilitation was 5 weeks (range, 1 to 19 weeks). All randomized patients were accounted for at the end of the study. Two patients in the intervention group died between 3 and 6 months of a recurrent stroke (at 14 weeks) and cardiac failure (at 18 weeks), respectively. Otherwise, follow-up was complete.

Table 2 shows information on the use of healthcare utilization during follow-up. Length of stay after randomization in the intervention group was significantly reduced (2 versus 11.5 days; $P<0.001$), so that the mean total time of initial hospital admission of 15 days in the intervention group was considerably shorter than that of 30 days in the control group (95% CI for difference, 6 to 22 days). No other significant differences between the 2 groups were found in the frequencies of readmission to hospital, use of community services, and admissions to residential care at the end of follow-up.

Table 3 describes the health outcomes for patients at 6 months. No significant differences between the 2 groups were found on any of the measures, including the domains of the SF-36, Nottingham Health Profile, and AAP. In both groups, most patients were satisfied with their recovery and input from services, but there was also consistency between groups in that the lowest levels of satisfaction were related to their understanding about stroke and the information they had received from healthcare professionals during the course of rehabilitation.

Among caregivers, however, there were some differences in health outcomes. Table 4 shows that caregivers of patients in the intervention group had lower general mental health (70

TABLE 3. Outcome Assessments for Patients at 6 Months by Treatment Group

Variable	Home-Based Scheme (n=42)	Conventional Care (n=44)	*P*	Mean or Median Difference	95% CI for Difference
SF-36,* mean (SD)					
Physical functioning	41.3 (29.1)	42.5 (28.1)	0.86	−1.2	(−13.8, 11.5)
Physical role limitation	70.7 (38.7)	76.9 (31.2)	0.43	−6.1	(−21.7, 9.4)
Bodily pain	61.2 (33.1)	70.1 (34.0)	0.24	−8.8	(−23.7, 6.0)
General health perceptions	61.8 (26.5)	67.3 (21.9)	0.31	−5.5	(−16.3, 5.2)
Vitality	53.8 (26.2)	55.5 (22.2)	0.75	−1.7	(−12.5, 9.0)
Social functioning	74.7 (31.3)	82.8 (23.8)	0.19	−8.1	(−20.4, 4.2)
Emotional role limitation	92.7 (21.7)	93.3 (24.1)	0.90	−0.7	(−10.8, 9.5)
Mental health	80.5 (17.3)	82.6 (13.6)	0.54	−2.1	(−9.0, 4.8)
Physical component score	37.4 (10.3)	39.6 (9.0)	0.47	−2.2	(−6.5, 2.1)
Mental component score	54.4 (9.2)	55.7 (8.4)	0.58	−1.3	(−5.2, 2.6)
Modified Barthel Index,† median (interquartile range)	96.0 (88.3–100)	98.0 (85.5–100)	0.99	0	(−2.0, 2.0)
Adelaide Activities Profile,‡ median (interquartile range)					
Domestic chores	39.7 (13.2–58.7)	36.4 (8.3–61.2)	0.89	0	(−9.9, 9.9)
Household maintenance	37.9 (23.1–49.5)	39.6 (23.1–52.8)	0.96	0	(−6.6, 6.6)
Service to others	50.1 (42.7–65.0)	57.6 (42.7–57.6)	0.86	0	(−7.4, 7.4)
Social activities	37.6 (37.6–61.2)	37.6 (37.6–54.8)	0.92	0	(−8.6, 8.6)
Nottingham Health Profile,§ median (interquartile range)					
Energy	24.0 (0–62.6)	24.0 (0–50)	0.61	0	(0, 21.6)
Pain	0.0 (0–12.9)	0.0 (0–17.1)	0.87	0	(0, 0)
Emotion	3.5 (0–10.5)	0.0 (0–11.2)	0.77	0	(0, 0)
Sleep	12.6 (0–33.4)	0.0 (0–22.4)	0.18	0	(0, 12.6)
Social	0.0 (0–22.4)	0.0 (0–22)	0.41	0	(0, 0)
Physical	23.9 (10.9–46.1)	21.1 (2.6–44.9)	0.52	0.5	(−9.3, 11.8)
Number (%) satisfied with care¶					
Satisfaction with recovery	33 (81)	29 (73)	0.56		(−10.4, 26.4)
Satisfaction with rehabilitation program	37 (90)	32 (80)	0.33		(−5.1, 25.6)
Satisfaction with return home	36 (95)	36 (90)	0.68		(−7.0, 16.4)
Satisfaction with information at time of illness	26 (63)	21 (53)	0.44		(−10.5, 32.3)
Satisfaction with communication with team	33 (81)	27 (68)	0.28		(−5.9, 31.9)
Satisfaction with understanding of why stroke occurred	16 (39)	22 (55)	0.22		(−37.4, 5.5)
Satisfaction with current support	39 (95)	36 (90)	0.43		(−6.3, 16.5)
McMaster Family Assessment Device,# median (interquartile range)	2.3 (2.0–2.5)	2.4 (2.0–2.5)	0.44	0	(−0.2, 0.1)
Number (%) with adverse events					
Dead at 6 months	2 (5)	0 (0)	0.24		(−1.7, 11.2)
Falls	5 (12)	7 (16)	0.82		(−18.6, 10.6)

Values are numbers (percentages) of patients unless stated otherwise. No more than 4 patients missed any assessment.

*Scale 0–100 (low score=low level of health-related quality of life).

†Scale 0–100 (low score=low level of physical function).

‡Scales standardized to mean 50 (low score=low level of activities).

§Scale 0–100 (high score=high level of ill-health).

¶Percentages calculated based on number of completed questionnaires.

#Assessed only in those patients living with family/others. Scale 0–4 (high score=greater level of family pathology).

TABLE 4. Outcome Assessments for Caregivers at 6 Months by Treatment Group

Variable	Home-Based Scheme (n=24)	Conventional Care (n=25)	*P*	Mean or Median Difference	95% CI for Difference
SF-36,* mean (SD)					
Physical functioning	76.4 (24.0)	72.6 (23.7)	0.61	3.7	(−11.0, 18.5)
Physical role limitation	73.9 (39.7)	60.7 (39.2)	0.28	13.2	(−11.2, 37.5)
Bodily pain	66.8 (31.4)	57.1 (29.9)	0.31	9.7	(−9.2, 28.6)
General health perceptions	67.9 (20.0)	63.5 (24.5)	0.53	4.3	(−9.6, 18.3)
Vitality	54.7 (23.2)	58.1 (19.6)	0.61	−3.4	(−16.6, 9.8)
Social functioning	74.4 (31.5)	80.4 (23.6)	0.49	−5.9	(−23.1, 11.3)
Emotional role limitation	80.3 (39.4)	73.0 (35.9)	0.53	7.3	(−16.0, 30.5)
Mental health	69.6 (18.5)	82.0 (11.9)	0.01	−12.4	(−22.1, −2.8)
Physical component score	47.4 (10.0)	41.6 (10.6)	0.07	5.9	(−0.6, 12.3)
Mental component score	46.7 (11.3)	52.3 (7.8)	0.07	−5.6	(−11.7, 0.4)
Not assessed	3	4			
Adelaide Activities Profile,† median (interquartile range)					
Domestic chores	69.4 (62.8–72.7)	69.4 (62–72.3)	0.64	0	(−3.3, 6.6)
Household maintenance	51.2 (45.4–63.6)	61.1 (55.3–66.0)	0.05	−9.9	(−13.2, 0)
Service to others	46.4 (33.5–59.4)	50.1 (42.7–72.4)	0.18	−7.4	(−14.8, 0)
Social activities	37.6 (26.9–57.0)	37.6 (20.5–54.8)	0.90	0	(−8.6, 17.2)
Not assessed	2	3			
General Health Questionnaire,‡ median (interquartile range)					
Somatic	5.0 (3–7.5)	3.0 (1–8)	0.29	1.0	(−1.0, 4.0)
Anxiety	7.0 (2.5–8.5)	5.0 (3.5–8)	0.76	0	(−3.0, 3.0)
Social	8.0 (7.0–9.5)	7.0 (6.5–9)	0.34	1.0	(−1.0, 2.0)
Depression	1.0 (0–2.5)	0.0 (0–0)	0.11	0	(0, 2.0)
Not assessed	7	8			
Caregiver strain index§					
Mean (SD)	0.2 (0.4)	0.2 (0.4)	0.94	0.01	(−0.3, 0.3)
Not assessed	0	4			
Number (%) satisfied with aspect of care¶					
Satisfaction with recovery	16 (73)	12 (55)	0.34		(−9.7, 46.1)
Satisfaction with rehabilitation program	17 (77)	13 (59)	0.33		(−8.8, 45.2)
Satisfaction with return home	17 (77)	19 (86)	0.70		(−31.7, 13.5)
Satisfaction with information at time of illness	17 (77)	16 (73)	1.00		(−21.0, 30.1)
Satisfaction with communication with team	17 (77)	19 (86)	0.70		(−31.7, 13.5)
Satisfaction with understanding of why stroke occurred	13 (59)	9 (41)	0.37		(−10.9, 47.2)
Satisfaction with current support	18 (82)	19 (86)	1.00		(−26.1, 17.0)
Not assessed	2	3			
McMaster Family Assessment Device,# median (interquartile range)	2.5 (2–2.6)	2.4 (1.5–2.5)	0.27	0.2	(−0.2, 0.6)
Not assessed	3	3			

*Scale 0–100 (low score=low level of health-related quality of life).

†Scales standardized to mean 50 (low score=low level of activities).

‡Scale 0–10 (high score=high level of psychological morbidity).

§Scale 0–1 (high score=high level of strain).

¶Percentages calculated based on number of completed questionnaires.

#Scale 0–4 (high score=greater level of family pathology).

versus 82; $P=0.01$) and mental component scores (47 versus 57; $P=0.07$) of the SF-36. Moreover, caregivers were less active in household maintenance activities according to the AAP ($P=0.05$) compared with caregivers in the control group. Caregiver satisfaction did not differ between the groups.

Discussion

This randomized, controlled trial of accelerated hospital discharge and home-based stroke rehabilitation examined a broad spectrum of outcomes ranging from substantive outcomes, such as death and readmissions to hospital, to more subjective outcomes, such as health-related quality of life and satisfaction with health care. Although patients in the intervention group received multidisciplinary home-based rehabilitation that was specifically targeted toward their individual needs, the program had no significant impact on their general health or physical or psychological outcomes that was different from that of conventional care. However, the program did achieve early discharge from hospital and a marked reduction in total length of stay. There is some evidence, however, that the program may have had an adverse impact on caregivers.

The finding of worse general mental health among caregivers in the intervention group is important, because there is little information about the impact of such schemes on the health and well-being of caregivers in previous studies of early discharge and home-based rehabilitation for patients with stroke. Although a "problem-solving" approach was used by the community rehabilitation team, it is possible that the observed trend of lower SF-36 mental health and mental component scores in caregivers in the intervention group may have occurred because the model of care focused on recovery for patients. If this is so, future accelerated discharge interventions for patients with stroke may benefit from increased focus on emotional support for caregivers and specific goal setting related to their own needs.[26,27] However, caution is needed in interpreting this result, because the sample size is small. In particular, these data relate to only ≈50% of the patient group who had a caregiver, and the large number of outcomes analyzed means that there is a possibility that a significant result occurred purely as a result of chance, resulting in a type I error. In addition, the process of consent to randomization might have biased the results, because some patients (and caregivers) might have been disappointed at being allocated to the control group,[28] although if there was bias, the expected direction of response would be for caregivers in the control group to have worse scores than those in the intervention group, but there was no such significant trend.

However, even if the observed significant difference between groups of caregivers is valid, there are certain issues about the SF-36 that are worth considering. The general mental health scale is a bipolar scale, with a midrange score earned by those reporting no symptoms of psychological distress. The high mean scores obtained by the caregivers in both groups (70 and 82) indicate a good level of mental health overall.[21] In addition, the mental health scale norm for the general population of South Australia is 79,[29] which again compares quite well with the scores obtained by the caregivers in both groups. Thus, it would seem that although there may be a difference in mental health scores between the groups of caregivers, their general mental health is not generally poor and, in fact, compares well with that of the South Australia population as a whole.

The 86 patients who participated in this study represented only 22% of all patients with stroke admitted to hospital over the study period. Unfortunately, no data are available to compare the trial patients with those who were excluded or refused to partake in the study. However, of the 312 hospitalized stroke patients who were not randomized, only 26 eligible patients declined to participate in the study, and the remainder were ineligible because of their health status or place of residence. Thus, the proportion of randomized patients probably compares well with patients allocated to rehabilitation services in everyday clinical practice.

Evidence of effectiveness of home-based stroke rehabilitation is available from several randomized controlled trials conducted over the past decade.[30–35] These trials have been undertaken among patients with stroke who have received either conventional[30–32] or early discharge from hospital.[33–35] All have concluded that home-based rehabilitation after stroke is feasible, acceptable to patients (and caregivers), and as effective as routine care and rehabilitation.[36,37] This study confirms that such a program can considerably shorten the length of stay in hospital, by ≈1 to 2 weeks on average, without compromising patient safety or functional outcomes for survivors of stroke. Of course, apart from the study involving 331 participants in London,[37] these studies of early discharge and home-based rehabilitation have all been relatively small (<100 participants), so there might be modest benefits (or risks) that would be evident only in a larger trial or from a systematic overview of all trials.[38]

In conclusion, accelerated hospital discharge and home-based rehabilitation in Adelaide proved to be a practical and effective alternative to conventional care for patients with stroke and resulted in a significant reduction in length of hospital stay. This reduction in length of stay may make home-based rehabilitation an attractive and cost-effective means of rehabilitating some patients with stroke in the Australian setting. However, further detailed investigation of the cost implications of such rehabilitation schemes is needed before they can be adopted unreservedly. The cost-minimization analysis of this randomized, controlled trial is reported in the accompanying article.

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