

Shared responsibility for ongoing rehabilitation: a new approach to home-based therapy after stroke

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Objective: To assess the efficacy of a programme of continuing self-directed exercises for people discharged home after a stroke, supervised once a week by therapists.

Design: A randomized controlled trial of 100 patients discharged from hospital after a stroke, requiring ongoing therapy. The control group received outpatient or day hospital therapy; the experimental group were visited once a week by an occupational and/or physiotherapist who prescribed a programme of exercises and activities for the following week. Subjects were studied for the first three months after discharge from hospital.

Setting: A district general hospital, or the homes of subjects randomized to the experimental group, in New Zealand.

Main outcome measures: (1) Characteristics of the groups, (2) gait speed, limb function, activities of daily living, (3) time with therapists, (4) mood of both subjects and caregivers, (5) anticipation of outcome at entry, compared with perceived outcome at exit.

Results: No statistical differences between the control and experimental groups in characteristics, or in any outcomes measured, except that the contact time period, but not the number of visits, was longer in the experimental group ($p = 0.003$).

Conclusions: A supervised home-based programme is as effective as outpatient or day hospital therapy.

Introduction

In our experience, patients with stroke-related disability attending outpatient rehabilitation clinics are often provided with instructions for an 'unsupervised' home-based therapy programme but may respond with variable enthusiasm. This has led us to speculate as to whether

conventional rehabilitation programmes may encourage patients and caregivers to believe that 'therapy' only happens during the time spent with a therapist. Typically such therapy can be given for 30-40 minutes only at each attendance and usually no more than two or three times a week. Thus outpatient therapy may disempower the patient and caregiver from believing that they can be actively involved in their own rehabilitation programme. Furthermore, in the hospital setting, it is often difficult to plan ongoing therapy without a detailed understanding of, and

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continuing supervision within, the home environment.

In this randomized controlled trial we report the results of a programme designed to share responsibility for ongoing rehabilitation at home by providing a visiting occupational therapist and/or physiotherapist once a week. The objective of the experimental (home) service was to advise on a continuing goal-orientated programme of activities for the clients, rather than to give 'hands on' therapy.

The main aims of this study were: to demonstrate the feasibility of such a programme; to show that the outcome for the experimental group would be no worse than for a control group attending outpatient or day hospital; and to identify whether or not home-based therapy would be less stressful for caregivers. The study was not designed to compare the relative value of each therapeutic approach.

Method

Inclusion criteria

We identified all patients admitted to North Shore Hospital with an acute stroke during the period August 1993 to September 1995. Acute stroke was defined according to the World Health Organization criteria as 'rapidly developing symptoms and/or signs of focal, and at times global, loss of cerebral function, with symptoms lasting longer than 24 hours or leading to death, with no apparent cause other than of vascular origin'.¹ Entry criteria for the study were: (a) a need for ongoing physiotherapy and/or occupational therapy after discharge as determined by the treating clinicians; (b) that subjects were able to travel to the hospital outpatient therapy departments; (c) that subjects be resident in a private home or rest home (residential homes for frail older people) within the health service region of the hospital.

All subjects gave informed consent, and the study was approved by the ethics committee of North Health, the Regional Health Authority for northern New Zealand.

Baseline data

Details were recorded in all subjects of age and sex, date of stroke and discharge from hospital, relationship of the caregiver and the volunteer helper (usually the caregiver), handedness, past medical history, additional comorbidity which might hinder ongoing rehabilitation and recovery, and history of previous strokes. Details of the neurological deficit from the stroke included side of the hemiplegia, and evidence of cognitive deficit using the Mini-Mental Status Examination (MMSE)² or the Mental Status Questionnaire (MSQ),³ visuospatial disorders using the Star Cancellation Test (a section of the Behavioural Inattention Test),⁴ loss of sensation to light touch and proprioception, presence or absence of speech disturbance. Speech disturbance was assessed using clinical judgement within a range of five options from normal speech through to major speech disturbance and great difficulty in being understood. The MMSE was used if this had been recorded as part of the ward assessment within a week of discharge, if not the MSQ was applied. A score of greater than 27/30 for the MMSE, or 8/10 for the MSQ, was accepted as 'normal'.

Randomization

Once entry criteria had been met subjects were randomized to one of two groups: outpatient therapy (control), or home therapy (experimental), before discharge home from hospital. Randomization employed a simple block design, with a total of five blocks of varying sizes, using sealed envelopes issued singly from a controlled source.

Study design

The control group were referred, at the time of discharge from hospital, to either the Health Services for Older People day hospital programme, or to a dedicated physiotherapy and/or occupational therapy outpatient department at the hospital. Patients attending the Health Services for Older People Day Hospital are outpatients who receive a multidisciplinary team assessment followed by goal setting. They then visit two or three times a week, for a total of about 5 hours each time, to undertake a therapeutic programme. Progress is monitored at weekly team meetings, the programme modified

as necessary, and discharge arranged when the patient is thought to have benefited as much as possible from the programme.

Entry to the day hospital is not restricted to older people, younger people with stroke may attend if this is the most suitable outpatient rehabilitation option available to them. Younger patients requiring only physiotherapy, or occupational therapy, are referred directly to the relevant outpatient department. Physiotherapy practice follows principles outlined by Bobath,⁵ and Carr and Shepherd.⁶ Occupational therapy practice is centred mainly on Bobath neuro-development and Carr and Shepherd motor relearning treatments, together with Kielhofner's model of human occupation.⁷

The experimental group were visited at home within a few days of discharge from hospital by the research physiotherapist and occupational therapist to make an assessment of their needs, ongoing rehabilitation goals, and of the environment in which the subject lived. A programme of exercises and activities was devised by the therapists, in collaboration with the subject, which the subject could continue throughout the following week. This was a functional approach which incorporated, as far as possible, goals set towards restoration, or improvement, of normal activities within the home and extending the boundaries of limitations that people had set for themselves. For instance reinforcing that 'doing the dishes', vacuuming, and other household activities were legitimate rehabilitation exercises requiring coordination, balance and a bilateral approach.

The programme was entered into a personalized diary, and updated as required throughout the active treatment period. Each subject was encouraged to attempt the prescribed programme several times a day, and if possible with the help of the caregiver. If a caregiver was not available, and if the subject was unable to manage alone, then an attempt was made to find a volunteer able to provide support and supervision. Otherwise subjects living on their own were asked to undertake their therapy programme unassisted. The subject or caregiver was asked to record the type and duration of activities they achieved each day. Therapists were instructed to make it clear that the purpose of their visit was to advise the subject on a self-directed therapy

programme. If the therapist decided that 'hands on' therapy was essential, she was asked to record the time spent doing this. Therapists visited once a week for as long as judged necessary, or for a maximum of 13 weeks. At the completion of the three-month study period those in the experimental (home) group who still required therapy were referred to an appropriate outpatient service.

During the experimental three-month period any subject in the experimental home group requiring a specialist medical opinion was referred to the day hospital medical clinic. If, in the course of home therapy, it became apparent that the subject or caregiver required support other than that which the home-based programme could offer, provision was made for that subject to cross over to the outpatient arm. Transfer from the outpatient arm to home therapy was not offered.

Outcome measures

The instruments used in this study were selected so that they could be completed within an hour, and from knowledge at the time of other similar studies published or in progress, to allow for the opportunity of meta-analysis at a later date.

Every effort was made to standardize assessments, and to blind assessors to the nature of the programme to which the subject had been randomized. All assessments for both groups were made by two independent research officers on site at the School of Occupational Therapy, Auckland Institute of Technology, a separate institution situated about 2 km from the hospital. Assessment was made within a week of discharge from hospital, six weeks later, and at exit from the study after three months.

Instruments used at each assessment were the Motor Assessment Scale (MAS),⁸ Modified Barthel Index of activities of daily living,⁹ 10-metre walking speed,¹⁰⁻¹² the Nine-hole Peg Test,¹³ Frenchay Arm Test,¹³ and grip strength using a Jamar Dynamometer NC 701550.¹⁴ An estimation of the mood of subjects was made using the Hospital Anxiety and Depression (HAD) Scale. This scale has been validated for patients in general medical outpatient departments, including for those with stroke.¹⁵ 'Prob-

ble anxiety' and 'probable depression' were recorded if the anxiety or depression subsets were 11 points or more.

Stress of caregivers was assessed at entry and at exit from the study using the 28-item General Health Questionnaire (GHQ-28), and depression in this group using the depression subset, section D.¹⁶

At entry into the programme subjects and caregivers in both groups were asked, individually, as to their expectations as to how much the programme might contribute to improvement of disability arising from the stroke. Later, at exit, subjects and caregivers were asked how much they thought that the programme had contributed to any improvement. On each occasion a response was elicited on a scale of 1-7, 7 being the most positive. Those scoring 6 or 7 were rated as 'very positive' with regard to expected or perceived improvement.

The number of visits and the amount of therapy time involved for each subject in each group was calculated from records kept by the research therapists, and from the records kept by therapists working in the hospital.

Statistical analysis

In all analyses subjects were categorized according to their initial group allocation on the intention to treat principle.

Based on available information at the time¹⁷ we estimated that a sample size of 45 subjects in each group would be required for a 90% power to detect a clinically important 4-second difference between subjects in a 10-metre walk time, and 80% power to detect a 20% difference in the other measures used ($\alpha = 0.05$). A sample of 100 subjects was obtained to allow for a 10% dropout rate over the three-month period of the study.

Statistical analysis to check randomization balance was undertaken using chi-square tests for proportions and *t*-tests for continuous data.

Since the distribution of the Modified Barthel Score is bounded at 100, potential for improvement in those whose entry score is high is limited relative to those whose entry score is lower. We therefore undertook an analysis of covariance, in which the baseline score is a covariant. The Wilcoxon two-sample rank sum test and the

Medians two-sample test were used to check the results obtained from analyses of covariance.

Results

Patient selection

From August 1993 until September 1995, 562 patients were admitted to North Shore Hospital with a provisional diagnosis of acute stroke. Three hundred and sixty-one were not eligible for the study because of the following: nonstroke diagnosis (32), death (50), adequate recovery that did not require ongoing outpatient therapy after discharge (106), severe disability requiring long-term institutional care (58), comorbidity which would affect their ability to undertake the trial (12), or a variety of other reasons (39). A further forty-seven had been referred to other hospitals for their rehabilitation, seven had not been assessed by the study team before discharge, and ten were still in hospital at the time recruitment was complete. Of the 201 eligible subjects, 82 lived too far away to be able to attend outpatient therapy or day hospital, and 19 declined to participate (six because they wanted to attend day hospital or outpatient therapy). At the end of the study 100 had been entered and randomized (Figure 1).

Of the 100 subjects entered into the study, two withdrew before the first assessment, one from personal choice, and one fell, requiring orthopaedic attention. Both were in the hospital (control) group meaning that 48 continued in this arm. By the six-week assessment one more had withdrawn from the hospital (control) group and one could not attend because of illness, and in the home (experimental) group three could not attend because of illness, one missed the appointment, and four withdrew. At the final assessment, three months after discharge, 46 were assessed in the hospital (control) group, with three withdrawn and one other too ill to attend, and 44 were assessed from the home (experimental) group, with four withdrawn and two too ill to attend. Those who withdrew did so from personal choice, or because they had moved away from the study catchment area.

One subject allocated to the home therapy group later crossed to the control arm after it

became evident that home therapy could not provide enough support for the caregiver who no longer wished to be involved with the ongoing

programme. For the purposes of data analysis this subject remained in the experimental (home) group.

The characteristics of the control (outpatient therapy) group ($n = 50$), and the experimental (home therapy) group ($n = 50$), are shown in Table 1. At entry into the study there were no significant differences between the two groups in age, sex, side of stroke, severity of stroke, or in associated diseases or conditions.

Outcomes

At baseline, six weeks and three months, there were no significant differences in neurological, physical and activities of daily living (ADL) function between the control and experimental groups, as measured by the various instruments applied. Table 2 shows the mean scores from all assessment instruments in both groups, with mean standard deviation. Walking speed (over 10 m) at entry was 19.6 (mean standard deviation = 19.3) seconds in the control group and 16.8 (13.2) seconds in the experimental group. Three months later there had been an improvement of 3.7 (10.8) seconds in controls, and 3.6 (5.7) seconds in the experimental group ($2p = 0.098$). Using Student's *t*-test, neither this, nor other measures showed superiority of one treatment over another, with the exception of the Barthel score ($p = 0.048$), but this apparent difference was not seen once observations with very low scores (<45) were removed. In subsequent covariance analysis of the Modified Barthel Score, the initial regression model predicting difference between entry and exit was particularly unstable. Model diagnostics identified several outliers which were unduly influencing the estimates and the effect sizes. When four observations were removed, the model became stable and accounted for 49% of the variance. Under this model a treatment group was not a significant predictor of improvement in Barthel score.

Subjects in the home group maintained their diaries with variable enthusiasm. There was a wide range of commitment to the prescribed activities, and to recording the time spent, so that it was not possible to accurately estimate the time spent on exercises at home.

Table 3 shows that there were no significant differences in anxiety and depression scores

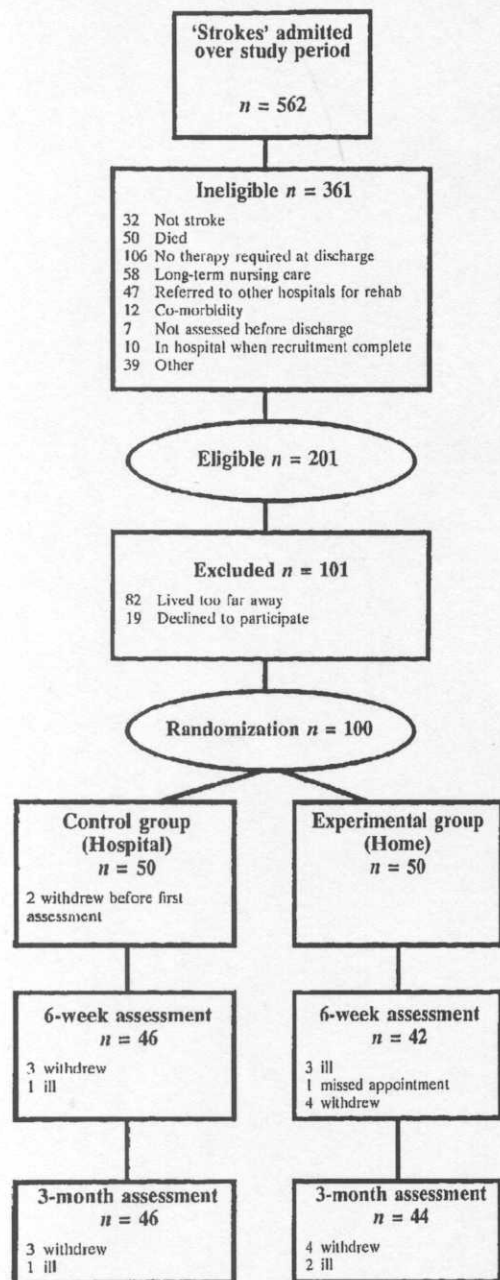


Figure 1 Profile of the trial

between the groups at entry into the study. However, at entry 11% in the control (outpatient) group and 22% in the experimental (home group) registered 'probable' anxiety, and 15% and 28% respectively registered 'probable' depression. The number registering 'probable'

Table 1 Demographic and descriptive comparisons at entry

	Hospital group (Controls)	Home group (Experimental)
Number randomized	50	50
Men	30	27
Left side affected by stroke	27	34
First stroke	42	37
Spouse was caregiver	32	30
Age, years		
Mean (SD)	71.7 (9.1)	67.8 (11.6)
Length of inpatient stay, days		
Mean (SD)	37.5 (36.4)	38.6 (28.1)
Median (Q2:Q3)	24 (8:59)	33 (15:64)

No differences between groups reached significance at $\alpha = 0.05$ level.

Table 2 Outcome measures at entry, and differences at mid-study and at exit (means and standard deviations unless otherwise stated). Some subjects could not complete all of the test instruments.

	Hospital group (Controls)		Home group (Experimental)		t-test <i>p</i> -value*
	<i>n</i>	Mean (SD)	<i>n</i>	Mean (SD)	
<i>At entry</i>					
10-m walking speed (s)	45	19.6 (19.3)	48	16.8 (13.2)#	
Motor Assessment Score (V48)	48	36.0 (12.6)	49	36.1 (12.2)	
Frenchay Arm Test (V5)	48	2.9 (2.2)	50	2.7 (2.1)	
Nine-hole Peg Test (pegs/s)	48	0.15 (0.17)	50	0.13 (0.16)	
Grip strength (kg) on affected side	48	14.9 (11.6)	49	18.2 (15.6)#	
Barthel Index (V100)	48	86.8 (15.7)	50	87.6 (14.2)	
Median (Q2:Q3)	48	93 (80:98)	50	93 (85:98)	
<i>Differences between scores at entry and mid-study</i>					
10-m walking speed (s)	43	-4.2 (10.4)	41	-3.0 (6.0)#	
Motor Assessment Score (V48)	46	2.0 (4.3)	41	3.0 (5.9)#	
Frenchay Arm Test (V5)	46	0.3 (1.1)	42	0.8 (1.3)	(<i>p</i> = 0.07)
Nine-hole Peg Test (pegs/s)	46	0.04 (0.09)	42	0.05 (0.08)	
Grip strength (kg) on affected side	46	2.4 (4.5)	40	2.4 (6.6)#	
Barthel Index (V100)	46	4.8 (7.4)	42	4.4 (7.4)	
Median (Q2:Q3)	46	3 (0:8)	42	3 (0:10)	
<i>Differences between scores at entry and exit</i>					
10-m walking speed (s)	43	-3.7 (10.8)	43	-3.6 (5.7)#	
Motor Assessment Score (V48)	45	3.1 (4.9)	43	2.6 (6.6)	
Frenchay Arm Test (V5)	47	0.6 (1.4)	44	0.7 (1.5)	
Nine-hole Peg Test (pegs/s)	47	0.07 (0.10)	44	0.08 (0.10)	
Grip strength (kg) on affected side	46	3.8 (5.5)	42	4.1 (7.1)	
Barthel Index (V100)					
All people included	46	6.5 (9.5)	44	2.5 (9.5)	(<i>p</i> = 0.048 sec text)
Outliers (scores <45 dropped)	46	6.5 (9.5)	42	3.6 (8.0)	

Variances differ significantly ($p < 0.05$).

* *p*-value on t-test (shown if two-tailed $p < 0.10$).

anxiety or depression declined after six weeks, remaining similar at three months at 6% (control) and 7% (experimental) for anxiety, and to 9% in both groups for depression. None of these differences reached significance.

Table 3 also shows stress in caregivers at entry and exit from the study as indicated by the GHQ-28. At entry, 31% of caregivers in the control (outpatient) group and 29% in the experimental (home) group scored more than six points, compared with 31% and 24% at exit. Using the

depression subset of the GHQ-28, 8% of caregivers in the control (outpatient) group, and 13% of caregivers in the experimental (home) group, registered significant alteration of mood at entry. This was sustained through to exit from the study for the experimental group, with a trend towards improvement in the control group. Again, there was no significant difference between the two groups.

Table 4 shows that at entry approximately three-quarters of subjects in both groups had

Table 3 Mood indicators at entry, at mid-study and at exit derived from Hospital Anxiety and Depression (HAD) Scale, and General Health Questionnaire (GHQ-28) (percentage of group scoring above cut-off)

	Hospital group (Controls)		Home group (Experimental)	
	<i>n</i>	%	<i>n</i>	%
<i>Patient's anxiety (score 11+ on anxiety questions in HAD)</i>				
At entry	47	10.6	50	22.0
At mid-study	46	10.9	41	14.6
At exit	47	6.4	44	6.8
<i>Patient's depression (score 11+ on depression questions in HAD)</i>				
At entry	47	14.9	50	28.0
At mid-study	46	8.7	41	7.3
At exit	47	8.5	44	9.1
<i>Caregiver's depression (score 1+ on depression subset of GHQ-28)</i>				
At entry	36	8.3	38	13.2
At exit	36	5.6	34	11.8
<i>Caregiver's total GHQ (score 6+ on GHQ-28)</i>				
At entry	36	30.6	38	29.0
At exit	36	30.6	34	23.5

Lower scores indicate better mood.
No comparisons were significant.

Table 4 Anticipation of outcome at entry, and judgement at exit (percentage rating 6, very good, or 7, excellent, on 7-point scale)

	Hospital group (Controls)		Home group (Experimental)		Chi-square <i>p</i> -value*
	<i>n</i>	%	<i>n</i>	%	
<i>At entry: 'How much do you expect that your therapy programme will help you improve?'</i>					
Subjects	48	72.9	49	81.6	
Caregivers	36	66.7	37	62.2	
<i>At exit: 'How much do you think that your therapy programme helped you to improve?'</i>					
Subjects	45	53.3	43	58.1	
Caregivers	36	36.1	34	52.9	(<i>p</i> = 0.06)

* *p*-value on chi-square (only shown if *p* < 0.10).
No differences between groups reached significance at $\alpha = 0.05$ level.

very positive expectations of further improvement during the therapy period. After three months just over half of the subjects thought that they had improved. Almost two-thirds of caregivers were similarly positive at entry, but at exit 36% of caregivers in the control (outpatient) group and 53% in the experimental (home) group thought that improvement had occurred. The differences between these groups were not significant, although the trend was that more caregivers in the experimental (home) group thought that there had been improvement ($p = 0.06$).

Table 5 gives the comparisons between the number of visits for therapy, and the total number of hours spent by the therapists with each subject. There was no significant difference in hours spent in therapy in either group, and the proportion of time spent in physiotherapy, compared to occupational therapy, was roughly equal. The number of visits either to hospital by the control group, or to home by the research therapists, was not significantly different. However the period over which contact was maintained with subjects was significantly greater in the home group (mean: eight weeks) compared to controls (mean: six weeks) ($p = 0.003$). Thus contact per visit was shorter in the experimental (home) group.

Discussion

Two published studies have already identified that ongoing therapy at home for patients discharged from hospital after a stroke is as effective as a rehabilitation programme in an outpatient department or day hospital.^{18,19} One,

the Bradford community study,¹⁸ provided physiotherapy alone and the other, the DOMINO study,¹⁹ provided physiotherapy and occupational therapy to patients in their own homes. In the Bradford study, cost calculations showed that the cost of providing home-based physiotherapy for patients was about half that for those attending day hospital.²⁰ Our research was similar in design to both studies, but emphasized the need for the patient and caregiver to share responsibility for ongoing rehabilitation. Recent consensus opinion on the management of acute stroke indicates that admission to hospital is the best option for almost all people who have had an acute stroke.^{21,22} However, selected patients discharged early and supported at home, compared with a routine hospital-based rehabilitation programme, appear to show no significant differences in outcomes for up to a year.^{23,24}

Our study has demonstrated that a once weekly visit by an occupational or physiotherapist to the home of a patient discharged from hospital after stroke to set up, supervise and encourage a set of simple activities which can be continued throughout the week is as effective as having the patient attend an outpatient clinic or day hospital. Validation of such an approach should be especially reassuring for those people with a stroke living in rural areas where access to ongoing outpatient therapy is difficult, for those who find transport to an outpatient clinic a problem, and for those for whom home-based therapy is their preferred choice.

Because of the wide variation of both disability and handicap in people who have had a stroke studies of this kind are difficult to design and to undertake. Power calculations are complicated in that the choice of instruments must cover a range

Table 5 Treatment during follow-up period of three months

	Hospital group (Controls)		Home group (Experimental)		t-test p-value*
	n	Mean (SD)	n	Mean (SD)	
Total hours spent in therapy	47#	11.3 (8.2)	50	8.75 (6.1)	($p = 0.09$)
Number of visits to/by therapy	47#	10.3 (7.2)	50	9.2 (5.3)	
Total therapy period (days)	47#	39.9 (27.3)	50	56.1 (23.9)	($p = 0.003$)

After removal of one outlier who had 61 hours of therapy and 85 visits.

* p-value on ttest (shown if two-tailed $p < 0.10$).

of physical disabilities which may be severe in one subject, mild in another, and normal in a third. Since discharge home usually depends on some degree of mobility, gait speed is likely to be the most reliable indicator of improvement in subjects,⁹ yet this gives no useful measure of quality of life. Our study may have been limited by the sample size, and by the fact that we have used surrogate quality of life measures in screening for mood disorders. Problems of sample size can be addressed by including this study in a meta-analysis with other similar studies. In our opinion, quality of life issues for people who have had a stroke, and their families, should be considered to be the most important area for future studies. Validation of shorter quality of life instruments, such as the EuroQol, for stroke may make this easier in the future.²⁵

An observation which requires follow-up was the increasing variance over time in 10-metre walking speed in the home group. This suggests that some subjects improved well, but others did worse in general than the hospital group, raising the possibility of a subgroup who may do better in home therapy. The DOMINO study suggested that younger people with stroke may do better in home therapy, but numbers in both studies were too small to demonstrate a significant effect and meta-analysis of the Bradford and the DOMINO studies failed to find a differential effect of treatment between those who were and were not frail.²⁶

Depression in subjects participating in the study seemed to decline after six weeks and therefore it may be important to screen for depression over this period, as discharge home appears to be a time associated with more risk of emotional distress. In our study, subjects in the experimental (home) group started out apparently more depressed than the control (hospital) group and, although not significant at entry, this almost reached significance at exit ($p = 0.06$). The baseline HAD score was not applied before the subjects were allocated to one or other of the two groups. Whilst we do not believe that knowledge of the nature of the therapy programme contributed to depression in some subjects randomized to the experimental group this possibility cannot be entirely excluded. All subjects registering probable anxiety and/or depression on the

HAD scale in our study were subsequently referred to and followed up by the Mental Health Services for Older People. This subset of the study will be discussed in a further publication.

Of equal concern is the apparently high incidence of stress in caregivers as indicated by the GHQ-28, and that this did not decline over the three months of the study. The Bradford community study found one-third of subjects were depressed, using the Nottingham Health Profile, and one-quarter of caregivers as indicated by the GHQ-28. The results of both studies stress the importance of using an appropriate assessment tool to monitor mood of both patients and caregivers following discharge from hospital after a stroke.

Fifty-three per cent of caregivers in the home group appeared to judge the outcome of the home programme favourably compared with 36% of caregivers of those attending outpatient clinics, although this did not quite reach significance ($p = 0.06$). Caregivers in the home group may have felt more supported by the research therapists, and may have gained from discussion and counselling during the visits of the therapist. Subjects coming to hospital for therapy tend to come alone, or be left at the hospital by caregivers, and the caregiver may not be able to get information and guidance so easily.

It has been shown that long-term physical performance after a stroke can be improved by pulses of physiotherapy, but that the advantage gained declines after therapy is discontinued.¹⁷ However, if gait training is maintained at home, improvement in gait, and perception of improved outcome, can be achieved for at least two years.²⁷ Therefore it seems important to change attitudes as to the nature and value of long-term rehabilitation. In our opinion, where possible, the patient should take control of their recovery programme by employing a range of activities which are both appropriate to the disability, and suit the emotional and social needs of that person. Long-term rehabilitation should not be seen solely in terms of contact with therapists but rather as a physical and emotional recovery programme using all available facilities, particularly those which are accessible and enjoyable. Future research should examine the role of programmes within stroke clubs, supervised swimming, gymnasiums, games,

alternative group activities such as conductive education, and social activities such as bus trips, lunches and barbecues, all of which require physical effort and therefore exercise combined with the pleasure of social interaction in a relatively safe environment.

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