Clinical Rehabilitation 1991, 5, 283-292

The Bradford community stroke trial: eight week results

John B Young and **Anne Forster** Department of Health Care for the Elderly, St Luke's Hospital, Bradford

To evaluate two commonly practised methods of stroke aftercare we have conducted a randomized comparison trial of day hospital (DH) and home physiotherapy (HPT). Patients over 60 years discharged from hospital following a new stroke event were eligible. One hundred and twenty-four patients were recruited, stratified by disability measured on the Barthel Index and by length of time since stroke onset, then randomized to attend a DH twice weekly or to receive HPT. Outcome measurements included the Barthel Index, Motor Club Assessment, Frenchay Activities Index, Nottingham Health Profile and the General Health Questionnaire.

One hundred and seven patients completed an eight week course of treatment. Both the DH and the HPT treated patients showed a significant but small further improvement in functional abilities with the HPT patients being significantly more able on stairs. Social function of both groups was poor but the HPT treated patients were significantly less so. More than a third of patients in each treatment group were depressed and more than a quarter of the carers were 'stressed'. The HPT patients received significantly less physiotherapy and virtually no occupational therapy compared to the DH group.

The findings suggest that HPT is slightly more effective for stroke aftercare than DH attendance and is considerably more resource efficient.

Introduction

There has been little appraisal of post-hospital discharge stroke care despite indications that disabled stroke patients returning home may show deterioration in functional skills.[1] A common pattern is for the disabled patient to become socially isolated and for care-givers to be anxious and emotionally stressed.[2,3] The day hospital and home physiotherapy are two important methods of providing stroke aftercare.

The importance of day hospital rehabilitation for stroke patients is reflected in the consistent finding of stroke as the commonest condition amongst day hospital attenders.[4] The day hospital provides an environment for multidisciplinary

Address for correspondence: Dr JB Young, Consultant Physician, Department of Health Care for the Elderly, St Luke's Hospital, Bradford BD5 ONA, UK.

rehabilitation, social interaction and offers carer support. However, these advantages may be outweighed by potential disadvantages: day hospital care is expensive,[5,6] the journey to the day hospital may be long and uncomfortable for the patient[7] and carer stress may be increased in preparing the patient for the unpredictable arrival of the ambulance. Moreover, day hospital rehabilitation, being remote from the patient's home, may concentrate more on disability than handicap.

It has been suggested that home physiotherapy is a more appropriate method of providing continuing rehabilitation for stroke patients.[8] There is no unsettling travel and the patient is therefore more likely to be relaxed and receptive to treatment. The therapy can be more readily directed away from disability and towards the handicapping problems of the patient's own environment with the additional potential advantage of greater carer involvement. However, these suggested benefits of home physiotherapy for stroke care remain unproven.[9] There are risks that the patient may become more isolated during home based treatment and that the physiotherapist becomes separated from a supporting multidisciplinary team. It has been shown that the provision of a special home care stroke service, including occupational therapy and physiotherapy, does not necessarily improve stroke outcome.[10]

The relative advantages and disadvantages of day hospital and home physiotherapy are therefore finely balanced.[11] Both services are well established in Bradford and the opportunity existed to organize a randomized trial to compare the two treatments. The trial was developed around three main questions:

1) Does one of the two rehabilitation treatments produce greater functional improvement as determined by selected outcome measures?
2) Does one of the two treatment modes reduce emotional stress and improve well-being for principal caregivers?
3) Does one of the two treatments reduce the need for social service or health authority community support?

Method

The trial was based on pilot work described in detail elsewhere.[12]

Entry criteria

All residents of Bradford Metropolitan District discharged home following a new stroke event from any of the Bradford hospitals, or from the elderly care wards of the neighbouring Airedale Health Authority, were eligible. The trial was limited to patients over 60 years who were fit to travel to the day hospital and had residual stroke related disability indicated by a discharge Barthel Index[13] score of less than 20. Patients with pre-stroke disability whose discharge Barthel score, although less than 20, had returned to their previous functional capabilities; patients discharged to residential care; and those patients whose main need was for family relief which could only be provided by a day hospital were excluded. A register of all stroke in-patients was maintained and updated daily by the research physiotherapist (AF). All stroke patients were seen prior to hospital discharge to determine if the entry criteria were fulfilled, and consent was then sought from the patient and their consultant.

Stratification

Once recruited, patients were stratified by time since stroke onset and by functional ability as indicated by the Barthel Index score at discharge. This stratification was used to increase the matching of the two groups and avoid one or other of the groups being biased by 'early discharges' with greater recovery potential or by severely disabled patients. Randomization to one of the two treatments was by an independent worker using four length random permuted blocks which ensured that each stratification cell would be well balanced for each trial treatment.

Trial treatments

To ensure that the trial would be a close reflection of the services currently available to stroke patients, treatment for the two groups of patients was based on a retrospective review of both services for the previous year.[12]

Day hospital treatment

These patients attended one of four day

hospitals. Two were within the Bradford Health Authority: a 30-place purpose built day hospital forming part of a geriatric rehabilitation hospital and a smaller newly converted day hospital forming an isolated unit in the community. Two were within Airedale Health Authority: a 30-place day hospital part of a district general hospital site and a smaller 15-place unit forming part of a community rehabilitation hospital.

All the day hospitals are consultant led and staffed by physiotherapists, occupational therapists, doctors and nurses with other members of the multidisciplinary team available as necessary. Trial patients attended the nearest day hospital twice a week for at least eight weeks and received multidisciplinary rehabilitation which included individual and group occupational therapy and physiotherapy given by experienced therapists. All patients were reviewed at regular intervals by the day hospital staff and therapy treatment modified as necessary.

Home physiotherapy treatment

Patients assigned to this group were treated by one of five community physiotherapists. Two specialized in treatment of stroke patients; two specialized in treatment of elderly patients and one was a general physiotherapist.

An important suggested advantage of home physiotherapy is the greater flexibility of treatment delivery which allows the physiotherapist to respond to individual patient need.[14] To reflect this advantage of home physiotherapy, the frequency and duration of treatment sessions for the trial patients was left to the discretion of individual therapists. However, to prevent an imbalance between the amount of therapy given, an upper limit of 20 hours treatment over the eight weeks was agreed with the five physiotherapists.

For both trial treatments the amount of therapy given to the patients was recorded by the staff concerned. All the trial patients were to receive at least eight weeks treatment, the patients were then reviewed and treatment continued or discontinued according to their needs.

Assessment of patients

Patients were assessed at time of discharge (in hospital), following the eight weeks treatment (at home) and at six months from discharge (at home) by a research worker (AF) who was not involved with the randomization or with the patient's treatment.

Physical function was assessed by the Functional Ambulation Categories,[15] the Barthel Index[13] and the Motor Club Assessment.[16] The Functional Ambulation Categories places patients in one of six categories depending upon the amount of assistance needed for walking. The Barthel Index measures capacity to perform some activities of daily living and has a scale of 0 (dependent) to 20 (independent but not necessarily normal). Functional movement, for example rolling, was measured by the movement section of the Motor Club Assessment. This scale was scored out of 45 with higher scores indicating independence in aspects of functional movement. Social activities such as cooking and going out were measured by the Frenchay Activities Index.[17] This index is in two parts but only the first part was used to assess patients following the eight weeks treatment. It is scored from 0 (inactive) to 30 (active). Perceived health status was assessed by the first part of the Nottingham Health Profile[18] (excluding the mobility section). A total score is obtained by summing the five subsections (emotion, energy, pain, sleep and social isolation) and dividing by five and has a range of 0 (best health) to 100 (worst health). The main carers completed the shortened version of the General Health Questionnaire[19] with a score of five or more indicating some stress.

Descriptive information including age, type of stroke, mental test score,[20] Frenchay Aphasia Screening Test (FAST),[21] home support and previous medical history was collected on all patients. Patients recording low scores on the FAST did not complete the Nottingham Health Profile.

Community services

The use of community services (e.g. home care, meals provision), was specifically recorded during the trial by the managers of those services. Information on district nursing input was available from data already routinely collected by that service.

Ethics

The trial was approved by the local Ethics Committee.

Analysis

A data base was constructed on a mainframe computer and analysed using the Statistical Package for the Social Sciences. Two principal types of analysis were performed.

Explanatory analysis

This analysis included only those patients who completed the eight weeks of therapy according to the protocol.

Intention to treat analysis

All patients, regardless of compliance with protocol, were included.

Within group statistical significance was determined by the Wilcoxon Signed Rank test; between group differences by the Mann-Whitney U test. In keeping with these nonparametric tests median values are reported. Only the eight week assessment results are described here, the six month assessments will be reported later.

Results

Patients

The first patient was recruited to the trial in January 1988 and the last patient in August 1989. During the study period 516 patients were assessed prior to discharge from the specified hospitals and 124 were recruited. Those patients not recruited comprised 143 patients discharged to residential care, 160 patients with a discharge Barthel score of 20, 40 patients with a Barthel score equal to their pre-stroke score, 25 patients who were transferred to other hospitals or lived outside the Bradford district and nine patients who required day hospital attendance to provide family relief. The consultant responsible for the patient refused permission in four cases and 11 patients refused consent. Of the 124 patients recruited to the study, 61 patients were randomized to the day hospital and 63 to receive home physiotherapy. The main characteristics of the patients in each group were well matched at base line assessment (Table 1). There were no statistically significant differences between the two groups for speech impairment (Frenchay Aphasia Screening Test), mental state (Abbreviated Mental Test), visual neglect (Albert's test[22]), tactile sensation or proprioception loss. There were seventeen withdrawals within the first eight weeks treatment (Table 2). Only the seven patients who died, the four readmitted to hospital and one patient who refused were not reassessed.

Table 1 Clinical features of the two groups of stroke patients

	Day hospital patients ($n = 61$) (%)	Home physiotherapy patients ($n = 63$) (%)
Male	31 (51)	38 (60)
Female	30 (49)	25 (40)
Right hemiplegia	26 (43)	27 (43)
Left hemiplegia	31 (51)	34 (54)
Other types of stroke	4 (7)	2 (3)
Previous stroke	18 (30)	18 (29)
Lived alone	18 (30)	18 (29)
Median age	72y	70y
(range)	60–88y	60–89y
Median discharge Barthel Index	15	16
(range)	4–19	1–19
Stroke-discharge interval		
< 4 weeks	10 (16)	14 (22)
4–7 weeks	19 (31)	23 (37)
8–11 weeks	14 (23)	12 (19)
> 12 weeks	18 (30)	14 (22)

Table 2 Reasons for patient withdrawal from the trial during the eight weeks.
Trial withdrawal criteria are listed in order of precedence so that there is no overlap between the groups.

	Day hospital patients ($n = 61$)	Home physiotherapy patients ($n = 63$)
Deaths	3	3
Readmitted	1	1
Refused treatment	5*	1†
Travel sick	2	–
Changed treatment to provide carer relief	–	1
TOTAL	11 (18%) - - - $p > 0.25$ - - -	6 (10%)

* One patient subsequently died, one was readmitted to hospital, two were treated by the community physiotherapist and one patient refused all treatment and reassessment.
† Patient later readmitted to hospital.

Explanatory analysis

There were 107 patients who completed the eight week course of treatment 50 in the day hospital group (DH) and 57 in the home physiotherapy group (HPT).

Physical outcome (Table 3)

Each group showed a significant but small improvement in Barthel score (median of the difference DH = 1.0; HPT = 1.0) and Motor Club Assessment score (DH = 3.0; HPT = 3.0) between discharge and eight weeks indicating a small degree of further functional improvement. However, there was no significant difference in the change of score between the two treatment groups (Barthel Index $p = 0.35$, Motor Club Assessment $p = 0.48$) indicating no overall advantage in physical outcome for day hospital or home physiotherapy as rehabilitation treatments in this situation. However, patients in the home physiotherapy group scored significantly higher on ability to climb stairs on both the Barthel Index ($p = 0.045$) and Motor Club Assessment ($p = 0.02$). There was no difference between the two groups in the changes in the Functional Ambulation Categories.

Emotional outcome (Table 3)

Each group showed a small but non-significant improvement in perceived health as indicated by the change in Nottingham Health Profile scores but there was no significant difference in the eight week score changes between the two groups either in the total score or in any of the individual

Table 3 Shows the median scores and the interquartile ranges for the Barthel Index, Motor Club Assessment and Nottingham Health Profile at discharge and following eight weeks treatment for the day hospital and home treated patients, the median change in score for the groups and a comparison of these changes between the two groups.

		Day hospital patients $n = 50$ Median (IQ range)	Home physiotherapy patients $n = 57$ Median (IQ range)	Between group differences
Barthel Index (range 0–20)	Discharge:	14.5 (11–16)	16.0 (13–17)	
	8 weeks:	15.0 (12–18)	16.0 (15–18.5)	
	Median change:	+1.0 (−1–2) ($p = 0.003$*)	+1.0 (0–3) ($p < 0.001$*)	$p = 0.35$**
Motor Club Assessment (range 0–45)	Discharge:	35.0 (29–38)	38.0 (32–40.5)	
	8 weeks:	39.0 (30.5–43)	41.0 (38–43)	
	Median change:	+3.0 (1–5.3) ($p < 0.001$*) $n = 45$‡	+3.0 (1–6) ($p < 0.001$*) $n = 51$‡	$p = 0.48$**
Nottingham Health Profile (range 100–0)	Discharge:	24.4 (8.9–42.1)	14.2 (4.6–37.6)	
	8 weeks:	23.7 (8.2–40.7)	12.4 (4.8–30.7)	
	Median change:	−1.7† (−8.5–11.3) ($p = 0.70$*)	+0.10 (−8.4–9.8) ($p = 0.69$*)	$p = 0.89$**

* Wilcoxon Signed Rank test

** Mann-Whitney U test

† The negative number for changes in the Nottingham Health Profile indicates an increase in the total score and a deterioration in perceived health status

‡ Missing values due to patients who had comprehension difficulties and therefore unable to complete the Nottingham Health Profile

subsections. Many of the patients (39% of DH and 27% of HPT; $p > 0.05$) had scores indicating depressed mood at eight weeks with a Nottingham Health Profile score of 30 or more.[18] Both groups of patients continued to have little energy and difficulty in sleeping. The mean social isolation scores were higher (greater perceived isolation) than those reported for 'fit elderly'[23] but of a similar order to those previously reported for patients assessed six months after hospital admission for acute stroke.[18]

Social outcome (Table 4)

The patients in the day hospital and home physiotherapy groups had similar levels of pre-stroke social activities as measured on the Frenchay Activities Index. Although both groups had low scores after eight weeks, indicating poor participation in social activities, the home treated group did score significantly higher (DH = 3.0; HPT = 4.0, $p = 0.02$). This difference was due to the home physiotherapy patients undertaking significantly more housework activities and walking outside.

Table 4 Frenchay Activities Index (Part I: maximum score 30) pre-stroke and following eight treatments for the day hospital and home physiotherapy patients.

	Day hospital patients $n = 50$	Home physiotherapy patients $n = 57$
Median pre-stroke score (IQR*)	19.5 ---- $p = 0.77$** ---- 20.0 (12–25)	(12–26)
Median 8 week score (IQR*)	3.0 ---- $p = 0.02$** ---- 4.0 (1–6)	(2–9.5)

* Interquartile range
** Mann-Whitney U Test

Carers

Of the 107 patients, 76 lived with a main caregiver. Three of these carers refused to complete the General Health Questionnaire and seven were unable to do so because of language difficulties. Fifteen (44%) of the 34 main carers in the day hospital group who completed the questionnaire showed an increase in stress over the eight weeks compared to only 8 (25%) of the 32 home physiotherapy group but this difference was not significant. Of the two groups, 47% of the day hospital and 34% of the home physiotherapy group had some depression at eight weeks as indicated by the General Health Questionnaire.

Intention to treat analysis

An intention to treat analysis was performed based on the procedure described by Barer *et al.*[24] This method is more robust when quantitative data rather than death is being used as the outcome as it ensures that all patients can be included in the analysis. The individual item scores of the Barthel Index and the Motor Club Assessment were listed and for each patient the number of items showing deterioration over eight weeks was subtracted from the number showing improvement to give a net indication of whether there was any change in the status of the patient. Patients who had died (seven) or were readmitted to hospital (four) within the first eight weeks were scored as having the worst possible functional outcome. Table 5 shows the comparison between the two groups. The between group changes for the Barthel Index was not significant but, and in contrast to the explanatory analysis, the home treated group showed a significant improvement compared to the day hospital group for the Motor Club Assessment scores ($p < 0.05$). This suggests that home therapy was more successful in maintaining functional movement.

Therapy input received (Table 6)

Day hospital and home physiotherapy patients received a similar amount of individual physiotherapy time over the eight weeks but, when group therapy is also included, the day hospital group received significantly more physiotherapy (DH median = 7.5 hours; HPT = 5, $p = 0.001$). Occupational therapy was available to all the day hospital patients but only three of the home treated patients received occupational therapy: two attended an outpatient department and one patient in the community group received occupational therapy at home when a pilot community care scheme was established to serve one area of Bradford. The difference in occupational therapy input was highly significant ($p < 0.001$).

Table 5 Intention to treat analysis comparing the aggregate change of the individual items of the Barthel Index and Motor Club Assessment

	Day hospital patients $n = 61$ Barthel Index $n(\%)$	Home physiotherapy patients $n = 63$ Barthel Index $n(\%)$	Between group differences
Improvement	30 (49)	34 (54)	$\chi^2 = 1.9$ df = 2
Deterioration	22 (36)	16 (25)	$p > 0.25$
No change	9 (15)	13 (21)	
	Motor Club Assessment	Motor Club Assessment	
Improvement	43 (70)	45 (71)	$\chi^2 = 6.4$ df = 2
Deterioration	16 (26)	9 (14)	$0.025 < p < 0.05$
No change	2 (3)	9 (14)	

Table 6 The amount of therapy in hours received by the two groups of patients. (* The occupational therapy records for four patients in the day hospital group were incomplete and have been excluded.)

	Day hospital patients ($n = 50$)	*Home physiotherapy patients* ($n = 57$)
Physiotherapy Median time (range):		
Individual	6.0 (0.9–15)	5.0 (0.5–15.5)
Group	*2.0 (0–8.5)*	—
TOTAL	7.5 (0.9–22)	5.0 (0.5–15.5)
	$p = 0.001$	
	($n = 46$)*	($n = 3$)
Occupational therapy time Median (range)	6.0 (0–19)	(2.5–15)
	$p < 0.001$	

Use of community services (Table 7)

District nursing

The district nursing records were available for all the trial patients but five were incomplete and have been omitted. Only seven (15%) of the day hospital group and eight (15%) of the community group were unknown to this service. The majority of the patients (63% of the day hospital group and 59% of the home treated group) received eight visits or less during the trial period and similar numbers in both groups received nine or more visits in the eight week periods. There was no significant difference between the two groups in the use of the district nursing service.

Social services

Information was provided on the home care support given to the trial patients. Of the 107

Table 7 The amount of community support provided by district nurses and the Home Care Service for the two groups of patients during the eight weeks following discharge from hospital

	Day hospital patients		Home physiotherapy patients
District Nursing Service			
	($n = 48$)		($n = 54$)
No service	7 (15%)	$\chi^2 = 0.139$	8 (15%)
< 9 visits	30 (63%)	$p = NS$	32 (59%)
9 visits or more	11 (23%)		14 (26%)
Home Care Service			
	($n = 50$)		($n = 57$)
No services	28 (56%)		30 (53%)
Alternate weekly help	5 (10%)	$\chi^2 = 5.4$	8 (14%)
< 4 hours a week	12 (24%)	$p = NS$	7 (12%)
4 to 6 hours a week	2 (4%)		8 (14%)
> 6 hours a week	3 (6%)		4 (7%)

patients, 56% patients in the day hospital group and 53% in the home treated group were given no assistance by the Home Care Service. This includes four patients (two from each group) who refused help that was offered. There was no significant difference in the quantity of assistance given to the two groups. The pattern of services remained similar for the majority of patients over the eight week period with only six patients (two in the day hospital group and four in the home group) having home care support reduced as personal independence improved.

Discussion

The randomized trial described here compares day hospital attendance with home physiotherapy for stroke patients leaving hospital. A pragmatic approach was adopted in the trial design as the intent was to evaluate the two services as they are currently practised. The entry criteria were therefore constructed to be simple but to minimize distortion in usual referral patterns. They were based on a retrospective review of stroke patients treated by the two services during the previous year and had some validity in that only six patients excluded from the trial (Barthel Index score of 20) received further rehabilitation as outpatients. Comparison with a previous day hospital study[11] suggests that the amount of therapy given to the day hospital patients was a fair reflection of current practice. Fears at the onset of the study that the trial might be biased by the home therapy patients being given considerably more physiotherapy were unfounded and the imposed upper limit of 20 hours treatment was unnecessary. Variation in therapeutic skills and in therapist–patient relationships are important potentially confounding variables but this trial encompassed the activities of four day hospitals and five community physiotherapists so diluting variations in individual competencies and represents an evaluation of the core concept of day hospital and home rehabilitation for stroke.

The principal findings of the trial are that following eight weeks treatment stroke patients in both groups showed further improvement in physical abilities; no change in emotional distress; remained socially inactive and that over a third of the care givers had continued high levels of stress. The improvement of physical function, although significant, was small and of limited clinical importance. However, it is apparent that *either* rehabilitation treatment can *maintain* physical function which is itself valuable given the concern that many stroke patients deteriorate functionally shortly after discharge from hospital. Neither treatment was associated with any change in community care support, but this first eight week period may be too early for community support to change; the support received by the patients represented that arranged by the hospital prior to discharge. The extended follow up which is under way may be a more reasonable period in which to observe changes in home support for the two treatment groups.

There were indications that home physiotherapy is capable of causing a modest benefit over day hospital attendance in certain aspects of stroke outcome. The home treated group showed significantly greater improvement in ability to use stairs, to walk outside and to do housework. The intention to treat analysis, but not the explanatory analysis, indicated that home therapy can produce a significantly greater improvement in functional movement. This may be because the patient is more relaxed in their own home and therefore more receptive to treatment compared to the patients transported by ambulance which may increase stroke related spasticity. The findings do suggest therefore that home based treatment can be more relevant to the patient.

There was also evidence that home treatment was preferred by the patient as indicated by the greater number of withdrawals from the day hospital treated group. Five patients refused day hospital treatment after a few attendances compared with only one in the home treated group. Ambulance travel to the day hospital is both expensive[5,6] and disliked by the patient: up to 20% experience motion sickness.[7] Travel related problems accounted for five of the day hospital withdrawals and two other patients had motion sickness but continued their attendance.

Subjective evidence has previously suggested that relatives find day hospital care beneficial.[25] Our study did not confirm this finding as there was a trend for the main carers of patients attending the day hospital to show an increase

n stress, compared to a decrease in stress in the nain carers of the home physiotherapy group.

Occupational therapy treatment is important n accelerating early stroke recovery,[26] but may ɔe less so in the later stages. In this study the day hospital patients received a median of six hours occupational therapy treatment during the eight weeks compared with essentially none in the home treatment group (only three patients received occupational therapy). However, the home treated patients did not seem disadvantaged by this lack of occupational therapy input. One explanation is that community physiotherapists may take on an extended role and undertake some 'occupational therapy' tasks. In this respect, and given that the outcome was slightly better for the home treated patients than the day hospital attenders, home treatment by a community physiotherapist can be seen to be more efficient in terms of resources used.

Further evidence of the greater efficiency of home treatment is provided by the trial information of the amount of physiotherapy provided to the two groups of patients. Both groups received a similar amount of individual physiotherapy treatment but the day hospital patients also received group treatment so that the total treatment was greater for the day hospital attenders. This finding implies either that day hospital group physiotherapy treatment is of limited value for stroke patients, or, that the combination of day hospital individual and group treatments is of a similar effectiveness as home based treatment. In either respect, and even if community physiotherapist travel time is also taken into account (8% of their total time according to one study[27]), home physiotherapy should still be preferred as the more efficient of the two rehabilitation approaches.

The apparent greater efficiency with some improvement in effectiveness for home based physiotherapy treatment does bring into question the role of the traditional multidisciplinary team for stroke care in this situation of 'aftercare'. A previous study[10] has also cautioned the effectiveness of multidisciplinary care in community stroke management. Further analysis is in hand to examine this aspect of the trial in more detail and the six month assessments will be available shortly to determine whether the benefits of home physiotherapy are maintained.

Acknowledgements

We are particularly grateful to Miss V Steele, Director of Rehabilitation, Bradford Health Authority, the day hospital staff and therapy staff of Bradford and Airedale Health Authorities without whose support and co-operation this trial could not have taken place. We would also like to thank the patients and their families who so freely gave of their time; the consultants who referred patients and the Home Care Organizers who completed the information sheets.

We are pleased to acknowledge the statistical and computer help given by Dr David Jerwood and Mr Brian Howlett of the University of Bradford.

We are especially indebted to the Chest, Heart and Stroke Association who provided the funding for this research.

References

1 Garraway WM, Akhtar AJ, Hockey L, Prescott RJ. Management of acute stroke in the elderly: follow-up of a controlled trial. *Br Med J* 1980; **281**: 827–29.
2 Kettle M, Chamberlain MA. The stroke patient in an urban environment. *Clinical Rehabilitation* 1989; **3**: 131–38.
3 Wade DT, Legh-Smith J, Langton Hewer R. Effects of living with and looking after survivors of a stroke. *Br Med J* 1986; **293**: 418–20.
4 Hildick-Smith M. Geriatric day hospitals: practice and planning *Age Ageing* 1980; **9**: 38–46.
5 Hildick-Smith M. Geriatric day hospitals – changing emphasis in costs. *Age Ageing* 1984; **13**: 95–100.
6 Young J, Forster A. Cost analysis of geriatric day hospital care. *J of Clinical and Experimental Gerontology* (in press).
7 Stokoe D, Zuccollo G. Travel sickness in patients attending a geriatric day hospital. *Age Ageing* 1985; **14**: 308–11.
8 Warlow C, Wade D, Sandercock P *et al. Strokes.* Lancaster: MTP Press Ltd, 1986: 125.
9 Forster A, Young J. The role of community physiotherapy for stroke patients. *Physiotherapy* 1990; **76**: 495–97.
10 Wade DT, Langton Hewer R, Skilbeck CE, Bainton D, Burns-Cox C. Controlled trial of a home-care service for acute stroke patients. *Lancet* 1985; **i**: 323–26.
11 Forster A, Young J. Day hospital and stroke patients. *Int Disabil Stud* 1989; **11**: 181–83.
12 Young J, Forster A. Methodology of a stroke rehabilitation trial. *Clinical Rehabilitation* 1991; **5**: 127–33.
13 Mahoney FI, Barthel DW. Functional evaluation: the

Barthel Index. *Maryland State Medical Journal* 1965; **14**: 61–65.
14 Partridge CJ. Access to physiotherapy services. *JR Coll of General Practitioners* 1982; **32**: 634–36.
15 Wade DT, Wood VA, Heller A, Maggs J, Langton Hewer R. Walking after stroke. *Scand J Rehab Med* 1987; **19**: 25–30.
16 Ashburn A. A physical assessment for stroke patients. *Physiotherapy* 1982; **68**: 109–13.
17 Wade DT, Legh-Smith J, Langton Hewer R. Social activities after stroke: measurement and natural history using the Frenchay Activities Index. *Int Rehabil Med* 1985; **7**: 176–81.
18 Ebrahim S, Barer D, Nouri F. Use of the Nottingham Health Profile with patients after a stroke. *J Epidemiol Community Health* 1986; **40**: 166–69.
19 Goldberg DP, Hillier VF. A scaled version of the General Health Questionnaire. *Psychol Med* 1979; **9**: 139–45.
20 Hodkinson HM. Evaluation of a mental test score for assessment of mental impairment in the elderly. *Age Ageing* 1972; **1**: 233–38.
21 Enderby PM, Wood VA, Wade DT, Langton Hewer R. The Frenchay Aphasia Screening Test: a short, simple test for aphasia appropriate for non-specialists. *Int Rehabil Med* 1987; **8**: 166–70.
22 Albert ML. A simple test of visual neglect. *Neurology* 1973; **23**: 658–64.
23 Hunt SM, McEwen J, McKenna SP. Measuring health status: a new tool for clinicians and epidemiologists. *J R Coll General Practitioners* 1985; **35**: 185–88.
24 Barer DH, Ebrahim SB, Mitchell JRA. The pragmatic approach to stroke trial design: stroke register, pilot trial, assessment of neurological then functional outcome. *Neuroepidemiology* 1988; **7**: 1–12.
25 Anand KB, Thomas JH, Osborne KL, Osmolski R. Cost and effectiveness of a geriatric day hospital. *J R Coll Physicians London* 1982; **16**: 53–56.
26 Smith ME, Garraway WM, Smith DL, Akhtar AJ. Therapy impact on functional outcome in a controlled trial of stroke rehabilitation. *Arch Phys Med Rehabil* 1982; **63**: 21–24.
27 Burnard S. Development of a community physiotherapy service. *Physiotherapy* 1988; **74**: 4–8.