

Occupational therapy for stroke patients not admitted to hospital: a randomised controlled trial

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Summary

Background Patients who have a stroke are not always admitted to hospital, and 22–60% remain in the community, frequently without coordinated rehabilitation. We aimed to assess the efficacy of an occupational therapy intervention for patients with stroke who were not admitted to hospital.

Methods In this single-blind randomised controlled trial, consecutive stroke patients on a UK community register in Nottingham and Derbyshire were allocated randomly to up to 5 months of occupational therapy at home or to no intervention (control group) 1 month after their stroke. The aim of the occupational therapy was to encourage independence in personal and instrumental activities of daily living. Patients were assessed on outcome measures at baseline (before randomisation) and at 6 months. The primary outcome measure was the score on the extended activities of daily living (EADL) scale at 6 months. Other outcome measures included the Barthel index, the general health questionnaire 28, the carer strain index, and the London handicap scale. All assessments were done by an independent assessor who was unaware of treatment allocation. The analysis included only data from completed questionnaires.

Findings 185 patients were included: 94 in the occupational therapy group and 91 in the control group. 22 patients were not assessed at 6 months. At follow-up, patients who had occupational therapy had significantly higher median scores than the controls on: the EADL scale (16 vs 12, $p < 0.01$, estimated difference 3 [95% CI 1 to 4]); the Barthel index (20 vs 18, $p < 0.01$, difference 1, [0–1]); the carer strain index (1 vs 3, $p < 0.05$, difference 1 [0 to 2]); and the London handicap scale (76 vs 65, $p < 0.05$, difference 7, [0.3 to 13.5]). There were no significant differences on the general health questionnaire between the patient or carer.

Interpretation Occupational therapy significantly reduced disability and handicap in patients with stroke who were not admitted to hospital.

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Introduction

Patients who have a stroke, particularly those who require limited nursing care and who do not live alone, are not always admitted to hospital. In the UK, 22–60% of stroke patients are not admitted and many do not receive rehabilitation.^{1–4} Lincoln and colleagues⁵ reported that these patients had a new disability in terms of instrumental activities of daily living (outdoor mobility, household tasks, leisure participation) rather than in personal activities of daily living (self-care skills), and that the common impairments responsible were arm weakness and various cognitive deficits. Noad and colleagues⁶ reported that stroke patients who were admitted to hospital, even for a short time, were more likely to receive increased community services than patients who were not admitted, although both groups had similar levels of disability.

Occupational therapy aims to promote recovery through purposeful activity; it focuses on disability and is commonly used in the treatment of stroke. There have been several small trials showing that this approach may reduce disability in stroke patients in the community after a hospital stay,^{7–9} but there has been no study of the effect of occupational therapy on stroke patients who are not admitted to hospital. We undertook a randomised, controlled trial of occupational therapy for this group of patients.

Methods

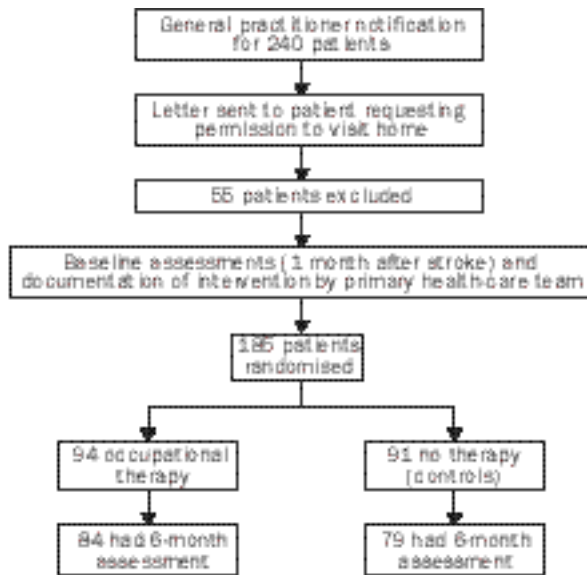
Patients

Our single-blind randomised controlled trial was approved by the local ethics committee. All patients gave their informed consent to take part in the study.

We identified patients from a community stroke register.⁵ The register was compiled from UK practices within Nottingham and southern Derbyshire, according to size of practice, age of patients, fundholding status, computersation, teaching (trainee general practitioners), and social deprivation. Patients who had had a recent (<1 month) clinically diagnosed stroke and had not been admitted to hospital were eligible to take part in the study. We excluded patients if they were identified later than 1 month after the stroke, had a history of dementia, lived in a nursing or residential home, or could not speak or understand English before their stroke.

Study design

Baseline assessments were done before randomisation in the patients' home 1 month after the stroke. We assessed activities of daily living with the Barthel index¹⁰ (range 0–20, higher scores denote greater independence) and the extended activities of daily living scale (EADL,¹¹ range 0–22, higher scores denote greater ability in instrumental activities of daily living). The Rivermead motor assessment gross function section¹² (range 0–13, higher scores denote greater motor ability) was used to assess motor performance. Mood was assessed by the general health questionnaire 28¹³ (range 0–84, higher scores denote worse psychological health). The carer strain index¹⁴ (range 0–13, higher scores denote greater strain) was used to assess the caregivers.



Trial profile

We recorded information about the services the patients reported that they had received since the onset of stroke. Patients were then allocated randomly to occupational therapy or to no intervention (control group). Randomisation was by numbered, sealed, opaque envelopes prepared from random-number tables.

Patients allocated to occupational therapy received visits from a research occupational therapist for up to 5 months. The frequency of treatment was agreed between the therapist, patient, and, if relevant, the carer. The aim of therapy was independence in personal and instrumental activities of daily living. Personal care included activities such as bathing, feeding, dressing, and stair mobility. Instrumental activities of daily living included activities such as outdoor mobility, driving a car, travelling by public transport, and household chores. Patients were also encouraged to take part in leisure pursuits. The focus of therapy was active intervention rather than assessment or liaison. Specific tasks were set as homework when possible.

Patients in the control group received no additional input from the research therapist, but may have received input from existing services, as would occur in routine practice.

	Occupational therapy group (n=94)	Control group (n=91)
Mean (SD) age in years	73.6 (8.1)	75.1 (8.6)
Sex (M/F)	52/42	42/49
Side of hemiparesis		
Left	45	40
Right	39	41
Other	10	10
Lived alone	28 (30%)	33 (36%)
History of one or more stroke(s)	27 (26%)	29 (32%)
Community intervention at 1 month		
None	70	73
Occupational therapy	6	4
Physiotherapy	9	5
Speech and language	0	2
Nursing	4	2
Day hospital	3	3
Homecare aid	6	6
Meals on wheels	0	1
Median (IQR) scores		
Barthel index	18 (15-20)	18 (15-20)
EADL	10 (4-15)	11 (3-16)
RMA (gross function)	8 (6-11)	8 (6-11)
Carer strain index	4 (1-7)	4 (1-7)
General health questionnaire 28	26 (18-35)	27 (19-32)

RMA=Rivermead motor assessment.

Table 1: Baseline characteristics of patients

Outcome measures	Median (IQR) scores		p	Mean difference (95% CI)
	Occupational therapy (n=84)	Control (n=79)		
Barthel index	20 (18-20)	18 (16-20)	0.002	1 (0 to 1)
EADL	16 (11-18.75)	12 (6-17)	0.009	3 (1 to 4)
Carer strain index	1 (0-4)	3 (1-6)	0.02	1 (0 to 2)
General health questionnaire 28				
Patient	20 (14-30)	23 (15-35)	0.29	-2 (6 to 2)
Carer	18 (11-24)	18 (13-27)	0.75	0 (-4 to 3)
London handicap scale	76.1 (60.8-88.6)	65.2 (47.9-86.9)	0.03	6.75 (0.3 to 13.5)

Table 2: Outcome at 6 months

Outcome assessments

We assessed patients 6 months after randomisation with measures of disability and handicap. The primary outcome measure was the score on the EADL scale as a measure of instrumental activities of daily living. Other measures included the Barthel index, the Rivermead motor assessment gross function section, the London handicap scale¹⁵ (range 0-100, lower scores denote greater handicap), the general health questionnaire 28 (to assess the patient and the carer), and the carer strain index. An independent assessor who was unaware of treatment allocation assessed the patients in their homes. To assess the frequency of unblinding to group allocation, the independent assessor was asked to guess which group the patients were in. Agreement between the guess of the assessor and the correct group allocation was analysed by Cohen's κ statistic.¹⁶

Statistical analysis

With a SD of five points on the EADL scale,^{8,9} a 5% significance level, and a power of 80%, we calculated that 100 patients would be needed to detect a two point difference and 200 patients (100 in each group) would be needed to detect a three point difference. A target of 200 patients was set. Data were ordinal and we used non-parametric tests that adjust for ties (SPSS Software version 8). The sizes of non-parametric treatment effects and their CIs were calculated when group distributions were similar. If the distributions between the groups were different, we collapsed the groups into categories and made comparisons by χ^2 .

Results

The trial profile (figure) shows the flow of patients during the trial. Between February, 1994, and March, 1998, we identified 240 stroke patients who were not admitted to hospital. 55 patients were excluded: 28 lived in a nursing or residential home; 11 died before assessment; nine did not give their consent; two had a history of dementia; two were misdiagnosed; two had long-term illness, and one did not speak or understand English. Of the remaining 185 patients, 94 were allocated randomly to occupational therapy and 91 to no intervention (the control group). The baseline characteristics of patients were well matched between the two groups. We found inadequate service provision in both groups (table 1).

22 patients were not assessed at 6 months: 13 died during follow-up (six in occupational therapy group) and nine withdrew from the study (four in occupational therapy group). Our analysis included only data from the 163 completed assessments.

The mean number of visits by the occupational therapist was 5.8 (SD 3.3, range 1-15) visits. The mean length of each visit was 52 (11.8, 24-90) min.

There were significant between-groups differences that favoured the occupational therapy group on the Barthel index, the EADL scale, the carer strain index, and the London handicap scale (table 2). The group distributions of the scores on the Rivermead motor assessment gross function varied. This variable was, therefore, collapsed into

three categories and statistical analysis with the χ^2 test were done: ten (12%) patients in the occupational therapy group scored 6 or less, 51 (61%) scored between 7 and 11, and 23 (27%) scored more than 11, compared with 22 (28%), 46 (58%), and 12 (15%), respectively, in the control group (χ^2 8.12, $p < 0.017$). The scores on the general health questionnaire for the patients or their carers did not differ significantly between the groups.

The independent assessor monitored masked conditions on 108 occasions, and guessed the group allocation correctly on 62 (57%) occasions. This level of agreement was poor ($\kappa < 0.20$).¹⁶

Discussion

Our finding of a low level of service provision in this group of patients accords with those of other studies and indicates that these patients are either judged not to require rehabilitation, that such services are not available, or both. Thus, the finding that stroke patients who were not admitted to hospital benefited from intervention from an occupational therapist is important. These benefits were mostly in terms of improved performance of instrumental activities of daily living, which is associated with less need to live in an institution and less dependence on social and health resources.¹⁷ The size of our treatment effect (3 EADL points) is larger than that reported by Juby and colleagues¹⁸ in a positive trial of a stroke unit (2 EADL points), and so is likely to be clinically significant. For example, for a patient who scores at the median of the control group to reach the median score of the occupational therapy group, he or she would have to have gained independence in housework, walking over uneven ground, and in crossing roads. Our finding adds to the evidence that community occupational therapy is beneficial to stroke patients.⁷⁻⁹

Our sample was not complete, because we relied on general practitioners to notify patients^{19,20} and we excluded a substantial number of patients in institutional care. Nevertheless, the number of patients we identified is sufficiently large to justify the provision of a clinical service. Pragmatic trials of rehabilitation services cannot be double-blinded, since patients need to know what service they are receiving so that they can make maximum use of it. To avoid bias such trials require that outcome is assessed by techniques that are independent of the trial intervention. In our trial, the assessor took as many steps as possible to maintain masked conditions,²¹ and she guessed which group patients were in only a little more frequently than would have occurred by chance (57%). We believe that our results were not significantly affected by observer bias.

Because of the association between disability and depressive symptoms after a stroke,²² it was possible that occupational therapy could have had a beneficial effect. However, we found that it had no significant effect on the mood of the patient or the carer, possibly because the effect was too small to be identified in this sample size, or because we used no specific therapeutic strategies to affect mood. Larger studies or the findings of meta-analysis are needed to confirm or refute whether physical or behavioural approaches reduce depressive symptoms after a stroke.

Although depressive symptoms were not reduced, occupational therapy significantly reduced the strain experienced by the main carer, as measured by the carer strain index. This finding indicates that an important effect of occupational therapy is to reduce the workload of the

carer, even though this effect does not necessarily improve the psychological wellbeing of the patient or carer.

The rehabilitation needs of a substantial number of stroke patients who remain at home can be met feasibly by an occupational therapist with measurable benefits. In countries such as the UK, where many stroke patients are not admitted to hospital, an occupational therapy service for this group should be offered. We believe that if such services are established, they should initially be assessed to replicate our findings. The durability of these benefits and their economic implications also needs to be examined.

Contributors

M F Walker was involved in the design of the study, its execution, analysis, and writing the paper. J R F Gladman and N B Lincoln were involved in the design of the study, its supervision, data interpretation and writing the paper. P Siemonsma contributed to the design of the project to maintain the masked conditions of the outcome assessment. T Whiteley made significant contributions to the manuscript.

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