

Effects of locality based community hospital care on independence in older people needing rehabilitation: randomised controlled trial

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Abstract

Objective To determine the effects on independence in older people needing rehabilitation in a locality based community hospital compared with care on a ward for elderly people in a district general hospital.

Design Randomised controlled trial.

Setting Care in a community hospital and district general hospital in Bradford, England.

Participants 220 patients needing rehabilitation after an acute illness that required hospital admission.

Interventions Patients were randomly allocated to a locality based community hospital or to remain within a department for the care of elderly people in a district general hospital.

Main outcome measures Primary outcomes were Nottingham extended activities of daily living scale and general health questionnaire 28 (carer).

Secondary outcomes were activities of daily living (Barthel index), Nottingham health profile, hospital anxiety and depression scale, mortality, destination after discharge, satisfaction with services, carer strain index, and carer's satisfaction with services.

Results The median length of stay was 15 days for both the community hospital and the district general hospital groups (interquartile range: community hospital 9-25 days; district general hospital 9-24 days). Independence at six months was greater in the community hospital group (adjusted mean difference 5.30, 95% confidence interval 0.64 to 9.96). Results for the secondary outcome measures, including care satisfaction and measures of carer burden, were similar for both groups.

Conclusions Care in a locality based community hospital is associated with greater independence for older people than care in wards for elderly people in a district general hospital.

Introduction

Interest in community hospitals¹ in England has been renewed, stimulated by the contraction of the district general hospital and the shift towards locality based health services under the umbrella term intermediate care.² A community hospital can result in lower bed usage in a district general hospital, but overall bed utilisation (district general hospital and community hospital combined) may be higher.³⁻⁵ This increased hospital stay may be acceptable if the overall quality of care is improved. We assessed the effectiveness of a locality based community hospital on independence in older people needing rehabilitation.

Participants and methods

Our study was based in a department dealing with the care of elderly people in a metropolitan city. The

department has five wards in a district general hospital and receives emergency admissions from casualty and general practitioners for patients aged over 76 years with acute medical conditions. The wards provide multidisciplinary care in accordance with described good practice.⁶

The community hospital we studied provides locality based care for predominantly older patients who reside in one of the three primary care trusts in Bradford city. The hospital has strong links to local general practitioners and health and social services (see table A on bmj.com).

Protocol

Patients were eligible for the trial if they were registered with a general practitioner in the primary care trust served by the community hospital and were considered by the responsible geriatrician to be medically stable and in need of post-acute rehabilitation care. We excluded patients if they had features of medical instability; were drowsy or unconscious; required specialist rehabilitation in the stroke unit, or treatment in other departments; or needed new placement in a care home.

Baseline assessment by a research nurse included reason for admission, current input from social services, cognitive function (abbreviated mental test score),⁷ activity restriction before admission (Nottingham extended activities of daily living and Barthel index),⁸⁻¹⁰ and other outcome measures (see bmj.com).

Assignment

We stratified patients by cognitive impairment using the abbreviated mental test and by activity restriction using the baseline Barthel index score. Randomisation to community hospital (intervention) or usual care (control) was by numbered, sealed, opaque envelopes prepared from random numbers tables. We used short length blocks to minimise the potential for disruption to clinical services. The ward staff were blinded to randomisation. The research nurse responsible for recruitment was unaware of the stratification boundaries and block length. We aimed to transfer patients randomised to the community hospital group within two days.

Intervention group

Patients allocated to community hospital care were assessed by the multidisciplinary team and received an individual care plan designed to maximise recovery and promote independence. The consultant visited the hospital at least twice a week and the hospital

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Summary scores for Nottingham extended activities of daily living scale at each assessment point

Nottingham extended activities of daily living scale	Community hospital group (n=141)			District general hospital group (n=79)		
	No of participants	Median (interquartile range)	Mean (SD)	No of participants	Median (interquartile range)	Mean (SD)
Mobility:						
Preadmission	140	6 (1-12)	6.6 (5.8)	79	6 (2-12)	7.3 (5.8)
1 week post-discharge	123	0 (0-3)	2.2 (3.5)	65	0 (0-3)	2.5 (4.3)
3 months post-recruitment	111	2 (0-6)	3.8 (4.6)	58	2 (0-6)	3.9 (5.0)
6 months post-recruitment	103	2 (1-5)	4.0 (4.9)	57	3 (0-6)	3.9 (4.7)
Kitchen:						
Preadmission	140	14 (7-15)	11.1 (4.8)	79	15 (10-15)	11.8 (4.3)
1 week post-discharge	123	8 (3-12)	7.8 (5.4)	65	3 (3-12)	6.7 (5.4)
3 months post-recruitment	111	10 (3-15)	8.4 (5.7)	58	9 (3-13)	8.0 (5.5)
6 months post-recruitment	103	10 (3-15)	8.8 (5.7)	57	9 (2-14)	7.8 (5.8)
Domestic:						
Preadmission	140	6 (3-10)	6.2 (4.8)	79	6 (3-11)	6.8 (4.5)
1 week post-discharge	123	3 (0-6)	3.5 (3.4)	65	3 (0-5)	3.2 (3.5)
3 months post-recruitment	111	3 (1-7)	4.4 (3.9)	58	3 (0-6)	3.9 (4.2)
6 months post-recruitment	103	4 (0-7)	4.6 (4.2)	57	3 (0-7)	3.9 (3.9)
Leisure:						
Preadmission	140	6 (4-9)	7.0 (3.9)	79	7 (3-10)	7.4 (3.9)
1 week post-discharge	123	5 (3-6)	4.8 (2.9)	65	3 (2-6)	4.4 (3.0)
3 months post-recruitment	111	6 (3-7)	5.3 (3.3)	58	6 (3-7)	4.9 (3.3)
6 months post-recruitment	103	6 (3-8)	5.6 (3.3)	57	6 (3-9)	5.2 (3.7)
Total:						
Preadmission	140	32 (18-43)	31.0 (15.8)	79	36 (21-46)	33.4 (15.3)
1 week post-discharge	123	17 (9-27)	18.2 (12.2)	65	13 (6-27)	16.8 (13.5)
3 months post-recruitment	111	21 (7-32)	21.8 (15.0)	58	17 (7-34)	20.7 (16.3)
6 months post-recruitment	103	23 (11-33)	23.0 (15.2)	57	21 (7-32)	20.9 (15.8)

practitioner visited the hospital each weekday. Local general practitioners provided out of hours cover (see bmj.com for input from nursing and therapy teams).

Control group

Usual care consisted primarily of an extended stay in the care of the elderly ward in the district general hospital but could include transfer to a non-locality based community hospital or to social service facilities.

Outcome measures, follow-up, and blinding

For the primary outcome measures we used the Nottingham extended activities of daily living scale for patients,^{8 11} and the general health questionnaire 28 for carers.¹² Other outcome measures are listed in table B on bmj.com. Information on death, length of stay in hospital, and destination after discharge was collected.

Follow-up assessments were at one week after hospital discharge, and at three and six months after recruitment.

Statistical analysis

We defined a clinically meaningful difference as a two point improvement of the Nottingham extended activities of daily living scale. We used the revised 0-66 scoring in accord with recent practice.

Our primary analysis was an intention to treat comparison of change in scores on the Nottingham extended activities of daily living scale from baseline to six months between the intervention and control groups. We used unpaired *t* test and the Mann-Whitney U test for unadjusted values. We also carried out an adjusted intention to treat comparison using analysis of covariance to adjust for the baseline variables of age, sex, institutional care, mental status, and baseline Barthel index score. To allow for potential bias due to the exclusion of patients who had died, we used the Mann-Whitney U test to compare the groups

for the change in Nottingham extended activities of daily living scale scores from preadmission to the six month assessment after recoding the six month scores for these patients as zero (worst outcome). The primary outcome for carers was the difference between the groups for change in general health questionnaire 28 scores between baseline and six months using the Mann-Whitney U test.

For our secondary analyses we used the Mann-Whitney U test to compare the groups for changes in the total Nottingham extended activities of daily living scale scores and general health questionnaire 28 scores between baseline and the follow-up assessments at one week and three months. We carried out similar analyses for each assessment point for the subsections of the Nottingham health profile, the total Barthel index score, and the hospital anxiety and depression subsections of the hospital anxiety and depression scale. We used the Mann-Whitney U test to examine the differences between the groups for the carer strain index scores at the follow-up assessments at one week and three and six months. The χ^2 test was used to examine differences in mortality and destination after discharge between the groups. We created a dichotomous response (satisfied or not satisfied) for patient and carer satisfaction scores, and compared the groups using the χ^2 test.

Results

Between November 2000 and September 2002 we identified 2232 potential participants. Overall, we excluded 1497 of 1829 medically stable patients. We randomised 141 of the 332 remaining patients to locality based community hospital care (intervention group) and 79 to usual care (control group) (see bmj.com). The main reasons for deviation from alloca-

tion for 26 patients were bed closures in the community hospital through infective gastroenteritis and extreme pressures on beds in the district general hospital. In the community hospital group 73 patients were transferred or died within two days of randomisation, and 52 patients were transferred after more than two days or died in hospital after more than two days without transfer. Eleven control patients were subsequently transferred to a non-locality based community hospital.

Participant flow and follow-up

Both groups were well matched for baseline characteristics and length of hospital stay (see [bmj.com](#)). Thirty two patients were not assessed one week after hospital discharge, 21 were not assessed at three months, and a further 13 were not assessed at six months (see [bmj.com](#)). The table shows the results of the patients' primary outcome measure (also see [bmj.com](#)).

Primary outcome analyses

The unadjusted intention to treat comparison of changes in scores on the Nottingham extended activities of daily living scale at six months showed a non-significant difference between the groups (mean difference 4.88, 95% confidence interval 0.18 to 9.59). The adjusted intention to treat comparison showed a significant difference between the groups (mean difference 5.30, 0.64 to 9.96). The difference remained after patients who had died were assigned the worst score on the Nottingham extended activities of daily living scale.

We found no differences between the groups for emotional distress in carers, measured using the general health questionnaire.

Secondary analyses

We found improvements in favour of the community hospital in the sleep subsection of the Nottingham health profile at one week and three months (median difference -10.5, -16.8 to 0.0 and -12.6, -22.4 to 0.0). The intervention group showed a greater increase in the depression subsection of the hospital anxiety and depression scale at one week (median difference 1.0, 0.0 to 2.0). Similar numbers of patients in both groups died before the six month assessment or were discharged to a new care home place.

Both groups had similar reported patient and carer satisfactions. At three months the intervention group showed greater satisfaction with the question "I get all the support I need from services such as meals on wheels, home helps, district nursing, etc" (odds ratio 3.43, 95% confidence interval 1.05 to 11.24).

Discussion

Transfer of older people to a locality based community hospital for post-acute care was associated with a greater functional independence. The community hospital was compared with predominantly extended stay in an elderly care department.¹³ The adjusted mean difference between the groups of over five points on the Nottingham extended activities of daily living scale represents greater independence in at least two and possibly five of the 22 items—changes likely to be useful to patients and carers.

What is already known on this topic

Community hospitals are a long established component of healthcare provision in England

The contraction of the district general hospital and the shift towards locality based services have stimulated new developments in community hospitals

What this study adds

A locality based community hospital for post-acute care of older people was associated with greater functional independence

The participants had all presented as emergency admissions to hospital and were considered by their consultant to be medically stable and in need of rehabilitation before discharge home. This group of patients is a key focus for the new intermediate care services currently being established in England.

We were unable to find evidence of any benefit or detriment for the burden of carers as assessed by two quantitative measures, unlike hospital at home care, for which there is concern about strain on carers.¹⁴ The main limitation to these conclusions relates to the modest sample sizes. A risk of bias also exists from the low response rate from carers. Both groups were similar for mortality, destination after discharge, length of hospital stay, and patient and carer satisfaction with services. The sleep section of the Nottingham health profile (but no other sections) showed a small difference in favour of the community hospital, and the depression subsection of the hospital anxiety and depression scale score showed a small difference in favour of the district general hospital.

The results of our study should be interpreted against some important factors. Firstly, the study took place in a busy department for the care of elderly people, with consequential operational difficulties for research: some staff refused access to eligible patients, some patients were not treated as randomised owing to pressures on beds and temporary closures, and some patients experienced a delay in transfer to the community hospital. The deviations from treatment allocation may have introduced bias. Secondly, these are the results from a single centre and a single community hospital and therefore need to be confirmed by further studies. The results are potentially generalisable because of the similar median length of stay (15 days) between the community hospital in our study and other community hospitals.¹ Lastly, the community hospital provided a locality based model of care. This is one of several possible care models offered by community hospitals¹ in which the hospital is essentially an extension of primary care.

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Commentary: Intermediate care: policy before evidence

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Intermediate care had the characteristics of much new national policy when it was launched; it lacked definition, had no evidence for its effectiveness, and was aimed at solving a problem that it was unlikely to impact on—in this case overcrowding in hospitals. It is therefore good to see new evidence on the effectiveness of a service that fits under the umbrella term “intermediate care” compared with care in a district general hospital department for the care of elderly people, as reported by Green et al.¹

The relation between older people and hospitals is a complex one. A suspicion among several eminent commentators is that ageism is still endemic in the NHS, keeping older people out of the bright sparkling general hospitals because they overstay their welcome.² A further suspicion is that the National Service Framework for older people is complicit in this, with its emphasis on an extra 5000 intermediate care beds, with no real definition or evidence for such an approach or for the number chosen (it would seem to be a heavy dose of digit preference). This suspicion is added to by the suggestion in the National Service Framework that acute admission rates for people aged over 75 should rise less than 2% per annum, again with no evidence to suggest that this percentage will match clinical need or that likely geographical variations should be taken into account. A fixed percentage seems especially odd in a country that has a successfully ageing population. Most geriatricians would regard 75 as quite young.

Work on methods of diverting older people into intermediate care straight from home has not proved successful so far using a non-randomised cohort approach.³ A systematic review of a nurse led intermediate care facility for post-acute rehabilitation, however, suggested that this is effective, although the authors urge caution as this may be due to an

increased length of stay in the nurse unit. They also make the point that the safety of the approach has not been fully proved.⁴ An economic evaluation using participants from a randomised trial has shown that such a nurse led unit was more expensive than a traditional approach.⁵

Green et al show that another approach—a single community hospital, in Bradford—gave better results in one variable, of many, compared with a hospital based unit for elderly people. The organisation of the study had lots of difficulties, but such health services research is always beset by such issues. In an area where resources are scarce, people are loath to allow their favourite patient groups to be entered into the lottery of a randomised trial. Many of us have had similar experiences. So the study group was unusual by the time randomisation took place. This, and the small proportion of positive outcomes, compared with the number measured, makes the work difficult to generalise elsewhere.

Overall, the paper does a little more to clothe the Emperor of intermediate care, but he is still not really fit to be seen out in public.

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