The Home Based Rehabilitation Service: Rationale, operation and outcomes

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Abstract

The Home Based Rehabilitation Service was established as an allied health early discharge and outreach service from a major metropolitan post-acute teaching hospital. Two hundred and eighty-two patients were discharged to the service according to established criteria from the following specialities: neurology, neurosurgery, rheumatology, amputation, orthopaedic and spinal. Inpatient length of stay was reduced by 19 days on average (the range was 3–75 days). Inpatient throughput was increased equivalent to 10 extra beds on an annual basis. The cost of home-based services was 11 per cent of the cost of the inpatient services they replaced. There were low rates of hospital readmissions, and users registered high levels of satisfaction with the service.

Introduction

In the post-acute hospital setting, it has been recognised that towards the end of the inpatient period, many patients do not require hospital medical and nursing services, but continue to require allied health services. For a variety of reasons, it is premature to discharge them for outpatient services and they remain in hospital only for allied health intervention. It was realised that such patients might be provided with allied health services in the home instead of in hospital, thereby allowing earlier discharge. Furthermore, it was anticipated that the home

and community environment may be a more appropriate context than a hospital environment in which to provide rehabilitation services (Freeman, Burrell & Sedger 1990; Helewa et al. 1991; Sargent & Patterson 1993; Schwartz 1995).

The use of home-based services in achieving early discharge and effective rehabilitation has been reported for elderly patients with proximal femoral fractures (Sikorski & Senior 1993) and hip fractures (Farnworth, Kenny & Shiell 1994), stroke (Holmqvist et al. 1995) and total hip replacement (Moller, Goldie & Jonsson 1992). Post-hospital community-based care has also been shown to reduce the rate of hospital readmission of elderly patients (Townsend et al. 1988).

The Home Based Rehabilitation Service (HBRS) was established as an allied health outreach service from a major post-acute metropolitan teaching hospital, with the following objectives:

- achieve early discharge and increased throughput of inpatients
- provide home-based services which are targeted to needs and are less costly than inpatient services
- provide links between hospital and community-based services to ensure continuity of rehabilitation.

Method

Staffing

The HBRS is staffed by a coordinator (1.0 FTE), senior occupational therapist (1.0 FTE), senior physiotherapist (1.0 FTE), senior social worker (1.0 FTE) and senior speech pathologist (0.5 FTE).

Acceptance criteria

Criteria supplied to ward discharge planning meetings included points relating to medical, nursing and allied health needs; the physical and social environment into which the patient was to be discharged; the availability of other essential community-based services; agreement of patient and caregiver (if applicable) to early discharge and home-based services.

Referral and handover

The Consultation Request Form signed by a medical officer and sent to the coordinator requires an explicit statement about the estimated reduction in length of stay that would be achieved if the HBRS were able to provide services

from the planned date of discharge. In addition, inpatient allied health staff provided a written referral and hand-over to respective HBRS staff before the patient's discharge from hospital.

Services provided

Introduction of patients and caregivers to the service

Following acceptance of a referral, a representative of the HBRS met with the patient (and caregiver) before discharge from hospital to:

- reinforce the concept that the patient was to be discharged early from hospital because allied health services were to be provided in the home
- explain the HBRS in terms of 'extending the hospital' out into the home and community
- reassure them that inpatient staff had provided written and verbal hand-overs and recommendations which would help ensure continuity in rehabilitation
- empower patients and caregivers in determining their own goals and priorities and consequently the type of service to be delivered
- clarify that the HBRS was a transitional service to be provided for the period of early discharge, albeit with flexibility for some short-term extension under certain circumstances.

They provided a pamphlet which described the service, and a timetable for the first week of home visits. They also obtained a signed agreement from the patient (and caregiver) for early discharge and the provision of services.

Contact with the patient's general practitioner

A letter and information pamphlet was sent to the patient's general practitioner welcoming liaison, as appropriate. The general practitioner was also sent a copy of the discharge report at the end of the patient's program.

Duration of service and discharge criteria

The duration of service was planned to equal the estimated reduction in length of stay, which was provided in the Consultation Request Form. The following were the discharge criteria:

- patient did not require hospital readmission and patient (and caregiver) could continue the rehabilitation process at home
- outpatient services were available for the patient at the time required
- referral to essential community-based services had been confirmed
- HBRS allied health staff were satisfied that withdrawal of their services or referral to alternative services did not violate professional ethics.

Nature of services to patients and caregivers

The home and community environment in which the patient needed to function in the longer term was the context for assessment and intervention, and for the education and involvement of caregivers in the rehabilitation of patients. The service encouraged a shift in the therapeutic relationship often found in a hospital setting, towards greater determination of rehabilitation goals by patients and caregivers, and a greater responsibility for achieving those goals. Patients and caregivers received services from any or all of the four allied health professionals, depending on needs.

Frequency of home visits

Direct services were provided on a five-day a week basis, although patients and caregivers were encouraged to carry on with home programs over weekends when appropriate. The frequency of visits from individual allied health professionals varied from once a week to daily, depending on needs.

Travel

Over a full year, the 4.5 full-time equivalent staff travelled a total of 33 647 kilometres to provide services to patients. Time spent travelling was 10.9 per cent of the total time on duty.

Coordination, case management and discharge planning

Referrals were accepted depending on the current case load, geographic distribution of patients, and the frequency and nature of services required.

All staff attended a case meeting held once a week in the HBRS office. They discussed current cases, informing each other about their assessments and interventions. Staff alerted each other to needs perhaps not already identified, and were able to reinforce each other's rehabilitation strategies. They planned joint home visits as appropriate. They discussed the need for services appropriate for longer term rehabilitation, and planned referrals to appropriate services.

Each patient had one staff member appointed as a case manager, who corresponded with general practitioners and coordinated and distributed the discharge report.

Rehabilitation goals were set, and services were provided, in the context of a planned discharge date which was determined by the estimated reduction in the length of hospital stay. Extension of the service beyond the early discharge period had to be explicitly justified in terms of the discharge criteria listed previously, and any extension was closely monitored.

Discharge reports

The case manager coordinated a multidisciplinary discharge report, with contributions from each allied health professional. The discharge report was finalised within three weeks of the patient's discharge from the HBRS, or by the date of the patient's first outpatient appointment with the consultant, whichever was sooner.

Clinical audit

From previous experience, standard instruments for measuring progress in rehabilitation such as the Functional Independence Measure (Keith et al. 1987) and the Barthel Index (Colin et al. 1988) were unsuitable for measuring outcomes of the present program because they are insufficiently sensitive for measuring change over the short period that services were to be provided.

Performance indicators were developed to documented goals agreed between staff and patients (also between staff and caregivers) and the frequency of attainment of goals. The instruments can be obtained from the authors, and will be the subject of another publication.

Surveys of user satisfaction with services were developed and employed with patients, caregivers, consultants and general practitioners. These instruments can also be obtained from the authors.

The General Health Questionnaire (Goldberg & Williams 1988) quantifies an individual's general sense of well-being and perceived ability to cope with the

demands of everyday living. It formed the basis of an interview with each patient (and caregiver when available) as soon as possible after the patient's discharge from hospital, and as soon as possible after the patient was discharged from the HBRS. Beside providing information that was useful for determining the need for support services, the questionnaire measured change in the status of patients and caregivers.

Results

Number of referrals

Table 1 shows the number of referrals accepted by the HBRS from each speciality over a 38-month period. It also reports some of the hospital admission diagnoses. The median age of patients admitted to the HBRS was 65.8 years (the range was 17.4 years to 94.6 years). Of total patients admitted, 143 were males and 139 were females.

Table 1: The number of referrals accepted by the HBRS from each speciality over a 38-month period

Speciality	Number	%	Examples of hospital admission diagnoses
Neurology	160	57	Stroke, multiple sclerosis, motor neurone disease
Neurosurgery	66	23	Cerebrovascular accident, head injury, carcinoma
Rheumatology	21	7	Osteoarthritis, rheumatoid arthritis, dermatomyocitis
Amputation	20	7	Below knee amputation, above knee amputation
Orthopaedic	10	4	Total knee replacement, multi-trauma
Spinal	5	2	Spinal fracture
Total	282	100	

Reduction in inpatient length of stay

The difference between the estimated date of discharge if the HBRS did not accept the referral and the actual date of hospital discharge was taken as the reduction in length of stay. Table 2 reports average length of stay and average estimated reduction in length of stay for patients in each speciality. The smallest reduction in length of stay of three days was achieved with a 75-year-old woman who had a total knee replacement. The largest reduction in length of stay was 75 days, achieved with a 73-year-old man who had a stroke.

Table 2: Average length of hospital stay, average estimated reduction in length of hospital stay, average duration of HBRS services for patients accepted from each speciality

Speciality	Average length of stay (days)	Average reduction in length of stay (days)	Average duration of HBRS services (days)
Neurology	91	20	21
Neurosurgery	80	22	22
Rheumatology	73	16	14
Amputee	59	14	15
Orthopaedic	40	9	9
Spinal	62	19	15
All referrals	82	19	20

Increased throughput of inpatients

The HBRS influenced discharge planning in two ways:

- it prompted the process of inpatient discharge planning for all patients, regardless of their suitability for the HBRS, by requesting updated estimated dates of discharge on a weekly basis
- it prompted discharge planning for patients satisfying acceptance criteria by offering home-based services as an alternative to inpatient services.

The present analysis compared discharge statistics for patients in the neurology and neurosurgery specialities, the source of 95 per cent of admissions to the HBRS in the first year of its operation, to discharge statistics for the 12 months before the scheme was established. Table 3 reports the number of patients discharged, their total length of stay, and their average length of stay for the two 12-month periods.

Table 3: Number of patients discharged from the neurology and neurosurgery specialities, their total length of hospital stay, and their average length of stay in the 12-month period before the establishment of the HBRS (Period 1) and in the first 12 months of the service (Period 2)

	Period 1	Period 2
Number of patients discharged	149	202
Total length of hospital stay (days)	9124	8805
Average length of hospital stay (days)	61	44

The data show that in the year the HBRS became operational, there was a reduction in the average length of stay of 17 days, from 61 to 44 days. If the hospital had not increased the number of admissions in the neurology and neurosurgery specialities above 149 patients, it can be estimated that the number of bed-days required would have been reduced from 9124 to 6556 (149 patients x 44 days average length of stay). This provided the opportunity to close hospital beds if that was considered possible and desirable.

In reality, hospital beds were not closed, the number of admissions increased and the specialities achieved 53 extra discharges in the year. On the basis of the original average length of stay of 61 days, it can be estimated that 12 322 hospital bed-days (202 patients x 61 days average length of stay) would have been required to achieve this throughput. As it happened, only 8805 hospital bed-days were required, and the earlier discharge of patients effectively created an estimated extra 3517 bed-days (12 322 less 8805). The increased throughput amounted to approximately 10 beds on an annual basis (3517/365).

Duration of service and alignment with reduction in length of stay

Table 2 reports average duration of HBRS services (period between first and last occasion of service) and the average reduction in length of hospital stay for patients from each speciality.

The averaged data show that the HBRS met the objective of providing services for a period equal to the reduction in length of stay. Some patients, however, made rapid gains as soon as they were discharged from hospital, enabling a shorter period of service. Conversely, in other cases, unforeseen problems emerged which required resolution before referral to long-term services, necessitating an extension of services (maximum extension was 27 days).

Cost of HBRS services compared to inpatient and outpatient services

The HBRS demonstrated that it could provide services concurrently to 10 patients who would otherwise be in hospital. The service effectively created a 10-bed 'outreach ward' in the community, amounting to 3650 patient-days in a full year.

All operating expenses for the service were provided from a single cost centre. The annual budget was $243 172, made up of salaries, other goods and services, operating expenses and add-on costs. The cost of a patient-day on the HBRS was estimated on an average marginal costing basis at $67 per day ($243 172/ 3650 patient-days). This cost can be compared to data published in the hospital's annual report: inpatient cost per day – $630; outpatient cost per occasion of service – $125.

Rate of hospital readmission

A total of 13 patients (5 per cent of admissions to the HBRS) were readmitted to hospital during the period that they were receiving services from the HBRS. None of the readmissions was due to a condition caused by the patient being discharged early from hospital. A further six patients were readmitted to hospital for a short procedure during which the HBRS was temporarily suspended.

Clinical audit

Performance indicators

Performance indicators showed that more than 90 per cent of goals agreed between staff and patients (also between staff and caregivers) at the commencement of services were agreed as being attained by the time of discharge from the HBRS.

User satisfaction with services

Ninety-three per cent of responses from patients and 92 per cent of responses from caregivers were in categories indicating satisfaction with the service. One area of relative dissatisfaction was the duration of the service; written and verbal comments indicated a desire that the service be provided for a longer period. There was a risk that patients would become dependent on services they find helpful, and the timing of discharge required professional judgement. Continued liaison with the HBRS was permitted following discharge and there was no evidence that any patient was disadvantaged by premature discharge from the service.

Eighty-eight per cent of returns from consultants indicated that they used the discharge reports when reviewing patients, while 62 per cent indicated that the reports were used for planning further treatment and intervention. Comments included: 'They are essential review information', 'They provide new information and additional insight into the home environment'.

Eighty per cent of respondent general practitioners indicated that the HBRS assisted their management of patients, and helped their patients readjust to living at home.

General Health Questionnaire

Sixty-six per cent of patients and 61 per cent of caregivers who participated in two interviews registered maintained or improved scores, indicating a maintained or improved general sense of well-being and a perceived ability to cope with the demands of everyday living. This result is encouraging, considering that the period between interviews covered initial re-adjustments to living at home. Unforeseen problems sometimes emerged for patients and their caregivers, and such respondents tended to register a reduction in scores.

Discussion

The data indicate that the HBRS met the objectives outlined earlier. In particular, services addressing the needs of patients, caregivers, general practitioners and consultants were provided, and at a lower cost than the inpatient services which they replaced.

Experience in providing home-based services indicated that such services may also be an effective alternative to outpatient and day hospital services, albeit published data provide ambivalent support for this concept (Young & Forster 1993; Gladman & Lincoln 1994; Gladman, Whynes & Lincoln 1994; Gladman, Forster & Young 1995). Some of the potential advantages of home-based services over outpatient services are that:

- the home provides a more relevant environment than the hospital in which to assess the functional needs of patients
- caregivers can be more readily educated and involved in the provision of treatment
- health professionals and patients are better able to work together in identifying relevant rehabilitation goals
- cost comparisons are favourable.

There can be difficulties in introducing an early discharge program to patients and caregivers. They can be somewhat cynical, viewing the program simply as a cost-cutting exercise. Furthermore, they can be anxious about the return home, especially after a lengthy period of hospitalisation or when recovering from surgery. However, only 2 per cent of patients declined the offer of early discharge; they generally looked favourably on the idea of returning home earlier, with the transition facilitated by an extension and outreach of hospital services. This should encourage the development of other programs to reduce the period of hospitalisation.

In 47 per cent of cases, services were provided by the HBRS for a shorter period than the reduction in length of hospital stay. Reasons for the reduced length of service included:

- problems with functioning in the home environment anticipated by the ward team did not materialise
- patients were better able to function at home because they ate and slept better, and had better emotional support
- in the case of brain injury, patients became less confused and better able to understand and comply with a rehabilitation program.

For all these reasons, early discharge with appropriate follow-up should be attempted where possible.

In 43 per cent of cases, the HBRS provided services for a longer period than the reduction in length of stay. Reasons for the extension of services included:

- the emergence of problems that were unforeseen by the ward team and which needed to be resolved in the home environment
- exacerbation of the patient's condition which would have required hospitalisation if home-based services had been withdrawn.

Patients and caregivers looked favourably on the hospital maintaining an interest in their welfare and progress in the immediate post-discharge period. Indeed, in some cases the HBRS managed to improve the relationship between patients and the hospital, damaged as a result of experiences during the inpatient period.

Patients and caregivers often commented on a sense of loss of control and decision-making during the period of hospitalisation. A certain amount of regulation and regimentation is required in an environment containing many personnel delivering and receiving services. With a transitional outreach service in which rehabilitation goals are negotiated between health professionals, patients and caregivers, the hospital participates in a process by which patients and

caregivers regain greater control of their lives and decisions, thus achieving satisfactory closure of their case.

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