Evaluation of the effectiveness of Leek Moorlands Community Hospital Rehabilitation Unit, Staffordshire, UK

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Abstract

Introduction: The utilisation of Intermediate Care and Rehabilitation Units has been increasing due to a rise of the ageing population and a preference to treat more patients in the community rather than Acute hospitals. However, to ensure optimal use of resources it is important to investigate whether such Units are clinically effective. We recently evaluated the effectiveness of the Intermediate Care and Rehabilitation programme in our department in Leek Moorlands Community Hospital, North Staffordshire, UK. Methods: We retrospectively analysed all consecutive patients admitted in a six months period (1st November 2009 to 30th April 2010). Our primary outcome measure of effectiveness was the change in patients' functional ability between admission and discharge in terms of their Barthel scores. Secondly, we sought to identify possible determinants of outcome by investigating the relationship between change in Barthel scores and a variety of demographic and clinical variables (age, length of in-patient stay, morbidity burden, and initial disability level). The Wilcoxon signed rank test was used to assess the difference between Barthel scores. The relationship between the change in Barthel score and other variables was tested using Spearman's rank correlation coefficient.
Results: The total number of patients was180. 35 patients were excluded from complete analysis because of missing or incomplete case-notes (31) or were still in hospital (4). For the patients who had complete data and could be analysed, there was a significant increase in Barthel score during admission (median difference 4, $p<0.0001$). There was no statistically significant correlation between the change in Barthel score and any other variables. 77% of patients were able to return home and only 23% had to be discharged to a Residential or Nursing home. Conclusions: Patients' functional abilities improved significantly during admission to the rehabilitation Unit and the vast majority returned home. Benefit was observed irrespective of age, initial level of dependence, medical complexity, and length of in-patient stay. This emphasizes the importance of providing access to rehabilitation services for patients of all age groups and initial disability level.

IINTRODUCTION

The role of Intermediate Care and Rehabilitation services in the management of older patients in the United Kingdom (UK) has been emphasised in recent years by a number of high profile publications (1,2,3). The increase in the ageing population, greater pressure on Acute Hospitals, and a preference of patients to be managed closer to their home and relatives have resulted in more transfers of patients to Intermediate Care and Rehabilitation units in community hospitals. Additional funding and manpower resources have been allocated in order to manage the rising workload in these units. The main objective of Intermediate Care and Rehabilitation in older patients with multiple medical problems and physical impairments is to maximise their physical, psychological and functional states so that they can live as independently as possible, preferably in their own home. Previous work in the UK has demonstrated gains in functional status and quality of life for patients who were treated in such units (4), and that outcomes of patients managed in community-based units were superior to patients treated only in Acute Hospitals (5). However, the number of such published studies is not extensive and it is important to replicate this assessment more widely.

The Intermediate Care and Rehabilitation unit at Leek Moorlands Community Hospital, North Staffordshire, UK was established in 1997 and has gradually expanded in line with national guidance (1). This, together with other health services in North Staffordshire, is currently undergoing a programme of reorganisation to enable even more provision of community-based services that can cater for a larger number of older patients with complex needs (2,6). We therefore evaluated recently the effectiveness of our unit in

terms of patient outcomes as this may have implications for future funding and development.

METHODS

VENUE

The community hospital is located in the market town of Leek, North Staffordshire, UK. The day-to-day medical cover (9a.m. to 5p.m., Monday to Friday) is provided by General Practitioners with Special Interest in Geriatric Medicine. Cover outside of these hours is provided by a local out-of-hours medical cooperative. In-patient care at Leek Hospital is multi-disciplinary and the team comprises medical and nursing staff, Physiotherapists, Occupational therapists, Rehabilitation assistants, Social Worker and a Discharge Facilitator. A Consultant Physician specialised in Geriatric Medicine conducts a detailed ward round once weekly.

Most patients are transferred to the unit from the local Acute University Hospital, Stoke-On-Trent, North Staffordshire, once they have recovered from acute illness but have not regained their pre-admission functional state and are unable to return to the community. A minority of patients are admitted directly from their home without first going to the Acute Hospital. All patients must be cooperative and have the physical capacity to undergo a rehabilitation programme. Patients with Dementia are accepted if their Dementia is mild or moderate, they have good insight, and are able to participate in the rehabilitation process. Each patient has a Collaborative Care Document file which includes initial assessment notes, medical, nursing, physiotherapy, occupational therapy and social work entries, multi-disciplinary goals-setting, and discharge documentation. All staff have access to these files allowing for a holistic approach to patient care, which is important in this group of elderly patients with complex needs. Multidisciplinary meetings are held once a week to discuss patients' progress and any issues that need addressing.

The service began in 1997 as a small unit that gradually expanded to the current status of two similar wards with 21 beds in each. Our analysis focuses on patients in the 31 beds under the care of the Consultant Physician and his team. Patients in the remaining 11 beds are managed by the patients' own General Practitioners under a different service contract and were excluded from this evaluation.

OBJECTIVES

The primary aim was to assess the effectiveness of Intermediate Care and Rehabilitation in terms of individual patient outcomes in functional ability as measured by the Barthel index. Secondly, other variables (age, sex, length-of-stay, number of prescription items on discharge documents, admission Barthel score and where the patients have been admitted from) were analysed to identify any factors which may have a relationship to the primary outcome.

ETHICAL APPROVAL

After review of the plan for the project by the Student Project Committee of the Undergraduate School of Medicine, the project was defined as a service evaluation and further scrutiny from the Local Research Ethics Committee was not required.

STUDY POPULATION

All Patients admitted between 1 st November 2009 and 30 th April 2010 were included.

OUTCOME MEASURE

As achieving a good functional status and independence are fundamental goals of Intermediate Care and Rehabilitation, measuring this outcome is useful in assessing effectiveness of the service. An appropriate method of measuring patients' functional ability is by focusing on basic activities of daily living. The Barthel index is a tool widely used in routine clinical practice to measure how independent somebody is when performing activities such as feeding, dressing and washing themselves (7). The reliability and validity of the Barthel index have been studied and found to be high (8,9,10). The Barthel Index has been used before as a measure of outcome in older patients undergoing rehabilitation and was found to be effective (11).

DATA COLLECTION

The relevant information was obtained anonymously from the medical case-notes, collaborative care documents, and the ward admission book where details of all patients are recorded. The data for each patient was entered onto a separate data collection sheet and then transferred to the computerised database OpenOffice.org 3.2 Calc. The items collected comprised: age (years at admission); where patients were admitted from; original type of residence; length of inpatient stay (in days); Barthel scores on admission and at discharge for assessing change in functional status (these are recorded routinely in all patients); the number of prescription items at discharge as a proxy of morbidity burden (see more information below);

and discharge destination. Patients who were transferred to the acute hospital or died did not go through the standard discharge process and so did not have the full set of discharge documentation. Patients were excluded from full analysis if they had incomplete data.

The number of prescription items on discharge was used as a measure of each patient's morbidity burden as it has been shown to be a reliable a measure of chronic disease in a large community study on older patients (12). It is also easier to collect and verify.

DATA ANALYSIS

Descriptive and statistical analyses of the data were performed using the StatsDirect software programme. Simple descriptive analysis was carried out on the whole dataset. For patients who were acutely transferred elsewhere or had died, only the descriptive analysis could be undertaken, whereas for patients who had complete data including admission and discharge Barthel scores (patient who had been discharged either home or to institutional care) additional statistical analyses were performed. The non-parametric Wilcoxon signed rank test for paired data was used to compare the admission and discharge Barthel scores to assess if there was a significant change. The Spearman's rank correlation coefficient tests were used to test the association between the change in Barthel score and: age; length of inpatient stay; number of prescription items; and the admission Barthel score as a measure of initial level of disability. If these univariate analyses revealed significant associations, the intention was to perform multiple regression analysis to assess the relative independence of these factors as predictors of functional improvement. Statistical significance was accepted at p-values of <0.05 and all tests were two-tailed.

RESULTS

STUDY POPULATION

The total number of patients admitted to the Unit in the six month period of study was 180. Of these, 35 were excluded for the following reasons: 19 had incomplete records, in 12 patients the case-notes could not be located, and 4 patients were still on the ward. The remaining 145 (81%) had mean age of 82.1 years (SD 9.7), median length of inpatient stay 25 days (interquartile range 29), and 58% were female. 88% were admitted from the local Acute hospital and 12% were admitted directly from their place of residence.

PATIENT CHARACTERISTICS

Of the 145 patients who were analysed, 21 were transferred back to the Acute hospital and 16 died. These 37 patients did not return to the community as planned and therefore were not investigated further. Thus, 108 patients had been discharged back into the community and had complete clinical data for full analysis.

The group of 108 and the group of 37 patients were similar in age i.e. 81.8(SD10) and 82.8(SD8.8) years respectively ($p>0.05$), male/female distribution i.e. 59% and 54% respectively were female ($p>0.05$), and origin of admission i.e. 89% and 87% respectively were admitted from the Acute hospital ($p>0.05$) and 11% and 13% directly from their residence ($p>0.05$). However, the length of stay in Leek Hospital was significantly shorter for the 37 patients who died or were transferred back to the Acute hospital i.e. median 11 (interquartile range 23) days versus 32 (interquartile range 22), $p=0.049$ (Mann-Whitney U test), reflecting more severe illness and/or acute complications.

CLINICAL OUTCOMES

Of the 108 patients whose therapy was completed and were discharged back to the community, 77% went back to their own home and only 23% to a Residential or Nursing Home. The median number of drug prescriptions at discharge was 6 (interquartile range 4). The median admission and discharge Barthel scores were 10 (interquartile range 8) and 14 (interquartile range 8) respectively ($p=0.0001$), reflecting a significant improvement in functional status.

OUTCOME DETERMINANTS

No significant association was found between the change in Barthel score and the following: patients' age ($r =0.12$, 95% CI ?0.06-0.31, $p=0.12$); length of inpatient stay ($r = ?0.02$, 95% CI ?0.21-0.17, $p=0.81$); number of prescription items at discharge ($r = ?0.05$, 95% CI ?0.23-0.14, $p=0.62$); and the admission Barthel score ($r = ?0.14$, 95% CI ?0.32-0.05, $p=0.16$).

DISCUSSION

The result of this service evaluation in terms of the primary outcome is positive, showing a modest improvement in patients' functional ability during admission to the rehabilitation unit. Although the median increase of 4 points in the Barthel score is not very large, it can enhance patients' quality-of-life by increasing independence in basic activities of daily living. Also, it can make the difference between

being able to live again at one's own home rather than having to go into a Residential Home, or being admitted to a Residential Home rather than a Nursing Home. Overall, more than three quarters of the patients were able to return to their own homes with the remaining minority having to be admitted to a Residential or Nursing Home, which again reflects a good outcome of managing patients in this unit. As the total size of the study population was appreciable and more than 80% of the patients had sufficient data to enable meaningful analysis, these favourable factors strengthen the credence of the study's main conclusions.

The fact that no correlation was found between the improvement in Barthel score and the patients' age, morbidity level, and initial functional ability is also of considerable clinical importance. In other words, patients stand to benefit from transfer to a rehabilitation unit even if they are older, have more chronic diseases, and are more disabled at the start. This emphasises the need for ensuring equity of access to these services for all patients and to avoid any tendency to discriminate against those patients of advanced age, chronic conditions, and higher pre-existing disability. In line with these findings, there was also a lack of correlation between improvement in Barthel score and length of inpatient stay. In other words, older patients with greater disability need longer to recover, but in the end they attain a similar improvement as younger or less disabled patients. This implies that, as long as patients are continuing to show improvement (however small), patients should continue their rehabilitation programme until their functional state maximises and cannot improve further. This is a challenging scenario as the ever-increasing demand for rehabilitation beds and a drive to contain costs can easily exert pressure on rehabilitation units to shorten lengths of stay. This would be short-sighted and counter-productive as patients would not reach their potential, will require more maintenance support and personal care services, result in a higher risk of hospital re-admission, and cost more in the long-term.

However, careful selection of patients for transfer to a rehabilitation unit is central to achieving favourable outcomes as those observed in this study. Patients should be medically stable and not acutely ill, have a satisfactory mental state and motivation, be cooperative, and have the strentgh and reserves to undergo an active programme of remedial therapies. Even in our dataset that resulted in positive outcomes, a minority of patients either had to be transfered back to the Acute hospital or died within two weeks of admission. This suggests that these patients had advanced medical problems and their condition may have been unstable. Minimising the number of such admissions would not only save these individuals from the inconvenience of futile transfers to and from the rehabilitation ward, but would also enhance the cost-effectiveness of the unit. Inevitably though, these cases cannot be eliminated as a number of patients will always develop acute complications that could not be foreseen or prevented e.g. pneumonia, acute myocardial infarction or stroke.

Our unit described in this study is typical of other Intermediate Care and Rehabiliation departments in the UK in various ways. It is cited outside an acute hospital, it has a multidisciplinary team in place that collaborates closely, most patients are transferred from Acute departments once they have stabilised but have not reached their pre-existing functional state and require further input, and accepts patients with a broad range of original medical presentations. However, our findings cannot necessarily be generalised to other hospitals as the precise selection process of patients as well as the expertise of the multidisciplinary professionals and the effectiveness of their team-working will inevitably impact on quality of care and ultimate outcomes. These pre-requisites can also alter significantly from time to time in any specific unit due to staff turnover or other organisational and resource changes. Hence, to ensure ongoing optimisation of any particular Intermediate Care and Rehabilitation Units it is important to periodically carry out detailed evaluations of the service and its outcomes.

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