Examining assessment tools for discharge planning

Aims: To compare three functional assessment tools, and provide evidence of reliability and validity.

Method: This was a prospective study of discharge in an acute hospital trust. The research nurse collected demographic data and Functional Independence Measure (FIM), Alpha FIM and Barthel Index (BI) scores on 551 patients. Patients were entered into the study between days five and 11 of their stay in acute medical wards and followed until discharge.

Results: The median age was 82 (range 19–102) years and 42% were male. The mean FIM score was 72, range 18–126 (SD ±31), mean Alpha FIM was 29, range 6–42 (SD ±11), and mean BI was 9, range 0–20 (SD ±6). The Cronbach alpha coefficients were: FIM 0.955, Alpha FIM 0.897 and BI 0.911.

Conclusion: The results suggest all three functional assessment tools are valid and reliable. Nurses can incorporate any of the three instruments into discharge planning; they are well advised to use a measure of function to get to know their patients and better inform this process.

Background: Discharge planning has been described as being a part of daily nursing practice that poses significant challenges for nurses. One study described four stages of proper hospital discharge for older patients (Bull and Roberts, 2001). The first stage is getting to know the patient, the second identifying the initial discharge plans, the third preparing the patient for their return home, and the fourth assessing the older adult’s transition back to the community following an acute hospital stay.

There is much in U.K. literature about nurse-led discharge and ways to improve patient care and the discharge process for patients. The Department of Health (2004) launched a toolkit for improving hospital discharge. Following this, several articles explained the process of ‘nurse-led’ discharge (Lees, 2004) and how nurses could manage ‘simple’ discharges (Chatterjee, 2004).

Several trusts have used information boards to assist with the discharge process. Nurses at King’s College Hospital in London undertook a two-year project to improve discharge planning. By using simple information boards that were updated daily, nurses reduced the average length of hospital stay from 3.6 days to 2.9 days and had 80% of patients ready for discharge before midday (Hoban, 2007).

In January 2007, a group of nurses at a U.K. trust set up a project to improve multidisciplinary team communication and coordination of patients’ progress through the discharge process (Lees and Delpino, 2007). The project involved a local agreement to adjust the information on the ward’s central patient location board to include discharge information.

Effective discharge planning is a complex interface between the acute trust and social services, community hospitals, older adult rehabilitation, rehabilitation for young people with disabilities and the housing authority, as well as public and private residential and nursing homes.

This study was part of a larger discharge planning project within Oxford Radcliffe Hospitals NHS Trust. The imperatives were to prevent delays and reduce length of stay (LOS). Several system changes were made to achieve the goals of reducing delays and LOS. Examples of changes included implementing twice-weekly multidisciplinary team meetings on some wards and strengthening existing multidisciplinary team meetings on other wards.

In spite of these changes, there was still no common instrument to assess function across all disciplines and agencies. Before implementing additional changes, such as information boards, it was felt that identifying a common functional assessment instrument could help facilitate communication, select...
patients with agreed priorities, measure patient improvement and thus improve the discharge planning process.

This article reports on a prospective comparison of three functional assessment tools. Knowing which tool is the most reliable and valid to best inform the complex discharge planning process is important.

AIM

The main objective of this analysis was to compare three functional assessment tools.

One aim was to determine if there were associations between patient scores on the three tools – Functional Independence Measure (FIM), Alpha FIM and Barthel Index – with age, gender, number of referrals, admitting medical diagnosis, discharge destination and length of acute hospital stay.

The hypothesis was that patients with lower scores would be more likely to be older and experience delayed discharge, discharged most often to nursing homes, and be more likely to have a prolonged LOS in the acute trust.

LITERATURE REVIEW

An initial review looking for a common tool to measure function identified the FIM, which was developed to help rehabilitation clinicians reliably document and report patients’ level of disability. The tool is widely used in the US and there are many research articles about its use and implementation in US literature. The FIM has had limited implementation in England, where the healthcare system is markedly different. Literature reporting use of the FIM in England was the primary focus of this review.

One study compared the responsiveness of the Barthel Index (BI) and the FIM in an inpatient neurorehabilitation population (van der Putten et al, 1999). Admission and discharge scores were generated for both the BI and the FIM on 201 patients with a diagnosis of multiple sclerosis and 82 with a medical diagnosis of stroke. The findings suggest the two instruments have similar responsiveness and the study concluded that the FIM has no advantage over the BI in evaluating changes in disability due to therapeutic interventions. The study did not include any report of the reliability or validity of the two instruments used.

Another study of patients after spinal cord injury reported that the FIM could be used reliably as a self-report questionnaire (Grey and Kennedy, 1993). The average age of the 40 patients was 30 years with a range of 17–54. There were no significant differences in clinician-rated and self-rated complete FIM scores. The results showed the FIM as a self-rated questionnaire is reliable without the need for a clinician to be present or for detailed instruction.

Two abstracts were located about ongoing work with the FIM in the UK. One described a project assessing when the FIM should be measured following injury (Coats, 1998). Results of this project, to our knowledge, have yet to be reported. Another abstract described a prospective evaluation of the UK FIM + Functional Assessment Measure being conducted in London (Turner-Stokes, 2002). Results of this multicentre cohort study, to our knowledge, have yet to be published.

In summary, the literature review identified the FIM. It also suggested that a newer Alpha FIM (Uniform Data System for Medical Rehabilitation, 2006), formulated for acute care, is beginning to be used in the US but has yet to be validated in the UK.

In this trust, the BI is included in paperwork for patients admitted but often not used. It was unclear which functional assessment instrument was a reliable and valid tool to inform the discharge process and therefore this study was undertaken.

METHOD

After obtaining ethical and other approvals, a research nurse was hired and trained to collect data. Patients entered into the study had been admitted to acute medical wards, medical short stay or the stroke unit at the John Radcliffe Hospital at the trust, although some patients who were then moved to other wards were also followed for the duration of the study.

A total of 551 patients were entered into the study out of a possible 813 who would have been eligible. Some patients were discharged or died before being seen by the research nurse.

Demographic characteristics collected included well-accepted parameters such as age, gender and whether there had been a carer before admission to hospital or not. Additional characteristics included medical diagnosis recorded at the time of admission, co-morbidities, numbers of referrals and the reason for the referral, whether there was a delay in discharge and the reason for the delay.

Instruments

The three tools used to measure patients’ function were the FIM, the Alpha FIM and the BI.

The adult 1990 version of the FIM instrument (Uniform Data System for Medical Rehabilitation, 1990) has 18 items: 13 motor (eating; grooming; bathing; dressing the upper body; dressing the lower body; toileting; bladder management; bowel management; bed, chair or wheelchair mobility; transfers to toilet; transfers to tub or shower; ability to walk or propel a wheelchair; and ability to climb stairs); and five cognitive (comprehension; expression; social interaction; problem solving; and memory). A seven-point scoring system is used for each item based on whether or not another person’s assistance is required for performance. A score of 6 or 7 represents functional independence, while scores between 1 and 5 represent different levels of dependence. The 18 items are added up to generate a total score, with 18 indicating complete dependence in function and 126 indicating independence in function. Sub-scores can be generated from the motor and cognitive items.

The adult Alpha FIM instrument consists of six items: four motor (eating, grooming, bowel management and transfers to toilet); and two cognitive (expression and memory) (Uniform Data System for Medical Rehabilitation, 2006). The same seven-point scoring system used for the adult 18-item FIM is used to score each item. The six items can be added up to generate a total score, with 6 indicating complete dependence in function and 42 indicating independence. Sub-scores can be generated from the four motor and two cognitive items.

The Barthel Index is a 10-item instrument that measures functional independence in daily activities of living (Mahoney...
and Barthel, 1965). In the version used at this hospital, the 10 items are added up to generate a total score ranging from 0, indicating minimum independence, to 100, indicating maximum independence.

Data was coded and entered into SPSS version 14 for analysis. Descriptive summary statistics were used to provide a description of patients. T-tests were used to determine differences in age, gender, number of referrals and LOS for each of the three tools. Analysis of variance (ANOVA) was used to see if there were differences between the three tools according to admitting medical diagnoses or discharge destination (Munro, 2005). Reliability was estimated using the Cronbach’s alpha coefficient. Validity was examined by comparing FIM scores and Alpha FIM scores with BI scores.

The results are presented as m=mean, t=T-test results, df=degrees of freedom, F=F-test results using ANOVA (as above) and p=significance level.

RESULTS

The median age of the 551 patients was 82 years (m=79) and 42% were male. Patients aged 82 and younger had higher FIM (m=79) (t=5.44, df=540, p<0.001), higher Alpha FIM (m=31) (t=4.32, df=549, p<0.001) but not BI scores (m=9) (t=0.36, df=74, p=0.722). Male patients had higher scores on the FIM (m=75) (t=2.10, df=442, p=0.037) but not on the Alpha FIM (m=29) (t=1.20, df=549, p=0.229). Women had higher BI scores (m=10) (t=2.01, df=74, p=0.048). For full details on demographic details, see nursingtimes.net.

The maximum number of referrals was two, with 202 patients having none, 258 one and 91 two referrals. There were 241 referrals to social services, 193 to this hospital’s single point of access, rehabilitation and care (SPARC) and six to the Oxford Centre for Enablement. The two most common reasons for referral were for transfer to a community hospital and for arrangements for a care package. Patients who had no referral had higher scores on the FIM (m=86) (t=7.62, df=320, p<0.001), higher Alpha FIM (m=32) (t=5.60, df=346, p<0.001) but did not have significantly higher scores on the BI (m=10) (t=1.05, df=74, p=0.299).

The mean number of co-morbidities was three. A total of 170 different types of co-morbidity were recorded on the medical chart on admission, the five most common being hypertension, diabetes, cancer, atrial fibrillation and stroke. Patients with a LOS of 16 days or fewer had higher FIM (m=81) (t=7.03, df=548, p<0.001), higher Alpha FIM (m=32) (t=6.33, df=549, p<0.001) but not significantly higher BI scores (m=9) (t=0.57, df=74, p=0.573).

The mean FIM score was 72, range 18–126 (SD =31), the mean Alpha FIM was 29, range 6–42 (SD ±11) and the mean BI was 9, range 0–20 (SD ±6). The Cronbach alphas were 0.955 for the FIM, 0.897 for the Alpha FIM and 0.911 for the BI. The correlation between the FIM and the BI was 0.77 (p<0.001). The correlation between the Alpha FIM and the BI was 0.68 (p<0.001). Doctors recorded a total of 64 different diagnoses on admission and these were regrouped mostly according to a system of 11 categories. Patient scores on the FIM (F=8.83, df=10, p<0.001) and the Alpha FIM (F=8.50, df=10, p<0.001) were significantly different between the medical diagnoses but there were no significant differences in patient scores on the BI (F=1.09, df=10, p=0.381). Patients with cardiac problems had the highest FIM (m=100), Alpha FIM (m=38), and BI (m=13) scores. See nursingtimes.net for a table showing patient scores on the three tools according to admission medical diagnoses of those included in the study.

Table 1 contains patient scores on the three tools according to discharge destinations. Originally there were 10 recorded discharge destinations; these were regrouped into the six categories shown in the table. Patients discharged from the acute hospital to community hospitals and other facilities for rehabilitation were felt to need about the same level of care and therefore grouped together.

The further care category included those discharged to residential care, nursing home or intermediate care.

Those transferred to other hospitals were patients discharged to four psychiatric facilities, two acute care trusts for out-of-area patients, a stroke unit in Poland and an orthopaedic centre.

Patient scores on the FIM (F=83.60, df=5, p<0.001), Alpha FIM (F=77.20, df=5, p<0.001), and BI (F=5.51, df=5, p<0.001)

<table>
<thead>
<tr>
<th>Discharge destination</th>
<th>n (%)</th>
<th>m (±SD)</th>
<th>Range</th>
<th>FIM n</th>
<th>m (±SD)</th>
<th>Range</th>
<th>Alpha FIM n</th>
<th>m (±SD)</th>
<th>Range</th>
<th>BI n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>211 (38.3)</td>
<td>95 (±24)</td>
<td>20–126</td>
<td>211</td>
<td>36 (±7)</td>
<td>6–42</td>
<td>211</td>
<td>13 (±5)</td>
<td>3–20</td>
<td>17</td>
</tr>
<tr>
<td>Community hospital or other rehabilitation</td>
<td>101 (18.3)</td>
<td>58 (±19)</td>
<td>18–124</td>
<td>101</td>
<td>25 (±8)</td>
<td>6–42</td>
<td>101</td>
<td>7 (±5)</td>
<td>1–17</td>
<td>17</td>
</tr>
<tr>
<td>Home with care package</td>
<td>98 (17.8)</td>
<td>73 (±22)</td>
<td>18–118</td>
<td>98</td>
<td>30 (±8)</td>
<td>6–42</td>
<td>98</td>
<td>9 (±6)</td>
<td>0–17</td>
<td>18</td>
</tr>
<tr>
<td>Death</td>
<td>79 (14.3)</td>
<td>42 (±26)</td>
<td>18–118</td>
<td>79</td>
<td>17 (±11)</td>
<td>6–42</td>
<td>79</td>
<td>5 (±5)</td>
<td>0–13</td>
<td>13</td>
</tr>
<tr>
<td>Further care</td>
<td>54 (9.8)</td>
<td>54 (±25)</td>
<td>18–99</td>
<td>54</td>
<td>22 (±10)</td>
<td>6–39</td>
<td>54</td>
<td>10 (±5)</td>
<td>1–18</td>
<td>9</td>
</tr>
<tr>
<td>Transfer to other hospitals</td>
<td>8 (1.5)</td>
<td>48 (±29)</td>
<td>18–97</td>
<td>8</td>
<td>18 (±10)</td>
<td>6–37</td>
<td>8</td>
<td>1 (±0)</td>
<td>1–1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>551 (100)</td>
<td>72 (±31)</td>
<td>18–126</td>
<td>551</td>
<td>29 (±11)</td>
<td>6–42</td>
<td>551</td>
<td>9 (±6)</td>
<td>0–20</td>
<td>76</td>
</tr>
</tbody>
</table>
were significantly different between the discharge destinations. Patients who went home without a care package had higher scores on all three tools.

DISCUSSION
The results suggest that the FIM, Alpha FIM and BI are all reliable and valid tools to measure function in this older adult population. The FIM and the Alpha FIM have a greater score spread and perhaps give nurses a better view of patients’ function. Furthermore, BI scores were found to be available on approximately 10% of patients in this study.

One outcome of note is that the trust negotiated and purchased a licence for the FIM (Uniform Data System for Medical Rehabilitation, 1997) as part of the changes taking place in the larger discharge planning project during the time this research was conducted.

Two universal challenges of any tool to measure function are reliability and validity. Thus nurses using tools in practice should enquire about these aspects.

One study of 40 patients with traumatic spinal cord injury reported the complete FIM can be used reliably as a self-report postal questionnaire (Grey and Kennedy, 1993). In this study, the internal consistency aspect of reliability was measured using Cronbach’s alpha. The closer the value of the Cronbach's reliability was measured using Cronbach’s alpha. The closer the value of the Cronbach’s alpha coefficient is to 1, the stronger the evidence that all the items on the tool fit together as a whole (Munro, 2005). This research, with Cronbach alpha coefficients of 0.955 for the FIM, 0.897 for the Alpha FIM, and 0.911 for the BI, suggests high internal consistency for each of the three tools.

It is extremely challenging to rigorously validate instruments that attempt to measure patients’ function. An examination of validity of the FIM, Alpha FIM and BI instrument poses the question: is function being measured? The significant correlations between both the FIM scores and Alpha FIM scores and the BI scores in this study suggest that the same concept (function) is what is validly being measured.

With a median age of 82 years and a mean of 79, this is the first report of scores on three tools in an older adult population in England. FIM scores have been reported on younger patients with an average age of 20 (range 17–54) (Grey and Kennedy, 1993). Another study reported FIM and BI scores in two groups of patients with average ages of 45 (range 22–73) and 52 (range 19–87) (van der Putten et al, 1999).

To our knowledge, this study is the largest sample of FIM scores with the widest range of different medical diagnoses in England. Other studies conducted in England have reported on patients with spinal cord injury (n=40) (Grey and Kennedy, 1993), with multiple sclerosis (n=201) and stroke (n=82) (van der Putten et al, 1999). This study had nearly equal groups of men and women compared with others with unequal groups, with 80% (Grey and Kennedy, 1993) and 31% (van der Putten et al, 1999) being men.

Patients in this study, with a mean total FIM score of 72, had quite a low level of functional independence. Others have reported a mean total FIM score of 105 (Grey and Kennedy, 1993). The finding of low average patient scores on the FIM is not surprising as function was measured early (target of day five) during patients’ acute hospital stay and those studied were mainly older adults. Grey and Kennedy (1993) reported function at the time of patients’ discharge from rehabilitation in younger adults.

Limitations
Perhaps the most significant limitation is that the functional assessment scores were measured only once, on approximately day 5–11 of the acute hospital stay. Many other studies assess function at least twice so that it can be determined if there has been a change in patients’ functional level between admission and discharge (van der Putten et al, 1999). Future studies should look at changes in patient function over time.

In this study, patients were followed only until acute hospital discharge. It is not known how many of the 20% of patients who were discharged from the acute trust to community hospitals and other types of rehabilitation were ultimately discharged home. Thus it is not known if there is a correlation between patient scores on the three tools and final discharge destination.

CONCLUSION
The results suggest the FIM, Alpha FIM and the BI are each valid and reliable measures. Nurses searching for a reliable and valid tool to measure function and thus inform discharge planning, could adopt any of these three. Now that there is an agreement for use of the FIM in this trust, further research should measure patient improvement as well as further aspects of reliability and validity.

A delay in discharge or a long LOS warrants at least one additional assessment, as nurses are well aware that patients’ function changes. The FIM, with its greater spread in scores compared with the BI, is perhaps more informative in the greater discharge planning process, especially for additional assessments.

KEY REFERENCES


The full reference list for this article is available at nursingtimes.net