Functional and self-efficacy changes of patients admitted to a Geriatric Rehabilitation Unit

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Background. Geriatric Rehabilitation Units (GRUs) have been established to restore functional abilities of older hospitalized patients. Although considerable health care resources have been allocated to these units, few outcome-based research studies have been reported on Canadian GRUs.

Aim. The aim of this paper is to report a study examining the effect of admission to a GRU on changes in patients' functional ability and self-efficacy in performing everyday activities at home.

Methods. Following Institutional Review Board approval, data were collected from 40 patients age 65–101 years (mean 83·8, SD 6·57) admitted to a 21-bed interdisciplinary GRUs over a 7-month period. All were living independently prior to hospital admission. Data were collected on admission to the unit and on discharge using two instruments: the Functional Independence Measure and Falls Efficacy Scale.

Results. Statistically significant improvements were found in functional ability and self-efficacy following admission to the GRUs.

Conclusions. Although functional level and feelings of self-efficacy on admission to the unit were at levels which may have prevented participants from returning home, the majority were discharged to the community. Results suggest that admission to a GRU helps prepare patients to return to community living.

Keywords: hospitalization, older adult, functional ability, self-efficacy, rehabilitation, nursing, hospital discharge

Introduction

Acute hospitalization of older adults often results in functional decline and decreased self-care abilities. Research has suggested that up to 50% of older hospitalized patients experience functional decline (Bergman *et al.* 1997, Hebert 1997, Rosenberg & Moore 1997). In fact, functional decline on admission to hospital has previously been shown to be a predictor of adverse hospital outcomes (Inouye *et al.* 2000, Fleury 2002, Huckstadt 2002). Geriatric Rehabilitation Units (GRUs) have been recognized as an effective strategy to restore older, hospitalized patients' functional abilities (Rubenstein *et al.* 1984, Baztan *et al.* 2003). However, studies reporting this have been mainly conducted in the United States.

Characteristically, GRUs are distinct, in-hospital units staffed by interdisciplinary teams specializing in the management of the medical, social, physical, psychological and economic well-being of older adults. The primary goal of GRUs is to assist older patients to achieve the highest level of functioning according to their individual abilities. Therefore, interventions are targeted at reducing the burden of disease and associated impairments, and promoting optimal function within the limitations of the diseases and physical impair-

ments (Gibbon 1992, Gregor *et al.* 1996). In addition, a fundamental principle underlying GRU care is that subjective well-being is an important determinant of physical functioning. Consequently, GRUs adopt a philosophy that emphasizes both the physical and emotional aspects of patient care (Easton *et al.* 1995, Hoenig *et al.* 1997). A better understanding of factors associated with functional improvements and ability to live as independent as possible should be helpful to nurses who provide rehabilitative care for older adults.

Background

One factor that has been suggested to influence functional ability positively is self-efficacy. This has been a focus of research in social psychology (Kneebone & Harrop 1996, Bandura 1997) and health sciences (Scherer & Schmieder 1996, Resnick 1998a, 1998b, 1998c, Li *et al.* 2002). As a concept, self-efficacy refers to a person's belief in their performance capabilities with respect to a specific task (Bandura 1986, Kneebone & Harrop 1996). Perceived self-efficacy is concerned with the belief in one's capabilities to mobilize the motivation, cognitive resources and courses of action required to perform a specific task (Resnick 1998a, 1998c). Self-efficacy has emerged as a strong predictor of health behaviours in people of all ages, and several studies have reported perceived self-efficacy as an important predictor of health status and patient outcomes (Tinetti *et al.* 1994, Kaplan *et al.* 1996, Gill *et al.* 1997). Self-efficacy has also been linked to both short-term and long-term success of behaviour change (Zimmerman *et al.* 1996, Resnick & Nigg 2003).

A key element of the rehabilitation of older adults is assisting them to return to independent living, with or without support. Since 1986, six GRUs have been established in New Brunswick, Canada, based on the expectation that improving patients' functional ability will decrease the risk of permanent residential care being needed, and increase the likelihood of older adults returning to independent living following hospitalization (P. Jarrett, personal communication). While considerable health care resources have been allocated to these units, no studies have been published on their effectiveness. Earlier studies, conducted by physicians in other countries have documented that GRU patients are more likely to return to and remain at home for longer periods of time than older patients who do not receive GRU services (Huusko *et al.* 2000, Heruti *et al.* 2002, Landi *et al.* 2002, Raphael *et al.* 2002, Tinetti *et al.* 2002). However, nursing research into the effect of GRUs within the Canadian Health System remains limited.

It cannot be assumed that functional gains made during a GRU admission will be maintained after rehabilitation is completed and a patient returns home. It is important for clinicians to recognize the difference contexts in which these occur; functional level obtained in hospital may not be the same as capacity to function at home. In keeping with Bandura's theory of self-efficacy and the fundamental principles of GRUs, nurses need to be aware of patients' functional ability and their beliefs in successfully performing activities in the home environment.

Despite the presence of a publicly funded health care system and the heavy demand on limited health care professionals to operate these units, there has been little research on GRUs in Canada. This paper reports a Canadian nursing study that measured changes in patients' functional abilities and self-efficacy in performing everyday activities of daily living at home.

The study

Aim

The aim of the study was to examine the effect of admission to a GRU on patients' functional abilities and feelings of self-efficacy in performing everyday activities at home. The following questions were addressed:

1 Does a patient's functional ability change following admission to a GRU?
2 Does a patient's self-efficacy for performing essential, non-hazardous activities of daily living at home change following admission to a GRU?

Design

We used an exploratory, one group, longitudinal design that involved no experimental manipulation of the independent variable (care provided on the GRU). Data were collected on admission to and discharge from the GRU using two instruments: the Functional Independence Measure (FIM) (Research Foundation of the State University of New York 1987) and the Falls Efficacy Scale (FES) (Tinetti *et al.* 1990).

Participants

The setting was 21-bed GRU located in an urban centre in Canada that services a population of 150 000. Patients were transferred to the unit after resolution of an acute medical or surgical condition that necessitated hospital admission. Those admitted to the unit who met study criteria from 1 July 1999 to 20 January 2000 were invited to participate. Recruitment

criteria were that potential participants must be over 65 years of age, English speaking, having their first admission to the unit, and able to provide informed consent. An α of 0·05 and an effect size of 0·40 yielded a power of 0·928 for the study, indicating a sample of 40 would be sufficient.

Instruments

The FIM (Research Foundation of the State University of New York 1987) is a widely used instrument to assess functional status. The tool has 16 items and each is rated on a seven-point scale ranging from completely dependent (1) to completely independent (7). Total FIM scores can range from 16 for complete dependency in all areas of functional ability, to 112 for independence in all measures. The higher the FIM score, the higher the level of independence. The validity and reliability of the FIM have been extensively reported (Research Foundation of the State University of New York 1987, Kidd & Yoshida 1995, Reker *et al.* 1998).

The FES (Tinetti *et al.* 1990) measures self-efficacy. Confidence in completing 10 activities in the home is rated on a 10-point scale ranging from 1 for 'not confident at all' to 10 for 'completely confident'. The activities measured are getting dressed and undressed, preparing a simple meal, bathing, getting in/out of a bed and a chair, answering the door or telephone, walking inside their home, reaching into cabinets, light housekeeping and simple shopping. Thus, total FES score ranges from 10 to 100. The FES has been psychometrically tested with cognitively intact people over the age of 65 (Tinetti *et al.* 1994).

Data collection

Data were collected according to the following procedure:

- Patients who met study criteria were asked by the admitting clerk of the hospital if they were willing to be approached about participating in a study.
- Within 72 hours of admission to the GRU, the researcher: (i) met all patients who had agreed to be approached to participate, (ii) obtained informed consent for participation and (iii) completed the FES in collaboration with the patient.
- Within 72 hours of the patient's admission to the GRU, the nurse in charge of the study unit from Monday to Friday during the day shift completed the FIM in collaboration with the patient's primary nurse.
- With 72 hours of the patient's discharge from the GRU, the researcher, an academic with no affiliation with the unit or the provision of patient care completed the FES in collaboration with the patient.
- Within 72 hours of the patient's discharge from the GRU, the charge nurse completed the FIM in collaboration with the patient's primary nurse.

Ethical considerations

Ethical approval was obtained from the hospital ethical review committee and the university ethics committee where the researcher was affiliated. To avoid the possibility of potential subjects perceiving that their participation would affect their admission to the unit and/or their subsequent care, patients were approached only after they arrived on the unit and by someone not involved in their care. When initially approached by the researcher, potential subjects received an explanation of the nature and purpose of the study and were provided with ample time for reflection and/or questions. They were informed of their right to refuse to participate without any repercussions, and that they would not derive any personal benefit from participating. Therefore, consent was voluntary and informed. This was reconfirmed during each contact with participants.

Data analysis

The data were analysed using SPSS 10.1 software. Descriptive statistics were used for all variables. To identify any statistically significant differences between admission and discharge functional ability and self-efficacy scores, *t*-tests were performed on mean scores for each instrument and mean scores for each FIM subscale (self-care, sphincter control, mobility, locomotion, communication, social cognition). The level of significance was set at $\alpha = 0{\cdot}01$ and two-tailed *t*-tests were used in all analyses to protect against type 1 errors. The internal consistency of each instrument was examined used Cronbach's α. Inter-rater reliability of the FIM was established using κ studies.

Rigour

The FIM scores were obtained by two administrators: a primary nurse, who provided expert knowledge of each subject's functional status, and a charge nurse, who provided consistency in interpretation of the instrument. Inter-rater reliability was established at two points. First, prior to data collection, FIM educational sessions were provided to all nursing staff, and then each nurse independently completed a standardized case study. FIM scores obtained for these case studies yielded a κ of 99·48. In addition, admission and discharge FIM scores were completed twice on participant

number 20: (i) with the researcher and a primary nurse and (ii) with a charge nurse and another primary nurse. Both admission and discharge scores for participant 20 gave a κ value of 1·00.

The internal reliability of both instruments was measured using Cronbach's α coefficient. For FIM admission and discharge scores, reliability coefficients were high at $r = 0{\cdot}82$ and 0·95, respectively. For the FES, reliability coefficients were also high, with $r = 0{\cdot}82$ for admission scores and $r = 0{\cdot}79$ for discharge scores.

Results

Sample

Of the 45 patients admitted to the unit during the study period who met the inclusion criteria, 43 agreed to participate. Complete data were obtained for 40 patients (one was transferred back to the medical–surgical unit due to recurrent illness, two were discharged home before data collection could be completed). As shown in Table 1, participants' ages ranged from 65 to 101 years (mean 83·8, SD 6·57). The majority were transferred to the GRU from an acute medical or surgical unit ($n = 39$), and all had lived in private homes prior to hospitalization. The majority of participants returned to community living: 35 (87·5%) returned home, while 2 (5%) were discharged to a special care home and 3 (7·5%) went to a nursing home.

Table 1 Characteristics of sample ($n = 40$)

Characteristic	*n*	%
Age (years)		
65–74	2	5
75–84	16	40
85–94	19	47·5
95–104	3	7·5
Gender		
Female	28	70
Male	12	30
Admission diagnosis to acute care		
Orthopaedic	10	25
Cardiovascular	4	10
Respiratory	5	12·5
Neurological	7	17·5
General medical	13	32·5
Admitted directly from home	1	2·5
Living arrangements prior to hospitalization		
Lived alone	23	57·5
Lived with others	17	42·5

Functional ability

As shown in Table 2, total FIM score was 84·9 (SD 16·4) on admission, indicating functional dependency, compared with 101·6 (SD 13·9) on discharge, indicating modified functional independence. A paired *t*-test revealed that mean total FIM scores were significantly higher on discharge [$t(39) = -6{\cdot}517$, $P = 0{\cdot}0001$] than on admission to the GRU. Significant improvements were also found in subscale scores for self-care [$t(35) = -6{\cdot}994$, $P = 0{\cdot}001$], sphincter control [$t(35) = -2{\cdot}744$, $P = 0{\cdot}010$], mobility [$t(35) = -5{\cdot}427$, $P = 0{\cdot}0001$], locomotion [$t(35) = -6{\cdot}296$, $P = 0{\cdot}0001$], and social cognition [$t(35) = -1{\cdot}464$, $P = 0{\cdot}152$]. Although improvements were found in communication, they were not statistically significant [$t(35) = -0{\cdot}539$, $P = 0{\cdot}593$] (Figure 1).

Table 2 Functional independence scores

	Admission			Discharge		
Functional item	Mean	SD	Range	Mean	SD	Range
Self-care						
Feeding	6·6	1·1	1–7	6·9	0·8	2–7
Grooming	4·9	1·8	1–7	6·4	1·2	3–7
Bathing	4·0	1·8	1–7	6·1	1·3	3–7
Dressing						
Upper body	4·8	1·8	1–7	6·3	1·2	3–7
Lower body	3·8	1·9	1–7	5·9	1·5	2–7
Toileting	4·6	2·0	1–7	6·2	1·3	3–7
Total*	28·7	8·1	13–42	38·1	5·7	17–42
Sphincter control						
Bladder	5·8	1·9	1–7	6·5	1·3	2–7
Bowel	5·9	1·4	1–7	6·6	0·8	3–7
Total*	11·8	3·1	3–14	13·1	1·9	6–14
Mobility/transfers						
Bed, chair, wheelchair	4·7	1·9	1–7	6·6	0·9	4–7
Toilet	4·9	1·8	1–7	6·3	0·8	4–7
Total*	9·6	3·4	2–14	12·9	1·6	9–14
Locomotion						
Walk/wheelchair	3·8	1·9	1–7	5·6	0·9	4–7
Total*	3·8	1·9	1–7	5·6	0·9	4–7
Communication						
Comprehension	6·3	1·3	2–7	6·5	1·1	1–7
Expression	6·5	1·1	3–7	6·7	1·1	1–7
Total	12·7	2·4	5–14	13·3	2·1	2–14
Social cognition						
Social interaction	6·3	1·2	3–7	6·7	0·7	3–7
Problem solving	5·8	1·6	2–7	6·2	1·3	1–7
Memory	6·2	1·6	2–7	6·5	1·3	1–7
Total*	18·2	3·9	7–21	19·4	3·1	5–21

*Significant difference at the 0·01 level (two-tailed).

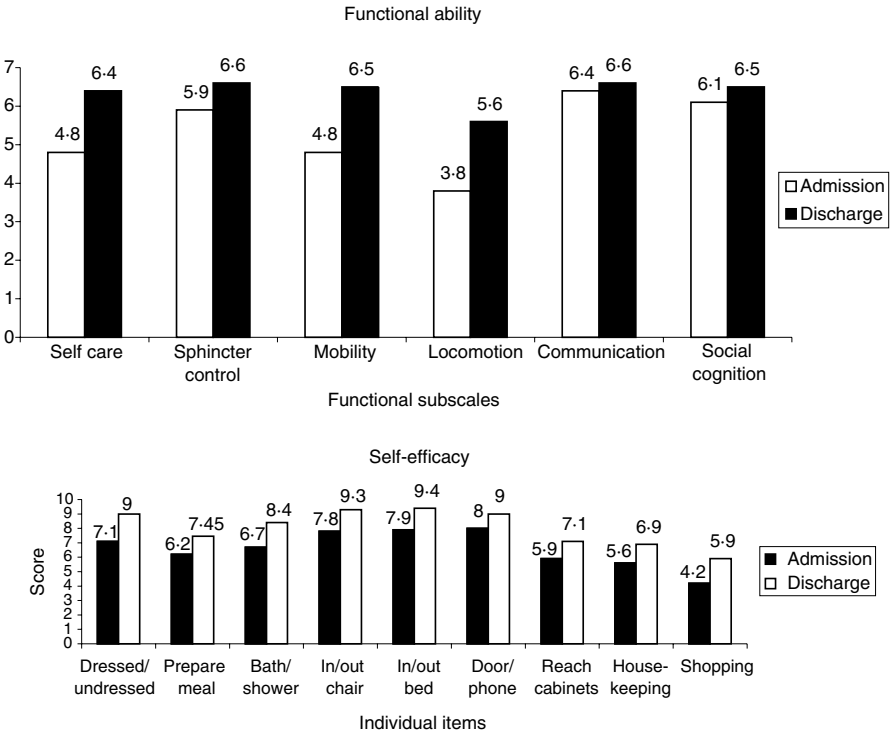

Figure 1 Changes in functional ability and self-efficacy.

Table 3 Falls self-efficacy scores

	Admission			Discharge		
Falls Efficacy Scale activity*	Mean	SD	Range	Mean	SD	Range
Get dressed and undressed	7·1	2·6	1–10	9·0	1·3	5–10
Prepare simple meal	6·2	2·9	1–10	7·45	2·6	1–10
Take a bath or shower	6·7	2·8	1–10	8·4	0·2	1–10
Get in/out of a chair	7·8	1·8	4–10	9·3	1·3	6–10
Get in/out of bed	7·9	2·2	1–10	9·4	1·5	3–10
Answer the door or telephone	8·0	2·5	1–10	9·0	1·6	5–10
Walk around inside your home	8·1	1·9	4–10	9·4	1·7	6–10
Reach into cabinets/closets	5·9	2·9	1–10	7·1	2·5	1–10
Light house-keeping	5·6	3·1	1–10	6·9	2·9	1–10
Simple shopping	4·2	3·5	1–10	5·9	3·5	1–10
Total Falls Efficacy Scale score	67·6	16·7	3–100	82·3	12·7	55–100

*Significant difference at the 0·01 level (two-tailed).

Self-efficacy

As shown in Table 3, mean FES score on admission was 67·6 (SD 16·7) and 82·3 (SD 12·7) on discharge, which also represents a significant improvement ($t(39) = -8{\cdot}201$, $P = 0{\cdot}0001$). The largest change scores were seen in dressing and undressing (1·9), bathing (1·7), and simple shopping (1·7).

Discussion

Nearly 80% of participants in the study were 80 years or older and represent a distinct group of older adults who generally have more health problems, more disabilities and decreased mobility than over 65 years population as a whole. The fact that this group continued to show functional improvements during their course of rehabilitation confirms that even those older than 80 benefit from rehabilitation. Prior to GRU admission, participants had been hospitalized for an acute medical or surgical problem. Although the scope of the study did not include assessment of functional status prior to the GRU admission, interviews revealed that all participants lived independently prior to the hospitalization. However, on admission to the GRU, 77·5% were unable to dress independently, 82·5% were unable to bath

independently, and 85% were unable to walk at least 150 feet even with assistance devices. The data strongly suggest that these patients would not have been able to return to independent community living directly from the acute care units. However, 87·5% (35) were able to return to community living following admission to the GRU. This restoration of independence is an important outcome in a health care system where the emphasis is on community living. The findings add to the literature on the effectiveness of GRUs in restoring lost function for older adults following admission to hospital.

Improvements were noted in all subscales on the FIM, with some areas demonstrating more improvement then others (self-care, sphincter control, transfers and locomotion). Statistically non-significant improvements were noted in communication; however, participants scored high in this on admission. The inclusion criteria for the study may have also led to this high score in this area, thereby giving little opportunity for improvement.

In this study, there was a statistically significant difference in participants' feelings of self-efficacy in performing everyday activities at home. Theoretically, this suggests that they felt prepared for discharge and were likely to engage in activities of daily living at home, outside the protected clinical environment. However, due to the study design, it is not possible to know unequivocally if the improved self-efficacy was due to the GRU admission itself or the enhanced functional ability of participants. Nonetheless, the GRU environment is designed to provide patients with the necessary information to enhance efficacy expectations; performance accomplishments, vicarious experiences, verbal persuasion and emotional arousal (Resnick 1998b), and could have affected self-efficacy. Interacting with other patients on the unit who successfully dealt with similar issues could have positively impacted on patients' confidence and ability to cope with disability (Strauser 1995). Verbal persuasion provided by staff on the GRU, perceived as having special knowledge and skilled in working with older adults, may have also promoted successful accomplishments and enhanced self-efficacy. Further studies are required to understand better the role of self-efficacy in the rehabilitation of older adults.

Limitations of the study

The following factors are recognized as limitations:

- the small convenient sample,
- the majority of participants were over 80 years of age, female and transferred to the GRU following hospital admission for an acute illness,
- only two variables were measured (functional ability and self-efficacy). Other physical, psychological and social variables may influence the effects of a GRU on patient outcomes,
- the use of a one group design weakens inferences that can be drawn about the effect of admission to the GRU and the variables under investigation,
- lack of a control group. Although recognized as a limitation, the small number of patients admitted to the unit who met study criteria (45 patients over a 7-month period) and absence of a similar unit for comparison limited the design options.

Conclusions

Implications for nursing research

This study documents the contribution of a GRU within the Canadian Health Care System. Replication of the study might strengthen the findings and provide further evidence to support recognition of the effectiveness of GRUs. Additional studies with larger and more diverse samples would assist generalizability, and a more controlled design could strengthen confidence in the findings.

Further research investigating changes in functional abilities and self-efficacy of GRU patients is required. In particular, functional ability and self-efficacy need to be documented at regular intervals throughout the GRU stay. This would assist in determining the required length of stay and promote efficient use of resources. Longitudinal studies, designed to follow patients after discharge from the GRU, would also be helpful to determine in functional gains made during a GRU stay are maintained.

The effectiveness of self-efficacy in predicting discharge preparedness and ability to function at home needs to be further explored. As self-efficacy is dynamic in nature, it is important to understand whether efficacy expectations change after a patient has been discharged and is forced to deal with the realities of functioning in the home.

A triangulated approach should be considered for future studies. The combined use of standardized measuring tools, interviews, participant observation and case study approaches would further develop an understanding of the impact of GRUs.

Implications for nursing practice

Any improvements made in functional ability and self-efficacy of GRU patients would be beneficial, even if they do not return home. The results of this study demonstrated that older adults are able to regain functional ability

What is already known about this topic

- Older adults frequently experience functional decline following hospitalization, and this can lead to a need for permanent residential care.
- Geriatric Rehabilitation Units have been established to restore functional ability in older adults.
- Self-efficacy is an important predictor of health behaviours.

What this paper adds

- Documentation on the effectiveness of a Canadian Geriatric Rehabilitation Unit in restoring functional ability and helping older adults return to community living.
- Self-efficacy in performing everyday activities at home, outside the protected clinical environment improves following admission to a Geriatric Rehabilitation Unit.

following significant decline. Although the literature does not identify standards for GRU admissions, these findings suggest that patients should not be excluded by age alone. Furthermore, although self-efficacy has been used as a predictor of behaviours in other contexts (Burbank *et al.* 2000, Resnick & Nigg 2003), our participants demonstrated significant gains in self-efficacy, suggesting that further work is required to understand self-efficacy in the context of a GRU and to determine if self-efficacy is a reliable predictor of rehabilitation potential and discharge readiness.

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