



An Intervention Program to Reduce Falls for Adult In-Patients Following Major Lower Limb Amputation

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Abstract

A qualitative and quantitative assessment was conducted regarding falls sustained by in-patients receiving rehabilitation therapy following major lower limb amputation at the Glenrose Rehabilitation Hospital. During the nine-month assessment period, 18 of 58 patients in the amputee unit experienced a fall, of which 17% resulted in a moderate injury. The majority of falls occurred during patients' use of a wheelchair (14 of 18) and involved poor balance (nine of 14). Patient wheelchair self-transfers accounted for 71% (10 of 14) of the falls, while sitting in the wheelchair and reaching represented 29% (four of 14). The hospital's rehabilitation program teaches patient safety including using assistive devices such as wheelchairs but did not include a comprehensive graded learning path to monitor patients' ongoing risk for falls.

Based upon the data collected, an intervention program was initiated to improve patient safety and reduce the number of falls. The multidisciplinary program encompassed aspects ranging from an environmental assessment of the patients' room to medication management, continuous patient wheelchair skills training and alteration of the care plan. The effectiveness of the intervention program was assessed through a series of interviews and questionnaires administered to medical personnel.

This article presents the preliminary data collected during the first three months of the six-month study. Overall, satisfaction has significantly improved as a direct result of the intervention program. The article provides evidence-based interventions that improve safety for a subset of in-patients known to be susceptible to falls when using wheelchairs. Other in-patient groups will also benefit from these findings as many are universally applicable.

Background

Glenrose Rehabilitation Hospital (GRH), Capital Health Edmonton Region, is a 220-bed facility whose mandate is to provide high-level rehabilitation care for both adults (including the elderly) and children. As the largest integrated health region in Canada, Capital Health implemented a web-based tracking and management system (NetSAFE) in 2005 to record the occurrence and avoidance of adverse events involving patient safety. All staff members are encouraged to use the NetSAFE program as management and quality committees routinely access the information to identify trends or areas of concern.

GRH has an eight-bed ward dedicated to the rehabilitation of patients recovering from the amputation of a lower limb. During a consecutive nine-month period from 2006 to 2007, the NetSAFE data indicated that 18 of 58 (31%) patients experienced falls, of which three sustained moderate injuries. The fall incidence was concerning for several reasons: (1) fallen amputee patients can experience serious physical and psychological events such as stump trauma or fractures and fear of falling again or loss of confidence, respectively (Behar et al. 1991; Gonzalez and Matthews 1980; Lewallen and Johnson 1981; Miller et al. 2001a, 2001b); (2) the amputee ward had the highest fall rate compared with that in the other adult wards (excluding geriatrics), suggesting the presence of mitigating factors; and (3) although the amputee ward's fall rate was similar to that of other hospitals (range 20–32%), GRH regarded this as unsatisfactory (Goody and Hunter 2004; Pauley et al. 2006). Thus, the GRH adult amputee program needed to minimize the number and severity of patient falls.

The aim of this study was to identify the associated and causative factors that led to falls in the adult amputee patient population. In turn, this information was used to develop two products: (1) an effective falls prevention program and (2) a falls risk assessment specific for adult amputee patients.

Methods

A literature review was conducted to identify the root causes of falls experienced by rehabilitation in-patients recovering from extensive lower limb amputation. This information was then compared with that collected through NetSAFE for GRH. Concurrently, the existing GRH Falls Prevention Program was critically assessed for its value and applicability to amputee patients. Several observational sessions were conducted in which team members noted factors that might contribute to falls in the amputee ward. The nursing staff provided voluntary feedback regarding the existing Falls Prevention Program via an anonymous questionnaire.

Interventions selected by the project team were implemented and assessed in terms of effectiveness on improving patient safety. Each patient admitted to the amputee ward qualified as a study participant during the initial three-month study

period. At its conclusion, the questionnaire was re-circulated to the nursing staff and data regarding amputee patient falls were retrieved from NetSAFE.

Results

Causes of Amputee In-Patient Falls

Two recent articles were retrieved that presented data from retrospective cohort studies of adult amputee in-patients (Goody and Hunter 2004; Pauley et al. 2006). The UK study (Goody and Hunter 2004) was conducted over 2.5 years and reported a fall incidence of 32.0%, while the Canadian study (Pauley et al. 2006) found a fall incidence of 20.5%. In the majority of instances, the patient was sitting in a wheelchair and attempted to perform an unassisted transfer to a bed, chair or toilet and fell due to a loss of balance, restricted movement, ignored instructions or other undefined issue related to the proper use of a wheelchair. The fall incidence at GRH was 31.0% according to the first nine months of data collected through NetSAFE. Of these, 14 of 18 amputee patients fell while using a wheelchair; poor balance was associated with nine of 14 falls. Patient self-transfers involving a wheelchair accounted for 71% (10 of 14) of the falls, while sitting and reaching in the wheelchair was the cause of 29% (four of 14). Patients who fell once had a one-in-three chance of falling again. The GRH amputee patient fall data are similar to that of previous studies (Goody and Hunter 2004; Pauley et al. 2006).

Studies and best practices regarding falls incidences for amputee patients are sparse in contrast to the volume of literature highlighting the need for this information.

Interventions

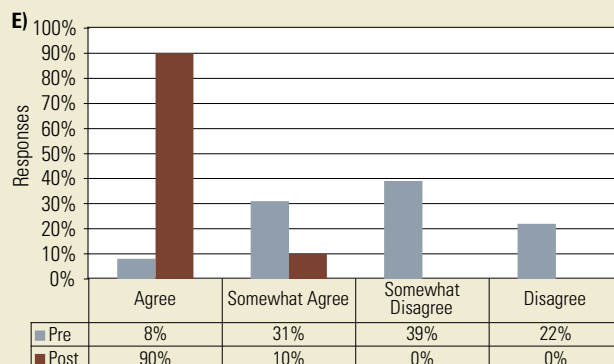
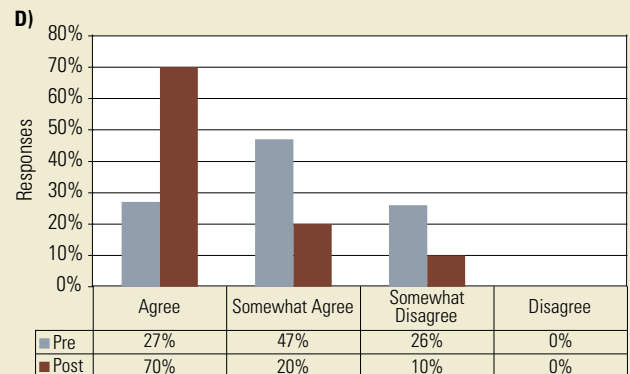
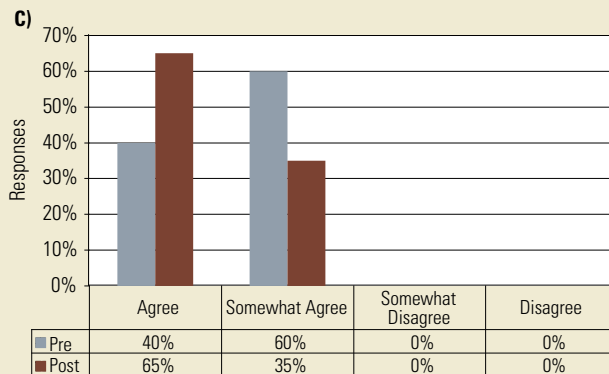
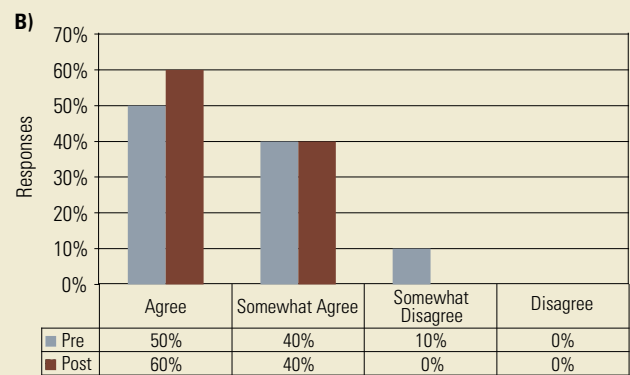
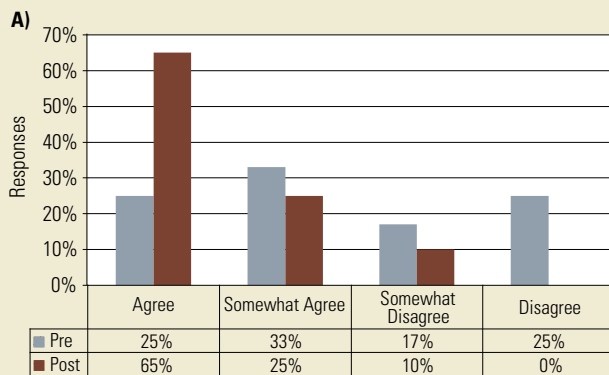
Based upon NetSAFE data, observational sessions and the literature, the multidisciplinary team developed several interventions to reduce patient falls:

- The Falls Assessment Tool was revised to accurately identify patients who may be at risk for falls.
- The Falls Assessment Tool was revised to delineate a clear process by which a customized intervention plan would be developed shortly for patients assessed to be at risk for falls.
- If a fall occurred, the multidisciplinary team identified the root cause and developed a customized plan to prevent the patient from subsequent falls.
- The NetSAFE falls data for the amputee ward were reviewed monthly by the multidisciplinary team to monitor the effectiveness of the interventions.

Figure 1. Results of the pre- and post-intervention questionnaires for nursing staff

Results for the five survey statements listed below are presented in graphs A to E and compare pre- and post-intervention responses:

- A. The current Falls Prevention Program uses a Falls Assessment Tool that accurately differentiates amputee patients who are at high risk for falling from those who are not.
 B. The current Nursing Assessment Tool is valuable in identifying and differentiating amputee patients who are at high risk for falling from those who are not.
 C. Identifying an amputee patient on the unit as being at risk for a fall helps prevent the patient from falling.
 D. After an amputee patient has fallen on the unit, a multidisciplinary team investigation routinely takes place, and the information is shared among the staff and shifts.
 E. A summary and interpretation of the NetSAFE data regarding the root cause(s) for falls by amputee patients on Unit 4A is routinely presented and discussed with the staff.



- Nursing staff were educated about the main causes and locations of falls specific to the GRH amputee patient population.

Effectiveness of the Interventions: Preliminary Data

The preliminary three-month study included a total of 24 patients, of whom two fell. This represented a 5% decrease in the falls incidence. Most importantly, neither fall resulted in any physical injuries, nor did either patient fall again. In one incident, the patient had disregarded wheelchair training instructions; the second incidence involved a balance issue.

The response to the pre- and post-intervention implementation questionnaire for the nursing staff was 60% (18 of 30). Prior to the implementation of the interventions, the nursing staff had had a negative view of the existing GRH Falls Prevention Program. This sharply contrasted with the positive views expressed post-implementation (Figure 1). Initially, 25% had agreed that the Falls Assessment Tool was being used effectively; this increased to 65% after implementation. Only 50% of the nurses had agreed that the Nursing Assessment Tool was useful for differentiating patients at risk for falling; following implementation, this increased to 60%. The efficacy of identifying patients as being at risk for a fall had been agreed to be effective by 40%. Post-implementation, this increased to 65%. Post-intervention, nursing staff indicated a 43% increase in investigations into falls and information dissemination regarding falls. Finally, the majority of staff agreed that there was a substantial improvement regarding the effective reporting and discussion of NetSAFE data (pre-implementation 8%, post-implementation 90%).

The marked reduction in the severity of falls and the fact that no one fell more than once both represent a substantial improvement to amputee patient safety.

Discussion

Following lower limb amputations, patients undergo an adjustment period to adapt to their altered biomechanical characteristics, increased postural sway and changes in sensory perception in their amputated and healthy legs. They must also mentally cope with effectively manipulating devices such as wheelchairs, walkers and prostheses (Pauley et al. 2006). In conjunction with traditional risk factors for falling (e.g., advanced age, impaired cognitive function, muscular weakness), wards for adult amputee patients typically report the greatest incidence of falls relative to other adult wards. However, studies and best practices regarding falls incidences for amputee patients are sparse in contrast to the volume of literature highlighting the need for this informa-

tion (Gavin-Dreschnack et al. 2005; Gooday and Hunter 2004; Lord et al. 2003; Miller et al. 2001b; Pauley et al. 2006; Vlahov et al. 1990; Zucker Levin 2004).

The multidisciplinary team devised and executed a well-designed research plan in accordance with the plan-do-study-act (PDSA) quality management research cycle. The interventions recommended and implemented were subject to a preliminary three-month study that collected quantitative and qualitative data. The incidence of falls was reduced marginally (5%). However, the marked reduction in the severity of falls and the fact that no one fell more than once both represent a substantial improvement to amputee patient safety. Previous studies have indicated that reducing the fall incidence is difficult; but fall severity can be successfully reduced, as is evidenced in this study (Gooday and Hunter 2004). The qualitative data revealed a large improvement on the nursing staff's acceptance and use of the revised Falls Assessment Tool and Falls Prevention Program. The coordinated efforts of the multidisciplinary team to create customized fall interventions for each patient deemed to be at risk for a fall were considered effective and worthwhile.

The three-month preliminary study provided sufficient data to assess the value of the interventions to reduce falls in the amputee patient population at GRH in Edmonton, Alberta. A longer study is under way to fully assess the impact of the interventions. Concurrently, the revisions to the Falls Assessment Tool and Falls Prevention Program are being communicated and integrated into the pediatric and geriatric wards since they also admit patients with major lower limb amputations. The multidisciplinary team's involvement in fall prevention is also being implemented throughout the hospital.

The coordinated efforts of the multidisciplinary team were considered effective and worthwhile.

Although the interventions were implemented with minimal financial or staffing resources, the efforts of the project team were considerable. These successes reflect the effort to ensure that all associated healthcare professionals are involved and in agreement regarding the strategies and interventions to improve patient safety. **HQ**

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