

Earlier discharge from orthopaedic surgery to geriatric rehabilitation and its effect on the functional status of hip-fracture patients: a pilot study

A. Albert BScN candidate¹, C. Backman PhD^{1, 2, 3}, A. Harley MD², K. Greene², V. French-Merkley MD²

¹ University of Ottawa, ² Bruyère Research Institute, ³ The Ottawa Hospital Research Institute

Introduction

As Canada's aging population continues to grow, it is imperative that researchers investigate ways in which quality healthcare for seniors can be preserved, while increasing the efficiency of the healthcare system and decreasing the costs associated with hip fractures.

It has been estimated that the average direct cost of a hip fracture in Ontario ranges from \$36,929 to \$39,479 for women and men, respectively (Nikitovic, Wodchis, Krahn, & Cadarette, 2013). These numbers translate into a total cost of approximately \$282 million per year in Ontario, and \$ 1.1 billion across the nation (Nikitovic, Wodchis, Krahn, & Cadarette, 2013).

In Ottawa's Champlain LINH region, it is hip fracture patients that experience the most significant delay between being ready for rehabilitation services, and admission to a rehab facility (Hay Group Health Care Consulting, 2016). This indicates that there is potential for these patients to have an earlier discharge from acute care to a *lower-cost* rehabilitation bed.

This study serves to investigate the hypothesis that *earlier* discharge from orthopaedic surgery (at The Ottawa Hospital, General campus) to geriatric rehabilitation (at Bruyère Continuing Care) will *not* have a significant negative impact on the functional status of hip fracture patients.

Methodology

- This study was conducted using a retrospective data analysis to compare the Functional Independence Measure (FIM) Efficiency of patients in rehabilitation who participated in the earlier discharge pilot program with those who did not.
- The test group of 50 geriatric hip-fracture patients from the Ottawa Hospital's General campus were selected on the basis of being participants in the earlier discharge pilot project between January 18th, 2017 and January 18th, 2018.
- The control group consists of 50 geriatric hip fracture patients who were discharged to rehabilitation services from the Civic campus during the same year, unattached to the project.
- The variables that were collected for participants in both groups include: age, sex, admission motor FIM, discharge motor FIM, and rehabilitation length of stay (LOS).
- FIM efficiency was calculated for each participant using the following formula: (discharge motor FIM – admission motor FIM) ÷ rehabilitation LOS.
- SPSS Statistics software was used to determine the measures of central tendency (e.g. mean) necessary to summarize the data sets, and an independent samples t-test was performed to compare the FIM efficiency scores in both groups.

Further information

If you have further questions about this research project, please contact Anika Albert at the following email address:

aalbe074@uottawa.ca

Results

	Test Group (TOH General Campus)	Control Group (TOH Civic Campus)
Age (Mean)	86	85
Sex (%)	70% F, 30% M	66% F, 34% M

Table 1: Demographic comparison between test and control groups.

The average motor FIM scores, rehabilitation LOS, and FIM efficiencies of patients in both groups are displayed below. **Motor FIM** is a measure that is used to track the progression of functional abilities of patients who are in rehabilitation programs. **FIM efficiency** refers to the average change in FIM score per day in rehab.

	Test Group (TOH General Campus)	Control Group (TOH Civic Campus)
Admission Motor FIM (Mean)	31.80	38.10
Discharge Motor FIM (Mean)	59.88	64.24
Rehabilitation Length of Stay (Mean)	30.44	24.84
FIM efficiency (Mean)	0.97	1.06

Table 2: Comparison of variables between the test and control groups.

An independent samples t-test, with a 95% confidence interval, was performed on the FIM efficiency scores of both groups to determine whether the difference between the scores was statistically significant. This test produced a result of $p=0.213$.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
FIM efficiency	Equal variances assumed	5.788	0.018	-1.255	98	.213	-.08520	.06790	Lower	Upper
	Equal variances not assumed			-1.255	88.064	.213	-.08520	.06790	-.22014	.04974

Table 3: Independent samples t-test: results.

Conclusions

The results of this study support the hypothesis that earlier discharge to rehabilitation does *not* have a significant impact on the functional status of geriatric hip fracture patients.

Although the average FIM efficiency score in the test group was lower than that of the control group, the t-test (with a p-value, or significance of 0.213) indicates that this result is *not* statistically significant. Otherwise said, the slightly lower mean FIM efficiency score in the test group is likely the result of chance and is not reflective of participation in the pilot program. As such, it can be concluded that the daily improvement in functional status of patients who are discharged from orthopaedic surgery units earlier, is comparable to that of patients who are discharged later (as per current practice in the hospital).

Given these results, it is plausible that earlier admission to rehabilitation will save costs to the healthcare system while maintaining the quality of hip fracture patients' recoveries.

Ultimately, the knowledge gained from this study marks the beginning of the investigation into whether an early discharge protocol has the potential to increase healthcare efficiency without compromising the functional status of these patients.

Future Studies

- The data retrieved from this study will be further analyzed to gain a more complete understanding of the functional outcome differences between these two groups of patients and the implications that this might have for discharge practices and cost-savings.
- One point of investigation may be the increased mean rehabilitation LOS in the test group. On average, these patients remained in rehab for nearly six days longer than their counterparts in the control group, and this difference may lessen potential cost-savings to the healthcare system.



Figure 1: Hip fracture graphic (modified) (Health Quality Ontario, 2017).

References

- Hay Group Health Care Consulting. (2016). *Sub-acute care capacity plan*. Toronto, ON: Hay Group.
- Health Quality Ontario. (2017). Hip fracture. Retrieved from <http://www.hqontario.ca/Portals/0/documents/evidence/quality-standards/qs-hip-fracture-infographic-en.pdf>
- Nikitovic, M., Wodchis, W. P., Krahn, M. D., & Cadarette, S. M. (2013). Direct health-care costs attributed to hip fractures among seniors: a matched cohort study. *Osteoporosis International*, 24(2), 659–669. <https://doi.org/10.1007/s00198-012-2034-6>

Acknowledgements

This project was funded by the Undergraduate Research Opportunity Program (UROP).

Thank you to Dr. Chantal Backman for providing me with the mentorship and support that enabled me to gain a valuable skill-set and knowledge from this research experience.