


Effectiveness of Weekend Physiotherapy on Geriatric In-Patients' Physical Function

Gerontology & Geriatric Medicine
Volume 8: 1–4
© The Author(s) 2022
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/23337214221100072
journals.sagepub.com/home/ggm


Venkadesan Rajendran, PT, PhD¹ , Deepa Jeevanantham, PT, PhD¹, and Dylan Falk, MD²

Abstract

Purpose: Hospital-associated disability (HAD) is significant among geriatric patients admitted to acute care hospitals. The objective of the study is to evaluate the effectiveness of additional weekend physiotherapy on mobility impairments of high-risk older patients admitted to the acute medical unit.

Methods: A prospective, non-randomized controlled trial was conducted in one of the medical units in a northern Ontario hospital. A total of 41 patients were recruited using a consecutive sampling method and assigned to a control group ($n = 19$) and an experimental group ($n = 22$). The de Morton Mobility Index (DEMMI) and the Barthel Index (BI) were the outcome measures.

Results: A Mann-Whitney U test was used to analyze the group differences, and it showed that there was a statistically significant difference ($p < .05$) between the experimental and control groups on the DEMMI and the BI.

Conclusion: Additional weekend physiotherapy significantly improves elderly patients' physical function and gets them physically ready for discharge when medically stable. This may significantly reduce the alternate level of care for patients.

Keywords

physical therapy modalities, geriatrics, hospitalization

Manuscript received: March 11, 2022; **final revision received:** April 20, 2022; **accepted:** April 24, 2022.

Background

Elderly patients admitted to the hospital are less active on weekends than on weekdays. It can be referred to as hospital-associated disability (HAD) (Lloyd et al., 2020). HAD is one of the most pervasive threats to independence faced by older adults. Up to 60% of geriatric patients experience a functional decline due to hospitalization. Despite common knowledge that age-related sarcopenia is accelerated during periods of muscle disuse and that physical activity levels while in the hospital predict capacity to be discharged home, evidence suggests that even older patients who can walk independently spend over 23 hours per day lying in bed while in hospital (Bell et al., 2016; Tasheva et al., 2020).

HAD is associated with a longer length of stay (LOS), hospital readmission (Tonkikh et al., 2016), poor prognosis, and a risk of those elderly patients being placed under the

alternate levels of care (ALC) category. According to the Canadian Institute of Health Information, "ALC designated patients are those who no longer require the intensity of resources and services provided in that care setting" (Canadian Institute of Health Information, 2016). ALC is a pressing concern in acute care settings. It significantly affects the effective use of hospital resources and patient flow (Costa

¹Health Sciences North, Northern Ontario School of Medicine, Laurentian University, Sudbury, ON, Canada

²Health Sciences North, Northern Ontario School of Medicine, Sudbury, ON, Canada

Corresponding Author:

Venkadesan Rajendran, PT, PhD, Internal Medicine, and Acute Stroke Unit, Health Sciences North, Sudbury, ON P3E 5J1, Canada.
Email: vrajendran@hnsudbury.ca



et al., 2012). It also increases hospital crowding, cancellation of surgeries, and delays in diagnostic testing and day procedures (Costa et al., 2012). One ALC patient occupying one bed can block access to four patients in an emergency department (Sutherland & Crump, 2013). The burden of ALC patients occupying acute care beds is expected to increase with Canada's aging population. To meet the increasing demand, it is crucial to develop and explore strategies to minimize the LOS of ALC patients.

Physiotherapy plays a major role in restoring function and is often recommended to improve physical function to facilitate an effective discharge from the hospital. Additional physical therapy improves the functional outcomes of patients with stroke, total knee replacement, and coronary artery bypass grafting (Peiris et al., 2018). However, to our knowledge, there is no study available that evaluates the effectiveness of additional weekend physiotherapy on elderly patients with acute medical conditions admitted to the general internal medicine units. In this pilot study, we aimed to evaluate the effects of additional weekend physiotherapy intervention on mobility impairments and the functional outcome/functional performance of high-risk older patients admitted to acute medical units and consequently diverting these patients from ALC beds.

Methods

Study Design

This prospective, non-randomized controlled trial was conducted in the medical unit at an Ontario hospital between September 2020 and August 2021. The study was conducted for up to 12 weeks after baseline assessment or until patients were discharged to slow-paced rehab or home/retirement home/assisted living—whichever came first. Ethics approval for this study was obtained from an Institutional Review Board of Health Sciences North Research Institute.

Eligibility Criteria

To be eligible, patients had to meet the following criteria: (1) 65 years of age and older; (2) live in a home or a retirement home with progressive decline in physical function; (3) before admission, the patient should have ambulated with or without an assistive device or was transferring independently from bed to wheelchair and wheelchair to commode/toilet and vice versa; (4) exercise intervention should not be affected by treatment of comorbid illness (e.g., dialysis); (5) have definite discharge destination following physiotherapy intervention such as home, group home, retirement home, shelter, or supportive housing with or without community services. Exclusion criteria include (1) medical instability; (2) lack of motivation; (3) weight-bearing restrictions excluding weight-bearing as tolerated; (4) restraints, acting out behavior, or wandering; (5) long-term care residents; (6)

Table 1. Mean Age and Percentage of Gender.

Group	Mean age	Percentage of gender	
		Male	Female
Experimental ($n = 22$)	78.81	22.7	77.3
Control ($n=19$)	80.68	57.8	42.2

transfers using a mechanical lift at baseline; and (7) known psychiatric illness and behavioral issues.

Outcome Measures

Functional mobility was the primary outcome measure and was measured using the DEMMI and the BI. The DEMMI is primarily designed to measure mobility across 15 hierarchical mobility challenges in hospitalized elderly patients. It has been validated across different clinical settings (e.g., acute care settings, subacute rehabilitation settings, community living). The DEMMI is also validated for use by a range of health-care providers, such as physiotherapists, physiotherapy students, medical students, general practitioners, and nurses. It is a user-friendly tool that takes less time to administer as compared to other mobility outcome measures. Other researchers have extensively investigated the psychometric properties of the DEMMI in the geriatric population. They have been deemed appropriate for application in a hospital setting (de Morton et al., 2010).

The BI is a functional assessment tool designed to measure activities of daily living and has been recommended for use in the geriatric population. The BI assesses 10 functional areas, including toileting, bathing, eating, dressing, continence, transfers, ambulation, and ascending and descending stairs. It has two versions: the original 10-item version and an expanded 15-item version. The most commonly used 10-item version was used for this study. The total score is calculated by summation of the scores of each item, and a higher score indicates greater independence. The reliability and validity of the BI have been studied by other researchers (Sainsbury et al., 2005).

Data Collection and Intervention

A total of 41 patients were recruited for this study and assigned to a control group ($n = 19$) and an intervention group ($n = 22$) by a consecutive sampling method. Written informed consent was obtained from all participants prior to data collection. Patients' demographics and baseline assessments were completed within 24 hours of physiotherapy (PT) ordered by an attending physician, and posttests were completed within 24 hours prior to discharge. Participants in the control group received usual care (i.e., PT assessment and treatment were done on weekdays). Participants in the experimental group received additional PT assessment and

Table 2. The Mann-Whitney U test.

Outcome measure	Median EG (n = 22)	Median CG (n = 19)	Sum of ranks in EG	Sum of ranks in CG	Mann-Whitney U	P value
de Morton mobility index	53	44	582	279	89	.0011
Barthel index	18	16	572	289	99	.0031

treatment during the weekends with interventions focusing on bed mobility, transfers, ambulation, and stair negotiation. PTs regularly reviewed and modified exercises according to patient progress.

Statistical analysis and Results

Descriptive statistics such as mean and percentage were used to analyze patient characteristics such as age and gender. A nonparametric Mann-Whitney U-test was used to analyze the differences between the control and experimental group because of the smaller sample size and skewed data. The p -value of $\leq .05$ was considered statistically significant for the confidence interval of 95%. The results were analyzed using the Prism software.

The mean age was 79 years with 23% of males and 77% of females, and 81 years with 58% of males and 42% of females for the experimental and control group, respectively (Table 1). For the DEMMI, the median for the experimental group was 53, with a sum of ranks of 582. The control group was 44, with a sum of ranks of 279. The Mann-Whitney U value was 89 between the control and experimental groups, which showed a statistically significant difference ($p < .05$) between the experimental and control groups. For the BI, the median was 18 and 16, with the sum of ranks of 572 and 289 for the experimental and control groups, respectively. The ADL components of the BI also showed that there was a statistically significant difference between the control and experimental groups (Table 2).

Discussion

Geriatric patients admitted to hospitals spend most of the time in bed secondary to various factors, such as medications, infections, and not having a purpose of getting up, and it is directly associated with decreased walking ability and increased mortality rate (Evensen et al., 2017; Jasper et al., 2020). This worsens with staff shortage and a lack of PT services, especially on the weekends. Typically, PT referrals ordered on weekdays (Monday to Thursday) are assessed on the next working day. However, in the absence of weekend PT, PT referrals ordered on Fridays are typically assessed on Mondays. Hence, patients wait for PT assessment for 3 days, increasing the risk of patients spending more time in bed. This situation could be improved with additional weekend PT. We

recommend prioritizing frail older patients at risk of extended LOS for the weekend PT program.

To our knowledge, this is the first study that explored the effectiveness of weekend physiotherapy on acute geriatric medical patients' physical function. This study showed that additional weekend physiotherapy assessment and treatment have significant effects on acute geriatric medical patients' physical function and ADLs. The findings of our study are supported by a systematic review that aimed to analyze the effects of after-hours or weekend rehabilitation on geriatric patients with other medical conditions (Peiris et al., 2011). This is an important factor to consider because geriatric patients are made ALC when they are medically stable but cannot be discharged due to impaired physical or cognitive status or social issues. This study provides crucial evidence to consider weekend PT in acute medical units to improve geriatric patients' physical function, which may divert them from ALC beds when physical function limits their ability to go home.

The findings of this study also showed that extra physiotherapy during the weekend significantly improved patients' ability to complete activities of daily living. Although ADL is typically associated with occupational therapy, deconditioning is one of the major factors that could impact ADL. Geriatric patients admitted to hospitals who are weak and unable to make it to the bathroom are usually provided an adult diaper or a commode to prevent accidents. This weakens them, especially when the nursing staff is unsure of patients' current physical status due to a lack of PT on the weekend. Weekend PT assessment of frail older adults would be beneficial in assisting patients in receiving appropriate gait aid and assisting the nurses with the current level of assistance required for the patients. It could also prevent deconditioning and restore the strength and endurance of geriatric patients to be independent with ADL as revealed by the scores of the BI in this study.

Conclusion

Additional weekend physiotherapy may have a positive impact on improving geriatric patients' physical function and mobility during hospitalization. Future research should focus on a larger sample size with cost analysis that may provide better strategies to improve geriatric patients' physical function and LOS.

Acknowledgements

The authors thank the geriatric patients who participated in this study during this COVID pandemic.

Author Contributions

All authors contributed to the idea and critical revision of the manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was funded by the NOAMA (Project C-19-015).

Ethics Approval

This study received ethics approval from Health Sciences North Research Ethics Board.

Consent to Participate

Written informed consent was obtained from all the patients.

Data Availability

Data is available upon request.

Code Availability

Available upon request.

ORCID iD

Venkadesan Rajendran  <https://orcid.org/0000-0003-4919-6000>

References

- Bell, K. E., von Allmen, M. T., Devries, M. C., & Phillips, S. M. (2016). Muscle disuse as a pivotal problem in sarcopenia-related muscle loss and dysfunction. *The Journal of Frailty & Aging*, 5(1), 33–41. <https://doi.org/10.14283/jfa.2016.78>
- Canadian Institute of Health Information. (2016). Definitions and Guidelines. to support ALC designation in acute inpatient care. Canadian Institute of Health Information. https://www.cihi.ca/en/acuteinpatientalc-definitionsandguidelines_en_corrected_-_en-web.pdf (Accessed 28 November 2017).
- Costa, A. P., Poss, J. W., Peirce, T., & Hirdes, J. P. (2012). Acute care inpatients with long-term delayed-discharge: Evidence from a Canadian health region. *BMC Health Services Research*, 12(1), 172. <https://doi.org/10.1186/1472-6963-12-172>
- de Morton, N. A., Davidson, M., & Keating, J. L. (2010). Validity, responsiveness and the minimal clinically important difference for the de Morton mobility index (DEMMI) in an older acute medical population. *BMC Geriatrics*, 10(1), 72. <https://doi.org/10.1186/1471-2318-10-72>
- Evensen, S., Sletvold, O., Lydersen, S., & Taraldsen, K. (2017). Physical activity among hospitalized older adults - an observational study. *BMC Geriatrics*, 17(1), 110. <https://doi.org/10.1186/s12877-017-0499-z>
- Jasper, U. S., Yadav, L., Jadczyk, A. D., Yu, S., Visvanathan, R., & Dollard, J. (2020). Sedentary behaviour in hospitalised older people: A scoping review. *International Journal of Environmental Research and Public Health*, 17(24), 9359. <https://doi.org/10.3390/ijerph17249359>
- Lloyd, C., Markland, A. D., Zhang, Y., Fowler, M., Harper, S., Wright, N. C., Carter, C. S., Buford, T. W., Smith, C. H., Kennedy, R., & Brown, C. J. (2020). Prevalence of hospital-associated disability in older adults: A meta-analysis. *Journal of the American Medical Directors Association*, 21(4), 455-461. e5. <https://doi.org/10.1016/j.jamda.2019.09.015>
- Peiris, C. L., Shields, N., Brusco, N. K., Watts, J. J., & Taylor, N. F. (2018). Additional physical therapy services reduce length of stay and improve health outcomes in people with acute and subacute conditions: An updated systematic review and meta-analysis. *Archives of Physical Medicine and Rehabilitation*, 99(11), 2299–2312. <https://doi.org/10.1016/j.apmr.2018.03.005>
- Peiris, C. L., Taylor, N. F., & Shields, N. (2011). Extra physical therapy reduces patient length of stay and improves functional outcomes and quality of life in people with acute or subacute conditions: a systematic review. *Archives of Physical Medicine and Rehabilitation*, 92(9), 1490–1500. <https://doi.org/10.1016/j.apmr.2011.04.005>
- Sainsbury, A., Seebass, G., Bansal, A., & Young, J. B. (2005). Reliability of the Barthel Index when used with older people. *Age and Ageing*, 34(3), 228–232. <https://doi.org/10.1093/ageing/afi063>
- Sutherland, J. M., & Crump, R. T. (2013). Alternative level of care: Canada's hospital beds, the evidence and options. *Healthcare policy = Politiques de sante*, 9(1), 26–34. <https://doi.org/10.12927/hcpol.2013.23480>
- Tasheva, P., Vollenweider, P., Kraege, V., Roulet, G., Lamy, O., Marques-Vidal, P., & Méan, M. (2020). Association between physical activity levels in the hospital setting and hospital-acquired functional decline in elderly patients. *JAMA Network Open*, 3(1), e1920185. <https://doi.org/10.1001/jamanetworkopen.2019.20185>
- Tonkikh, O., Shadmi, E., Flaks-Manov, N., Hoshen, M., Balicer, R. D., & Zisberg, A. (2016). Functional status before and during acute hospitalization and readmission risk identification. *Journal of Hospital Medicine*, 11(9), 636–641. <https://doi.org/10.1002/jhm.2595>