

Poststroke Physical Activity Levels No Higher in Rehabilitation than in the Acute Hospital

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Background: Returning to physical activity is a common goal for stroke survivors undergoing rehabilitation, and higher levels of activity have been linked to better gait and greater independence in activities of daily living. Our aim was to determine if inpatient rehabilitation settings promoted higher levels of physical activity in stroke survivors than an acute stroke unit setting. **Methods:** Stroke survivors were recruited from the inpatient rehabilitation wards of 4 different hospitals in southern Sweden and from the acute stroke unit at Karolinska University Hospital in Stockholm. Participants were observed for 1 minute every 10 minutes from 8:00 a.m. to 5:00 p.m. At each observation, the person's highest level of physical activity, location, and other people present were recorded. **Results:** We collected data from 190 stroke survivors (104 rehabilitation, 86 acute). Contrary to our hypothesis, there was no significant difference between the groups in the amount of time spent in moderate-to-high physical activity (rehabilitation median 24%, acute median 23%; adjusted $P = .74$). Compared to those in the acute setting, participants in the rehabilitation setting spent less time lying in bed, more time sitting supported out of bed, less time in their bedroom, and more time with a therapist (all adjusted $P < .001$). **Conclusion:** In the context of stroke, the inpatient rehabilitation environment does not appear to promote higher levels of physical activity than the acute hospital environment. **Key Words:** Cerebrovascular disease—exercise—behavioral mapping—inactivity.

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Received July 29, 2015; revision received November 4, 2015; accepted December 30, 2015.

Grant support: Västra Götaland and Göteborg/Södra Bohuslän R&D offices, Ahrenberg Foundation, Edit Jacobsson Foundation, Per Olof Ahl Foundation for Cerebrovascular Diseases Research, Foundation for Neurological Research in Gothenburg, County Council Fund for Health Care Development at Karolinska University Hospital, Stockholm.

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1052-3057/\$ - see front matter

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<http://dx.doi.org/10.1016/j.jstrokecerebrovasdis.2015.12.046>

Introduction

Stroke is a worldwide problem that affects 15 million people each year and is considered to be the major cause of adult disability.¹ Swedish national stroke care guidelines² stipulate that patients should be admitted to a dedicated acute stroke unit in the first instance. An acute stroke unit typically admits patients immediately following a stroke and often discharges them within 7 days.³ The main focus is to secure survival, make an accurate diagnosis, give correct medical treatment, and prevent and manage complications.⁴ This unit should offer acute stroke care as well as early rehabilitation. If patients need further rehabilitation after they have achieved medical stability in the acute unit, it is recommended that they should be discharged to a rehabilitation ward.²

Physical activity is an important factor in stroke recovery,⁵ yet many patients are inactive across both the early⁶ and later⁷ time course following stroke. In the acute setting, physical activity might promote recovery of walking,⁸ while protecting against depressive symptoms⁹ and secondary complications of bed rest.¹⁰ Recent data from AVERT (A Very Early Rehabilitation Trial) ($n = 2104$), however, indicated that very early higher dose physical activity in the acute stage was related to poorer functional outcomes at 3 months.¹¹ More is not necessarily better at this early stage. Optimal timing and dose of physical activity remain unclear; in AVERT, even the control group, on average, began mobilization within 24 hours of stroke onset, and complications of immobility were very low in both groups.

If a patient is discharged from an acute unit to a rehabilitation ward, the purpose of treatment shifts. The main goal for inpatient rehabilitation after a stroke is for the patient to gain a higher degree of independence, enabling participation in the community and social reintegration. Stroke rehabilitation typically includes identifying a patient's needs, defining goals to improve affected functions, implementing interventions to achieve these goals, and conducting assessments to chart progress.¹² In this postacute stage, there is stronger evidence for the benefits of increased physical activity and exercise therapy.¹³ Physical fitness training after stroke has the capacity to improve walking speed and independence.¹⁴ Even in stroke survivors with marked mobility impairment, multimodal exercise programs of 10 hours/week are feasible.¹⁵ The recent consensus statement from the American Heart Association and American Stroke Association recommends incorporating exercise prescription into the management of stroke survivors.⁵ Despite the known benefits of increased physical activity and exercise, evidence from several rehabilitation wards in Sweden indicates that low levels of activity are the norm at this stage after a stroke.¹⁶

Comparisons of different acute stroke units have revealed marked differences in levels of patient physical activity. A Norwegian stroke unit, with specialized mo-

bilization protocols and a rehabilitation focus, featured higher levels of physical activity than an Australian stroke unit.¹⁷ Comprehensive stroke units (acute stroke care and stroke rehabilitation bed in the same ward) are associated with more therapy and higher levels of activity than standard acute stroke units.¹⁸ Given these findings, and the fact that stroke patients in rehabilitation settings are more medically stable than those in acute units, we would expect higher levels of therapy and patient physical activity in rehabilitation wards as compared to acute stroke units. Comparing physical activity levels between these two settings will reveal the relative importance of patient-level and environment-level factors, and help guide the development of interventions designed to improve recovery.

The aim of this study was to directly compare, using the observational technique of behavioral mapping, the physical activity levels of stroke patients between the acute and rehabilitation settings in the same country and health care system. To our knowledge, no such study has been done before. We hypothesize that, compared to patients in an acute stroke unit, inpatients in stroke rehabilitation will: (1) spend more time in moderate-to-high physical activities, (2) spend less time in their bedroom, and (3) spend more time with a therapist.

Materials and Methods

Study Design

The study had a comparative observational design. The data used were derived from behavioral mapping studies of hospitalized stroke patients conducted in acute and rehabilitation units in Sweden. This standardized approach is commonly used to quantify the amount and nature of physical activity and to describe patients' interaction with others and locations of activity throughout the day. The method has been shown to be valid⁶ and to have good interobserver reliability.¹⁹

Study Setting and Population

The acute stroke unit in this study was at Karolinska University Hospital in Solna, Sweden, and the data were collected between May 2007 and December 2008. The stroke rehabilitation wards were in 4 different hospitals in the West Gothia region in Sweden: Södra Älvsborg Hospital in Borås, Skaraborg Hospital in Skövde, Sahlgrenska University Hospital in Gothenburg, and NU Hospital in Uddevalla. They were all standard rehabilitation wards for hospitalized stroke patients. Not all wards were exclusively focused on stroke patients; some also admitted other patient groups in need of rehabilitation. The data were collected between November 2009 and September 2010. Within these time windows, consecutive stroke patients who met the inclusion criteria and were willing to provide consent were recruited to the study. Inclusion criteria were broad: patients over 18 years with

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