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Chair Rise Ability and Length of Stay in Hospitalized Older Adults

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To the Editor: Length of stay is an important indicator of recovery associated with acute hospitalization.¹ Typically, combinations of variables such as advanced age, frailty status, fall history, immobility, and malnutrition are used as a general set of risk indicators for prolonged length of stay.^{2,3} This study sought to determine whether a simple, objective test—ability to rise once from a chair—could identify older patients at risk for longer length of stay. Patients were categorized into those able and unable to perform a chair rise task. Associations between chair rise ability and length of stay were examined, adjusting for demographic, functional, and clinical measures.

A convenience sample of 83 patients aged 65 and older admitted to an Acute Care for Elders (ACE) unit was studied. Patients were excluded from participation if they were transferred from a nursing home or unable to get out bed, had a stroke or lower extremity trauma-related diagnosis, were cognitively unable to provide their own informed consent, or reported one or more limitations in activities of daily living 2 weeks before admission.

Patients were asked to stand up once from a straight-backed, regular-height (17 cm) chair with their hands folded across their chest. A licensed physical therapist performed the assessment within 24 hours of admission. If the patient was able to stand up once without the use of his or her hands, the test was recorded as successful and otherwise as unsuccessful. Interviewers trained in clinical research also collected patient information in a face-to-face interview and using medical chart review.

To compare the association between length of stay and chair rise ability, three generalized estimating equation models were computed using a poisson distribution. The first model

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included chair rise ability, the second model added demographic measures, and the third model added functional and clinical measures.

Mean age $\pm$ standard deviation was 74.2 ± 6.2 (range 65–89); 57.8% were women. Forty-two patients (50.6%) were unable to perform the chair rise task. The unadjusted mean length of stay for patients who could not perform the chair rise task was 1.5 days longer than for those who could perform the task (3.0 ± 1.7 vs 4.5 ± 2.6 days). Table 1 shows associations between length of stay and chair rise ability with and without adjustment for relevant covariates. Odds ratios and 95% confidence intervals are presented for each of the three models. Only chair rise ability was significantly associated with length of stay in all models.

The study showed chair rise ability assessed within the first 24 hours of hospital admission was significantly associated with length of stay. After adjusting for relevant covariates, patients who could not perform the chair rise task had, on average, expected lengths of stay of approximately 45% longer than those who could.

Recent research showing linkages between measures of lower-body performance and the overall health and well-being of older adults supports the use of chair rise ability as a clinical risk indicator in an acute care setting.⁴ Rising from a seated to standing position is known to be a bio-mechanically challenging activity.⁵ It requires threshold levels of muscular strength and adequate balance control.

At the time of chair transfer, hip torques can be much larger than those required for walking or stair climbing,^{6,7} and the body is in a statically unstable position.^{6,8,9} The findings of the current study indicate that the inability to rise once from a chair reflects a state of functional and physiological vulnerability in older patients, placing them at risk for adverse outcomes during hospitalization, which could lead to complications related to the longer stay.¹⁰

Although the sample was not randomly selected, men and women were equally represented, and all patients included in the analyses reported no activity of daily living limitations 2 weeks before hospitalization. Factors associated with illness severity that may have influenced length of stay were also not identified; however, because the chair rise assessment was performed within 24 hours of admission, the association between chair rise ability and length of stay suggests that patient ability or inability to perform the task acted as a proxy for overall health and vitality.

The chair rise task described in this study is an easily interpretable, objective measure that any member of the healthcare team can perform. The inability to rise once from a chair without use of the hands may be one way to characterize older patients who may be at risk for longer length of hospital stay, which has implications for decisions regarding early preventative measures, inpatient therapy services, and potential postdischarge level of care.

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Table 1

Generalized Linear Regression Models Assessing the Association Between Length of Hospital Stay and Chair Rise Ability (N = 83)

Characteristic	Odds Ratio (95% Confidence Interval) P-Value		
	Model 1	Model 2	Model 2
Unable to perform chair rise (vs able)	1.51 (1.12–1.96) .002	1.52 (1.20–1.91) .002	1.45 (1.15–1.94) .01
Age (continuous)	*	1.00 (0.98–1.10) .69	1.00 (0.98–1.02) .69
Men (vs women)	*	1.21 (0.96–1.51) .14	1.22 (0.97–1.55) .08
Body mass index (continuous)	*	*	1.01 (0.99–1.04) .31
Comorbidities (continuous) [†]	*	*	0.93 (0.84–1.04) .19
Pain (0 vs ≥ 1) [‡]	*	*	1.03 (0.78–1.35) .81
ADLs (continuous) [§]	*	*	1.04 (0.99–1.09) .10
Diagnosis (cardiopulmonary vs other) [¶]	*	*	0.98 (0.76–1.28) .64

* Not included in model.

[†] Comorbidities were hypertension, heart attack, stroke, cancer, diabetes mellitus, hip fracture after age 50, arthritis, and respiratory distress.

[‡] Self-rated level of pain: no pain (0) to worst pain possible (10).

[§] Number of self-reported limitations in basic activities of daily living (ADLs): bathing, using the toilet, transferring from bed to chair, walking across a small room, personal grooming, dressing, and eating.

[¶] Admitting diagnosis: cardiopulmonary (n = 34) versus other (e.g., urinary tract infection, gastrointestinal, pneumonia, dehydration; n = 49).