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Original Study

Functional Status Is Associated With 30-Day Potentially Preventable Readmissions Following Skilled Nursing Facility Discharge Among Medicare Beneficiaries

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A B S T R A C T

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Objectives: The objectives of this study were to determine the association between patients' functional status at discharge from skilled nursing facility (SNF) care and 30-day potentially preventable hospital readmissions, and to examine common reasons for potentially preventable readmissions.

Design: Retrospective cohort study.

Setting: SNFs and acute care hospitals submitting claims to Medicare.

Participants: National cohort of Medicare fee-for-service beneficiaries discharged from SNF care between July 15, 2013, and July 15, 2014 (n = 693,808). Average age was 81.4 (SD 8.1) years, 67.1% were women, and 86.3% were non-Hispanic white.

Measurements: Functional items from the Minimum Data Set 3.0 were categorized into self-care, mobility, and cognition domains. We used specifications for the SNF potentially preventable 30-day postdischarge readmission quality metric to identify potentially preventable readmissions.

Results: The overall observed rate of 30-day potentially preventable readmissions following SNF discharge was 5.7% (n = 39,318). All 3 functional domains were independently associated with potentially preventable readmissions in the multivariable models. Odds ratios for the most dependent category versus the least dependent category from multilevel models adjusted for patients' sociodemographic and clinical characteristics were as follows: mobility, 1.54 (95% confidence interval [CI] 1.49–1.59); self-care, 1.50 (95% CI 1.44–1.55); and cognition, 1.12 (95% CI 1.04–1.20). The 5 most common conditions were congestive heart failure (n = 7654, 19.5%), septicemia (n = 7412, 18.9%), urinary tract infection/kidney infection (n = 4297, 10.9%), bacterial pneumonia (n = 3663, 9.3%), and renal failure (n = 3587, 9.1%). Across all 3 functional domains, septicemia was the most common condition among the most dependent patients and congestive heart failure among the least dependent.

Conclusions: Patients with functional limitations at SNF discharge are at increased risk of hospital readmissions considered potentially preventable. Future research is needed to determine whether improving functional status reduces risk of potentially preventable readmissions among this vulnerable population.

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The focus of readmission-related health care reform is shifting from 30-day all-cause readmissions to potentially preventable readmissions.^{1–3} Older adults discharged from post-acute care in skilled nursing facilities (SNFs) are a high-risk population for hospital readmission, with reported all-cause readmission rates as high as 23%.^{4–6} Potentially preventable readmissions over this time frame have been examined by Medicare contractors only during measure development. In their analyses of 2013 Medicare data, the average facility-level rate of post-SNF potentially preventable readmissions was 6.2%.²

Post-SNF potentially preventable readmissions are defined as readmissions “that should be avoidable with adequately planned, explained, and implemented post discharge instructions, including the establishment of appropriate follow-up ambulatory care.”^{2,p.25} The conditions considered potentially preventable represent (1) inadequate management of chronic conditions, (2) inadequate management of infections, or (3) inadequate management of other unplanned events.² Understanding the risk factors associated with potentially preventable readmissions is an important first step in preventing this undesirable outcome. This area of research is important, because beginning in 2018, SNF provider rates of potentially preventable readmissions occurring over the 30 days following discharge will be publicly reported as part of the SNF Quality Reporting Program.⁷

Functional status is a patient characteristic likely associated with potentially preventable readmissions following SNF discharge⁸; however, this relationship has not been studied. Improving patients' functional independence is a primary goal of SNF care, and functional outcomes are indicative of quality of care in this setting.^{3,9} Subsequently, function is a component of the Minimum Data Set (MDS), the comprehensive patient assessments conducted at 5, 14, 30, 60, and 90 days during SNF stays and at discharge from the facility.¹⁰ The standardized collection of data provides an opportunity for examining the association between patients' functional status at discharge and their risk for a potentially preventable readmission.

Investigating the relationship between discharge functional status and risk for potentially preventable readmissions following SNF care is logical for several reasons. First, functional status is associated with hospital readmissions in other settings.^{8,11–13} Second, functional status is routinely assessed during SNF care. If a relationship is established between discharge functional status and 30-day potentially preventable readmissions, at-risk individuals can be identified without additional resource utilization. Finally, the goal of SNF care is to stabilize and improve patients' health following a hospitalization so they can successfully return home. Functional status may be a modifiable risk factor for potentially preventable readmissions following SNF discharge. Determining modifiable risk factors will inform targeted prevention efforts.

The primary objective of our study was to determine the association between patients' functional status at discharge from SNF care and 30-day potentially preventable hospital readmissions. We hypothesized that lower functional status would be associated with greater readmission risk. To more accurately inform prevention efforts, we examined 3 distinct functional domains: self-care, mobility, and cognition. A secondary objective was to identify the most common conditions resulting in potentially preventable readmissions.

Methods

Data Sources

We used the following 100% national Center for Medicare and Medicaid Services (CMS) data files for 2013–2014: MDS version 3.0, Medicare Provider Analysis and Review (MedPAR), and Beneficiary Summary. MDS files were used to identify our cohort of interest and obtain information on patients' functional status at SNF discharge. MedPAR Part A files were used to verify SNF stays, identify potentially preventable readmissions, and extract information on patients' clinical characteristics. The Beneficiary Summary files were used to obtain information on patients' sociodemographic characteristics and to identify those with continuous Part A enrollment. The study was approved by the University of Texas Medical Branch institutional review board. A data use agreement was completed following CMS requirements.

Patient Population

The cohort selection is presented in Figure 1. The final sample included 693,808 Medicare fee-for-service beneficiaries aged 66 years and older newly discharged from an SNF between July 15, 2013 and July 15, 2014. We did not include long-stay (>100 days) SNF residents.^{14,15} Additional exclusion criteria were based on the specifications included in the SNF Quality Reporting Program measure.² Furthermore, because patients' functional status at discharge was our predictor of interest, we excluded patients who were comatose at discharge and those with incomplete functional data at the MDS assessment closest to SNF discharge.

Outcome

We used the specifications for the new potentially preventable 30-day postdischarge readmission quality metric for SNFs to identify the outcome of interest.² The *International Classification of Diseases, Ninth Revision* (ICD-9) codes for readmissions that occurred over the specified observation window (i.e., days 2 to 32 after SNF discharge) were compared with the list developed for the quality metric to determine whether the hospitalization was potentially preventable.²

Primary Predictors

The predictors of interest were patients' self-care, mobility, and cognitive status at SNF discharge. We used the MDS assessment occurring closest to discharge to extract information on patients' functional status. Self-care included eating, personal hygiene, bathing, dressing, and toilet use. Mobility included transfers, bed mobility, walking in the room, walking in the corridor, and locomotion on and off the unit. Patient performance on the items in the self-care and mobility domains are scored 0 (independent) to 4 (total dependence) if the activity occurred 3 or more times over the previous 7 days, otherwise items are scored as 7 (activity occurred only once or twice) or 8 (activity did not occur).¹⁰ We recoded scores of 7 or 8 as “total dependence” (4 points).¹⁵ The range of scores for the self-care domain was 0 to 20 and the range of scores for mobility was 0 to 24, with higher scores reflecting greater dependence. We created 4-level categorical variables for mobility and self-care scores based on quartiles of domain score distributions.

Cognitive status was operationally defined using the Cognitive Function Scale,¹⁶ which can be calculated from MDS items. Depending on patients' cognitive abilities, either the Brief Interview for Mental Status (BIMS)¹⁷ or the Cognitive Performance Scale (CPS)¹⁸ is used to evaluate patients' cognitive status during MDS assessments. The BIMS is a cognitive screening tool that measures patients' attention, orientation, and recall.¹⁰ Scores on the BIMS can range from 0 to 15 points, with lower scores indicating greater cognitive impairment. If a patient cannot attempt or is unable to complete the BIMS, a CPS score is calculated using 5 MDS items. The Cognitive Function Scale is a validated scale that integrates data from the BIMS and CPS and classifies patients as cognitively intact (BIMS 13–15), mildly impaired (BIMS 8–12 or CPS 0–2), moderately impaired (BIMS 0–7 or CPS 3–4), or severely impaired (CPS 5–6).¹⁶ Patients who complete the BIMS do not receive the cognitive MDS items that are used to calculate a CPS score. It also should be noted that the BIMS classifies patients who score between 0 and 7 points as severely impaired,¹⁷ whereas the Cognitive Function Scale considers these patients to be moderately impaired. The Cognitive Function Scale validation study reported that nearly 80% of patients with a CPS score of 5 or 6 (severe impairment) were unable to complete the BIMS and 43% of patients with a CPS score of 3 or 4 (moderate impairment) scored between 0 and 7 points on the BIMS.¹⁶ This indicates that being unable to complete the BIMS is consistent

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