Skilled Nursing Facility Admissions among Nursing Home Residents with Advanced Dementia

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Abstract

Background—Nursing home residents with advanced dementia are often hospitalized. Little is known about their use of skilled nursing facilities (SNF) post-hospitalization.

Design—Cohort study utilizing data from the Minimum DataSet, Medicare claims and the Online Survey Certification of Automated Records.

Setting—United States, 2000-2006.

Participants—4177 nursing home residents with advanced dementia, age 65 or over, having had a 3-day hospitalization.

Measurements—The likelihood of SNF admission following hospitalization was calculated. Resident and nursing home factors associated with SNF admission were identified using hierarchical multivariable logistic regression.

Results—A total of 61% residents with advanced dementia were admitted to a SNF post-hospitalization. Percutaneous endoscopic gastrostomy (PEG) tube placement during hospitalization was strongly associated with SNF admission (adjusted odds ratio (AOR) 2.31, 95% confidence interval (CI) 1.85-2.88), as was better functional status (AOR 1.21, 95% CI 1.05-1.38). The presence of diabetes was protective (AOR 0.85, 95% CI 0.73-0.99). Facility features significantly associated with SNF admission included > 100 beds (AOR 1.25, 95% CI 1.07-1.46), being part of a chain (AOR 1.31, 95% CI 1.14-1.50), urban location (AOR 1.21, 95% CI1.03-1.41) and for-profit status (AOR 1.28, 95% CI 1.09-1.51).

Conclusion—The majority of nursing home residents with advanced dementia are admitted to SNFs after a qualifying hospitalization. SNF admission is strongly associated with PEG tube insertion during hospitalization as well as nursing home factors. Efforts to optimize appropriate use of SNF services in patients with advanced dementia should focus on these factors.

INTRODUCTION

An estimated 6 million Americans currently have Alzheimer's disease, a number expected to reach 13 million by 2050.[1] Health care expenditures for dementia care are significant and are estimated to reach $1.1 trillion by 2050.[2] Despite efforts towards earlier diagnosis and treatment, dementia remains an incurable condition and the 6th leading U.S. cause of death.[3]

Recent research has documented that end-of-life care for patients with advanced dementia can be improved by reducing unnecessary health care transitions,[4] particularly hospitalizations. Hospitalizations for these patients are not only costly to the health care system, but often involve use of burdensome interventions that are of limited clinical benefit.[5, 6] In addition, the majority of hospitalizations in this population are potentially avoidable.[7]

The use of skilled nursing facility (SNF) care following acute hospitalization has greatly increased in the past decade, and is responsible for $32 billion in Medicare spending in 2011.[8] The Medicare SNF benefit covers up to 100 days of short-term skilled nursing care or rehabilitation services for patients after a 3-night hospitalization. Historically SNF care is restricted to restoring function to recently hospitalized patients and to supporting their transition back to the community or prior living situation. The vast majority (>90%) of SNFs are not freestanding entities, but exist within nursing homes (NHs) that also provide long-term care.[8] Medicare payment for SNF services is much higher than the Medicaid per diem rate that pays for most NH resident's long-term care. Thus, there is a potential financial incentive for NHs to temporarily cost shift the care of long-stay NH residents to the Medicare SNF benefit,[9] particularly for dual-eligible beneficiaries who qualify for both Medicare and Medicaid services.[10]

Recently, attention has been focused on the use of SNF services among patients at the end-of-life.[11] For example, in a recent study of over 5000 Medicare beneficiaries, 30.5% were found to use the SNF benefit in the last 6 months of life, and 9.2% to die while enrolled in a SNF.[11] NH residents with advanced dementia have profound cognitive and functional disability and are nearing the end-of-life. As such, these residents are unlikely to be able to participate in intensive rehabilitation or demonstrate clinical improvement after receipt of the type of clinical services typically offered in SNFs. Nonetheless, recent data from a prospective cohort of 323 NH residents with advanced dementia in Boston reveal that 53% of eligible hospitalizations were immediately followed by a SNF admission, and that SNF services accounted for 11% of total Medicare expenditures in the cohort.[12] This high rate of SNF use in advanced dementia is of concern, but whether or not it persists beyond the limited region and relatively small sample size is not known.

In order to better understand the SNF use by NH residents with advanced dementia, we utilized a nationwide database that included Minimum DataSet assessments linked to Medicare claims from 2000 to 2006. The objectives of this study were to describe the extent to which these residents were admitted to a SNF after a qualifying hospitalization and identify resident and nursing home characteristics associated with a greater likelihood of SNF admissions in this population.

METHODS

Study population

Subjects were nursing home (NH) residents with advanced dementia who had a skilled nursing facility (SNF)-eligible hospitalization. We identified this cohort from a nationwide dataset that included all residents living in 3,457 NH facilities in the US, between 2000 and 2006. The dataset was comprised of federally mandated Minimum Data Set (MDS) assessments linked to a 20% random sample of Medicare part B claims data.

Inclusion criteria for the residents were as follows: 1. enrollment in a Medicare fee-for-service plan, 2. age> 65, 3. advanced dementia, 4. Severe functional impairment, and 5.a hospitalization with a minimum 3-night stay. Medicare claims data were used to determine age > 65 and also to identify the first resident hospitalization of at least 3 nights duration during the 6 months following the baseline MDS assessment date. Advanced dementia was determined from MDS data and defined as having a diagnosis of dementia (any type) and recent progression to very severe cognitive impairment as measured by the Cognitive Performance Score (CPS)[13] of 6.The CPS score uses five MDS variables to group residents into cognitive performance categories as follows: 0=intact; 1= borderline intact; 2 = mild impairment; 3= moderate impairment; 4= moderately severe impairment; 5=severe impairment; and 6=very severe impairment with eating problems. We selected residents who had CPS score of 6 on a MDS assessment conducted between 2000 and 2006, (hereby referred to as the baseline assessment), and whose CPS score on the MDS assessment immediately prior to this baseline assessment was either 4 or 5. Severe functional impairment as defined as a score of 3 (extensive assistance) or 4 (total dependence) in each of the 7 dimensions of the MDS-derived Activities of Daily Living (ADL) scale.[14] With this definition, possible ADL scores in this cohort range from 21 to 28.

Residents were excluded if they did not survive their hospitalization (based on Medicare Claims) or if they were in a coma at the baseline MDS assessment. Residents with percutaneous endoscopic gastrostomy (PEG) tube placed within 6 months prior to the baseline assessment were also excluded as we felt that a new feeding tube placement may be associated with SNF admission. PEG-tube status was determined from Medicare claims, using methods are described in detail elsewhere.[15]

Variables

The main outcome variable was whether or not the resident was admitted to a SNF following a 3-night hospitalization as determined from Medicare claims data. Independent variables potentially associated with SNF admission were selected 'a priori' based on the literature[16] and grouped as follows: resident characteristics and characteristics of the NH in which the resident lived prior to the hospitalization.

Resident variables obtained from the baseline MDS assessment included: age; gender; race or ethnicity (white, black, Hispanic, other); comorbid conditions (diabetes mellitus, hypertension, coronary artery disease, congestive heart failure, stroke, chronic obstructive pulmonary disease (COPD), cancer (MDS does not specify type); functional status, the presence of a stage II or greater pressure ulcer; risk of dying in the next 6 months using the Advanced Dementia Prognostic Tool (ADEPT)[17] score (dichotomized at the median; possible range, 1-32.5, higher scores indicate higher risk of death); and the presence of a do-not-resuscitate (DNR) order. Functional status was quantified using the Activities of Daily Living (ADL) score as described above, dichotomized at less than 28 vs. 28(total dependence).[14]

Additional resident variables related to the hospitalization derived from Medicare claims data, included the diagnostic related group (DRG) assigned as the primary reason for hospitalization, and whether a PEG-tube was placed during the hospital stay. All DRGs reaching 5% or greater frequency (respiratory infection, urinary tract infection, nutritional/metabolic derangement, sepsis) as well as hip fracture were included as independent variables.

Facility characteristics were obtained from aggregated MDS data and information from the On-line Survey Certification of Automated Records (OSCAR) data sets from the same calendar year as the baseline assessment. OSCAR is a national database of information collected annually as part of the nursing home survey and recertification process and contains data on facility demographics, fiscal and corporate structure, staffing, and aggregated patient data. Facility characteristics included: size (greater vs. less than 100 beds), urban vs. rural location, whether the facility was part of a chain, for-profit status, whether there was a special care dementia unit, whether the facility had a physician extender (nurse practitioner or physician assistant) on staff, and whether the facility was hospital based. Staffing levels for nurses were quantified as the mean number of hours of nursing time per day, per resident. Finally, the proportion of non-white residents in the facility was ascertained from aggregated MDS data (dichotomized at the median).

Statistical Analysis

Descriptive statistics were calculated for the outcome and all independent variables using means for continuous variables and frequencies for categorical variables. The outcome was whether or not a resident was admitted to a SNF post-hospitalization; thus the resident was the unit of analysis. The association between the independent variables and the outcome was assessed using logistic regression models. Unadjusted and adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were generated from these analyses. A final multivariable model was adjusted for all resident and facility independent variables. Standard errors for the unadjusted and adjusted models were based on the robust (sandwich) variance estimator due to clustering at the facility level.

RESULTS

Study population

A total of 30,279 NH residents met initial eligibility criteria (i.e., enrolled in Medicare, > 65, advanced dementia, severe functional impairment, no recent PEG insertion, not in coma) of whom 4,703 experienced a hospitalization of at least three days duration within 6-months of the baseline MDS assessment. Of these, 4,177 residents with advanced dementia survived the hospitalization and are included in these analyses. These residents lived in 3292 NH facilities.

The residents' mean age was 84 years (standard deviation [S.D.] 7.1), 29% were male, and 80% were white. The prevalence of comorbid conditions at baseline were as follows: diabetes mellitus (25%), hypertension (55%), coronary artery disease (16%), congestive heart failure (22%), stroke (24%), COPD (13%) and cancer (7%). Forty four percent of residents had an ADL score above 21 and below 28, and 26% had a stage II or greater pressure ulcer. The median ADEPT score was 12, and 55% of residents had a DNR order.

The most common reason for hospitalization was a respiratory infection (22%), followed by urinary tract infection (11%), sepsis (10%), and nutritional or metabolic disease (9%). Hip fractures accounted for only 2% of hospitalizations. All other diagnoses comprised 46% of hospitalizations, each less than 5% in frequency.

SNF admission post-hospitalization

A total of 61% (n=2557) of residents with advanced dementia were admitted to SNF following hospitalization. The distributions of independent variables in the entire cohort and among residents who were and were not admitted to a SNF are presented in Table 1.

In unadjusted analysis, resident characteristics associated with a greater likelihood of SNF admission at a p value 0.05 were: better functional status prior to hospital admission [ADL <28], and having a PEG-tube placed during hospitalization. The presence of diabetes was associated with a lower likelihood of SNF admission. The following facility characteristics were also associated with a SNF admission in the unadjusted analyses: >100 beds, urban location, part of a chain, for profit status, and not hospital based.

In adjusted analysis, the insertion of a PEG-tube during hospitalization was the variable most strongly associated with SNF admission (adjusted odds ratio (AOR) 2.31, 95% confidence interval (CI) 1.85-2.88). Better functional status (ADL score < 28) (AOR 1.21, 95% CI 1.05-1.38) was also independently associated with a greater likelihood of SNF admission. Diabetes remained significantly associated with a lower likelihood of SNF admission (AOR 0.85, 95% CI 0.73-0.99). NH features significantly associated with SNF admission in the adjusted model were: > 100 beds (AOR 1.25, 95% CI 1.07-1.46), being part of a chain (AOR 1.31, 95% CI 1.14-1.50), urban location (AOR 1.21, 95% CI1.03-1.41) and for-profit status (AOR 1.28, 95% CI 1.09-1.51).

DISCUSSION

To our knowledge, this is the first nationwide report of post-hospital SNF utilization among NH residents with advanced dementia. We found that the majority (61%) of eligible hospitalizations in this cohort were followed by a SNF stay. PEG-tube placement during the hospitalization was the factor most strongly associated with SNF admission. NH features including larger size, being part of a chain, urban location and for profit status were also found to be predictive of SNF utilization. These findings raise concerns about the potential misuse of costly and intensive SNF services and overall quality of care provided to this profoundly debilitated population.

Our finding that 61% percent of NH residents with advanced dementia were admitted to SNF after a qualifying 3-day hospitalization is similar to that of the smaller (n=323) Choices, Attitudes, and Strategies for Care of Advanced Dementia at the End-of-Life (CASCADE) study (53%).[18] Also similar to findings from the CASCADE study, and other advanced dementia studies, respiratory infections were the most common reason for hospitalization.[7, 19, 20] This is notable, because earlier work suggests that hospitalization for pneumonia among NHs residents may not be necessary as it can be treated with similar clinical outcomes in the NH setting.[21, 22] Despite the fact that NH residents with advanced dementia are profoundly disabled, SNF use in our cohort was higher than that of a national sample of NH residents in the last 6 months of life, in which 40% were found to use the SNF Medicare benefit.[11]

We found that the strongest predictor of SNF admission was PEG tube placement during the hospitalization. Although close to one third of NH residents with advanced dementia are tube-fed,[23] PEG tubes have not been shown to improve survival, prevent aspiration pneumonia or improve any clinical outcomes in this population.[24, 25] The use of PEG tubes in advanced dementia is clearly linked to acute care utilization and burdensome transitions. Close to 70% of PEG tubes in NH advanced dementia residents are inserted during a hospitalization,[26] and PEG tube complications are the most common reason for emergency room visits among these residents.[7] Prior research shows that NH residents living in for-

profit facilities are more likely to be tube-fed.[23] In the current study, living in for-profit facility was also associated with SNF admission. The skilled nursing care required following PEG tube placement does qualify a patient for a SNF stay, but whether or not NH fiscal incentive motivate PEG tube placement remains a question. Nonetheless, our findings clearly highlight yet another individual burden and cost associated with PEG tube insertion in NH residents with advanced dementia, of which families, health care providers and policy-makers should be aware.

The use of SNF services in this population may limit the provision of appropriate end-of-life care. Hospice services are underutilized among patients with dementia, especially those in the NH,[27] which is of particular concern given the fact that utilization of the Medicare SNF benefit prohibits concurrent utilization of the Medicare hospice benefit for the same diagnosis. Indeed, SNF admissions have been found to be associated with lower subsequent hospice use among community dwelling patients,[11] as well as among NH residents with advanced dementia.[28]

Our results should be interpreted in light of several limitations. First, we acknowledge the possibility of unmeasured factors influencing SNF admission such shared decision-making between providers and families. Second, we do not have detailed information regarding the SNF admission itself, such as what services were provided, the length of stay, or resident disposition upon discharge. Finally, we lack information on whether residents qualified for SNF admission based on skilled nursing or rehabilitation services, which would be of interest due to variable reimbursement rates.

This study provides novel information on post-hospitalization care among NH residents with advanced dementia and documents a high rate of SNF utilization. Due to the potential for financial incentives to guide the use of SNF services, our findings point to the need for further inquiry to determine whether SNF services are truly necessary or beneficial for these residents. Our results also provide evidence that interventions such as PEG tube placement during hospitalization are associated with subsequent disruption of continuity of care and continued intensive therapy. Finally, the prevalence of SNF admissions in this frail population is of concern due to the potential that it may delay or prevent the appropriate utilization of palliative and hospice services.

Acknowledgments

CONFLICT OF INTERESTS

Elements of Financial/Personal Conflicts	*Author 1 JLG		Author 2 SLM		Author 3 DK		Author 4 PG		Author 5 VM		Author 6 JT	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Employment or Affiliation		×		×		×		×		×		×
Grants/Funds		×		×		×		×		×		×
Honoraria		×		×		×		×	×			×
									I receive honoraria from the Alliance			

Elements of Financial/Personal Conflicts	*Author 1 JLG		Author 2 SLM		Author 3 DK		Author 4 PG		Author 5 VM		Author 6 JT	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
									for Nursing Home Quality for consultation and speaking			
Speaker Forum		×		×		×		×		×		×
Consultant		×		×		×		×	×			×
									I chair the independent Quality Committee for HCR-ManorCare, a nursing home chain			
Stocks		×		×		×		×	×			×
									I am a shareholder in PointRight, Inc. an information services company serving the LTC industry. I own stock in NaviHealth, a new post-acute care management services company and chair their National Advisory Committee.			
Royalties		×		×		×		×		×		×
Expert Testimony		×		×		×		×		×		×
Board Member		×		×		×		×	×			×
									I am on the board of directors of PointRight, Inc.			
Patents		×		×		×		×		×		×
Personal Relationship		×		×		×		×		×		×

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Table

Characteristics of Nursing Home Residents with Advanced Dementia (n=4177) and their Associations with Skilled Nursing Facility (SNF) Admission

Characteristic	All Residents, N= 4177 (%)	Resident admitted to a SNF N= 2557 (%)	Resident not admitted to a SNF N=1620 (%)	Unadjusted odds ratio,[1] 95% Confidence Interval (CI)	Adjusted odds ratio,[1] 95% CI
Resident characteristics					
Age in years, mean (SD)	84.3 (7.1)	84.3 (7.0)	84.3 (7.2)	1.00 (0.99-1.01)	1.01 (1.00-1.02)
Male, no. (%)	1198 (28.7)	747 (29.2)	451 (27.8)	1.07 (0.93-1.23)	1.11 (0.95-1.30)
Race or ethnic group, no. (%)					
White	3337 (79.9)	2025 (79.2)	1312 (81.0)	0.89 (0.76-1.05)	Ref
Black	623 (14.9)	386 (15.1)	237 (14.6)	1.04 (0.87-1.24)	0.98 (0.80-1.19)
Hispanic	169 (4.1)	115 (4.5)	54 (3.3)	1.37 (0.96-1.94)	1.30 (0.90-1.88)
Other race	47 (1.1)	30 (1.2)	17 (1.1)	1.12 (0.61-2.05)	1.03 (0.56-1.89)
Comorbidities, no. (%)					
Diabetes Mellitus	1039 (24.9)	604 (23.6)	435 (26.9)	0.84 (0.73-0.97)	0.85 (0.73-0.98)
Hypertension	2289 (54.8)	1411 (55.2)	878 (54.2)	1.04 (0.92-1.18)	1.07 (0.94-1.22)
Coronary artery disease	654 (15.7)	396 (15.5)	258 (15.9)	0.97 (0.81-1.15)	0.97 (0.81-1.16)
Congestive heart failure	926 (22.2)	525 (21.6)	374 (23.1)	0.92 (0.79-1.07)	0.97 (0.83-1.14)
Stroke	995 (23.8)	599 (23.4)	396 (24.4)	0.95 (0.82-1.09)	0.93 (0.80-1.09)
Chronic obstructive pulmonary disease	551 (13.2)	333 (13.0)	218 (13.5)	0.96 (0.80-1.16)	0.95 (0.79-1.15)
Cancer	292 (7.0)	187 (7.3)	105 (6.5)	1.14 (0.89-1.46)	1.14 (0.88-1.48)
Activities of Daily Living score, < 28 vs. 28, no. (%)	1838 (44.0)	1173 (45.9)	665 (41.1)	1.22 (1.07-1.38)	1.21 (1.05-1.38)
Stage II or greater pressure ulcer, no. (%)	1056 (25.3)	627 (24.5)	429 (26.5)	0.90 (0.78-1.04)	0.93 (0.79-1.08)
ADEPT[2] score, > median (12)	2013 (48.2)	1260 (49.3)	753 (46.5)	1.12 (0.99-1.27)	1.09 (0.93-1.28)
Do-not-resuscitate order, no. (%)	2302 (55.1)	1391 (54.4)	911 (56.2)	0.93 (0.82-1.06)	1.02 (0.89-1.17)
Primary Diagnostic Related Group for hospitalization, no. (%)					
Respiratory infection	921 (22.1)	581 (22.7)	340 (21.0)	1.11 (0.95-1.29)	1.14 (0.96-1.34)
Nutritional/metabolic disease	353 (8.5)	218 (8.5)	135 (8.3)	1.03 (0.82-1.28)	0.97 (0.76-1.23)
Urinary tract infection	450 (10.8)	276 (10.8)	174 (10.7)	1.00 (0.82-1.23)	1.04 (0.84-1.30)
Sepsis	401 (9.6)	248 (9.7)	153 (9.4)	1.03 (0.83-1.28)	1.03 (0.82-1.29)
Hip fracture	80 (1.9)	55 (2.2)	25 (1.5)	1.40 (0.87-2.26)	1.58 (0.97-2.56)
Percutaneous gastrostomy tube placed during hospitalization (vs none or pre-existing tube)	518 (12.4)	396 (15.5)	122 (7.5)	2.25 (1.81-2.80)	2.31 (1.85-2.88)
Nursing Home Characteristics					
>100 beds, no. (%)	2948 (70.6)	1863 (72.9)	1085 (67.0)	1.32 (1.15-1.52)	1.25 (1.07-1.46)
Urban, no. (%)	3059 (73.3)	1926 (75.3)	1133 (70.0)	1.31 (1.13-1.52)	1.21 (1.03-1.42)
Part of a chain, no. (%)	2309 (55.3)	1487 (58.2)	822 (50.7)	1.35 (1.18-1.54)	1.31 (1.14-1.50)
For profit, no. (%)	3024 (72.4)	1913 (74.8)	1111 (68.6)	1.36 (1.18-1.58)	1.28 (1.09-1.51)
Dementia Special Care Unit, no. (%)	1073 (25.7)	674 (26.4)	399 (24.6)	1.10 (0.95-1.27)	1.06 (0.91-1.24)
Use of NP/PAs, no. (%)	1075 (25.7)	667 (26.1)	408 (25.2)	1.05 (0.90-1.21)	1.00 (0.86-1.17)

Characteristic	All Residents, N= 4177 (%)	Resident admitted to a SNF N= 2557 (%)	Resident not admitted to a SNF N=1620 (%)	Unadjusted odds ratio,[1] 95% Confidence Interval (CI)	Adjusted odds ratio,[1] 95% CI
Hospital based, no. (%)	171 (4.1)	91 (3.6)	80 (4.9)	0.71 (0.52-0.98)	1.07 (0.75-1.51)
Registered nurse hours/resident/day mean (SD)	0.33 (0.52)	0.33 (0.44)	0.35 (0.63)	0.93 (0.83-1.05)	0.96 (0.85-1.09)
% non white residents above median,	2090 (50.0)	1295 (50.7)	795 (49.1)	1.06 (0.93-1.21)	0.94 (0.81-1.09)

[1] Logistic regression, outcome of SNF admission, adjusted for clustering at facility level using robust standard errors

[2] Advanced Dementia Prognostic Tool score range, 1-32.5, higher scores indicate higher risk of death