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Receipt of Timely Primary Care Services Following Post-Acute Skilled Nursing Facility Care

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Abstract

Objectives: Our study examined the proportion of skilled nursing facility (SNF) post-acute care residents that did not receive timely primary care provider (PCP) services following discharge, factors associated with lack of timely PCP services, and factors associated with perfect 30-day home time among those who did not receive timely PCP services.

Design: Longitudinal cohort study. Data sources included Medicare claims and other administrative databases.

Setting and Participants: 25,357 fee-for-service New York State Medicare beneficiaries aged 65 years and older admitted to SNFs for post-acute care in 2014 and then discharged to the community.

Methods: Our outcomes were a timely PCP visit (within 7 days of SNF discharge) and perfect 30-day home time, and we examined their association with patient, SNF, and county factors.

Results: Among SNF discharges, 60.6% had a timely PCP visit. In multivariate regression analyses, female sex, non-White race, Medicare only status, less functional impairment and medical comorbidity, a surgical hospitalization, fewer hospital days, more SNF days, absence of home health services, for-profit SNF status, higher SNF star rating, lower ratio of registered nurse/total nursing hours, and rural counties were associated with lower odds of a timely PCP visit following SNF discharge. Among those without a timely PCP visit, female sex, less cognitive and

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Authors' Contributions

All authors met the criteria for authorship stated in the Uniform Requirements for Manuscripts Submitted to Biomedical Journals. AS developed the study concept and design and had primary responsibility for the preparation of the manuscript. JO had primary responsibility for managing the data and data analyses. AS, JO, TC, YL, JW, and HTG provided input regarding the study concept and design as well as with data analyses interpretation, drafting and revising of the manuscript, critical review of the manuscript for important intellectual content, and approval of the final manuscript.

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functional impairment, less medical comorbidity, a surgical hospitalization, fewer hospital days, receipt of home health services, and higher SNF star rating were associated with increased odds of perfect 30-day home time following SNF discharge.

Conclusions/Implications: That 4 in 10 post-acute care SNF patients did not have a timely PCP visit post-SNF discharge, with racial minority and rural county status associated with decreased odds of a timely PCP visit, is concerning. Examination of whether the timing and type of outpatient visit may have varying effects on different post-acute care subpopulations would build upon this work.

Brief Summary:

Many patients did not have a timely PCP visit post-SNF discharge. Pertinent patient, SNF, and county factors were identified, and findings suggest that racial and geographic disparities were present.

Keywords

Post-acute care; care transition; health services; rehabilitation

Introduction

Medicare covers up to 100 days of post-acute skilled nursing facility (SNF) care, and nearly 1.5 million fee-for-service (FFS) Medicare beneficiaries received Medicare-covered SNF services in 2018.[1] Of these beneficiaries, 41.4% were discharged to the community.[1] However, patients often experience adverse outcomes after SNF discharge.[2,3] For example, 24.2% of heart failure patients had a hospital readmission within 30-days of SNF discharge.[4] To improve outcomes, the American Geriatrics Society, Society of General Internal Medicine, and AMDA-The Society for Post-Acute and Long-Term Care Medicine collectively recommended patients to have an appointment with their primary care provider (PCP) within 7 days of SNF discharge.[5]

This recommendation, however, is mostly based on hospital-to-home data. In a cohort of patients discharged from an urban hospital, 50.8% did not see their PCP within 4 weeks of hospital discharge and were nearly 7 times more likely to have a 30-day readmission than those who had a PCP visit.[6] Moreover, 50.2% of patients rehospitalized within 30 days of hospital discharge did not have an outpatient physician visit prior to readmission.[7] Studies using largescale administrative data also suggest that a timely outpatient follow-up appointment (e.g., within 2–10 days of hospital discharge) was associated with readmission risk reductions.[8,9] While high-risk patients may benefit the most from timely post-acute PCP follow-up,[9,10] some evidence indicates that extremely high-risk groups may derive limited benefit from timely outpatient follow-up.[8] Additionally, the combination of home health with physician follow-up within one week of hospital discharge has been associated with a lower rehospitalization risk.[11,12]

Data on the SNF-to-home transition are scarce, however, particularly on how post-SNF linkage to PCP services affects SNF discharge outcomes. Among 1,543 post-acute care SNF

patients in Indiana, only 23.0% had an outpatient clinician visit within 7 days of SNF discharge, which was not associated with a reduced 30-day hospital readmission risk.[13]

Our study had three objectives to address gaps in the literature on timely PCP linkage (within 7 days) following post-acute SNF discharge. First, we estimated the proportion of older adult Medicare FFS beneficiaries in New York State (NYS) who had a timely PCP visit. Second, we assessed the patient-, SNF-, and county-level characteristics associated with having a timely PCP visit. Lastly, among those who did not have a timely PCP visit, we examined patient-, SNF-, and county-level characteristics associated with days spent alive in the community 30-days post-SNF discharge (i.e., perfect 30-day home time). We thereby sought to identify who was at most risk of poor discharge outcomes among those that did not receive timely PCP services, which could potentially inform targets to prioritize for future SNF-to-home transition interventions.

Methods

Study Population

Our cohort consisted of 25,357 NYS FFS Medicare beneficiaries aged 65 years and older with an index 2014 SNF admission (an admission that occurred after a qualifying hospitalization with no SNF admission in the prior 90 days) and were discharged within 100 days of SNF admission. We used 2014 data from the Master Beneficiary Summary File,[14] Medicare Provider Analysis and Review File,[14] Medicare Outpatient Revenue Center File,[14] Physician Part B file,[14] Medicare Home Health claims data,[14] Long-Term Care Minimum Data Set 3.0,[14] Centers for Medicare and Medicaid Services' (CMS) FY 2014 Final Rule Tables,[15] Area Health Resources File,[16] and the Nursing Home Compare file.[17] Appendix Table A1 lists the variables and databases. The University of Rochester Institutional Review Board approved this study.

Measures

Dependent variables.—Our first outcome was receipt of PCP services within 7 days of SNF discharge (binary: yes, no). Guided by prior studies,[18,19] we considered a visit to a general practice, family practice, internal medicine, geriatric medicine, nurse practitioner (NP), public health agency, preventive medicine, and physician assistant to qualify as a PCP visit. Our second outcome was "perfect 30-day home time" post-SNF discharge (binary: present, absent). Home time considers the number of days an older adult was alive and not in an institutional medical setting,[20,21] and thereby accounts for hospital and SNF readmissions and mortality, which we provide descriptive data on. In contrast, CMS' successful SNF discharge metric (i.e., discharged to the community without unplanned readmissions or death within 31 days after discharge)[22] is different because its denominator considers SNF admissions whereas the perfect 30-day home time's denominator only includes SNF discharges.

Independent variables.—Patient-level covariates included age, sex, race, marital status, Medicare and Medicaid dual-eligible, Alzheimer's disease or dementia, cognitive functioning as assessed by the Brief Interview for Mental Status (BIMS) scores (scored 0–

15; higher scores indicate better functioning),[23] functional status as determined by activities of daily living (ADL) scores (0–28; higher scores indicated worse functional status),[24,25] number of medical conditions, the reason for the pre-SNF hospitalization (medical or surgical), number of days in the qualifying hospitalization and in the SNF, and receipt of home health services within 7 days of SNF discharge. SNF-level factors included ownership, occupancy, SNF 5-star overall quality rating, and registered nurse (RN)/total nursing hours per resident day. County-level factors included metro status (urban, rural) and the supply of primary care physicians, non-primary care physicians (all physicians minus the primary care physicians), and advanced practice nurses per 100,000 people aged 65 years or older in the SNF county.

Statistical Analyses

First, we conducted bivariate analyses (chi-square and analysis of variance for statistical inference as appropriate) to examine differences in patient -, SNF-, and county-level factors and discharge outcomes between those who did and did not receive timely PCP services. Next, we performed multivariate logistic regression analyses that examined the association of these factors with our dependent variable, receipt of timely PCP services (yes, no). Lastly, among the cohort of patients who did not have a PCP visit within 7 days of SNF discharge, we conducted multivariate logistic regression analyses that examined the association of these factors with our dependent variable, perfect 30-day home time following SNF discharge (present, absent). We used SAS (version 9.4, SAS Institute, Inc., Cary, NC) and STATA (version 12.1, StataCorp LLC, College Station, TX) to conduct analyses at the individual-level and did not cluster standard errors at the SNF- or county-level.

Results

Sample Characteristics

Among the 25,357 older adults discharged to the community following a post-acute SNF stay, 60.6% visited their PCP within 7 days of discharge. Compared to those who did see the PCP, those who did not were more likely to be younger and female and to have had Medicare-only status, less cognitive and functional impairment, fewer medical conditions, a surgical qualifying hospital admission, a shorter hospitalization, and no home health services (Table 1). Patients discharged from for-profit SNFs were less likely to have had a timely PCP visit. Unexpectedly, more primary care physicians, non-primary care physicians, and advanced practice nurses at the county-level were associated with not having a timely PCP visit. Compared to those with a timely PCP visit, patients without a timely PCP visit were more likely to have a perfect 30-day home time post-SNF discharge (88.3% vs. 80.6%; $p<0.001$) as they had fewer hospital readmissions (9.6% vs. 16.4%; $p<0.001$) and SNF readmissions (3.3% vs. 7.4%; $p<0.001$); however, mortality was not different across PCP visit groups (2.2% vs. 2.6%; $p=0.095$).

Multivariate Analyses of Timely PCP Visits

In multivariate analyses, female sex, non-White race, Medicare-only status, less functional impairment and medical comorbidity, a surgical hospitalization, fewer days spent in the hospital, more days spent in the SNF, absence of home health services, and counties with

more primary care physicians, fewer non-primary care physicians, and more advanced practice nurses were associated with lower odds of having a timely PCP visit following SNF discharge (Table 2). Patients discharged from SNFs that were for-profit, had a higher SNF star rating, had a lower ratio of RN/total nursing hours, and were in rural counties were also less likely to have had a timely PCP visit.

Multivariate Analyses of Perfect 30-Day Home Time

In multivariate analyses of those without a timely PCP visit, female sex, less cognitive and functional impairment, less medical comorbidity, a surgical hospitalization, fewer hospital days, receipt of home health services, and higher SNF star rating were associated with increased odds of perfect 30-day home time following SNF discharge (Table 3).

Discussion

Sixty percent of our post-acute SNF care cohort discharged to the community had a PCP visit within the recommended 7-day timeframe. As the benefit of timely PCP visits may be concentrated among the higher-risk patients,[9,10] our findings were encouraging in that receipt of PCP services by those more vulnerable (e.g., patients with increased functional impairment and medical comorbidities) seems to be occurring more frequently than in those with lower risk. Conversely, that non-White race and rural county status were associated with an increased risk for not having timely PCP follow-up is consistent with prior health disparities findings in the United States and Canada.[9,26] Post-acute care residents of rural SNFs also are less likely to have a visit by a physician or advanced practitioner during their SNF stays.[27] Our findings suggest that racial minorities and rural residents comprise vulnerable subgroups of post-acute SNF care patients for whom connection to outpatient follow-up should be more heavily prioritized. To address these issues, expansion of video telehealth and technology may decrease barriers for homebound older adults and efforts such as Project RED (“ReEngineered Discharge”) that make appointments prior to SNF discharge, may improve linkage to PCP services.[28] Additionally, advanced practice clinicians (NPs, PAs) are playing critical roles in alleviating primary care physician shortages in rural and other high-need settings[29,30] and should be involved in SNF-to-home optimization efforts.

In our study cohort, it appears as though SNF factors may affect linkage to PCP services following discharge. Post-acute care patients discharged from for-profit SNFs and SNFs with a lower ratio of RN/total nursing hours had a decreased likelihood of a timely PCP visit. Furthermore, among those who did not have a PCP visit, being discharged from lower quality SNFs was associated with less than perfect 30-day home times. Our study also found that, while patients with surgical hospital admissions were less likely to have a timely PCP visit, they also were more likely to have had perfect 30-day home time following SNF discharge. Although post-hospital follow-up with a primary care physician rather than with a specialist was associated with a larger readmission reduction risk,[9] it is unclear whether SNF patients with a surgical hospitalization likewise derive the same benefit from a timely PCP visit as SNF patients with a medical hospitalization. As PCPs may defer to surgeons for the

initial follow-up of surgical patients, future studies should examine receipt of outpatient surgical services among post-acute surgical patients.

Of note, the estimated prevalence of a hospital or SNF readmission was higher by 71% and 124%, respectively, for those who had a timely PCP visit. This study was not designed to examine the benefit of timely PCP linkage, however, and future studies designed to carefully manage bias between those who receive and do not receive timely PCP services are needed to clarify the potential effect of timely PCP visits on post-discharge outcomes.

Our study has several limitations. First, we lacked information on in-home assistance and social determinants of health that may affect linkage to outpatient services and post-SNF discharge outcomes. Second, there may be unaccounted SNF factors that affected linkage to timely PCP services (e.g., whether the SNF providers and practices also see patients in the outpatient setting). Third, some PCP services may have been misclassified, but we relied upon prior studies[18,19] to guide our determination of PCP services to help reduce potential misclassification. Fourth, while based on a geographically, socioeconomically, and racially diverse state, the findings may not be representative of post-acute SNF care patients from other regions or for those with Medicare Advantaged plans.

Conclusions and Implications

This study provides an indication of which post-acute SNF care patients see a PCP within the recommended 7-days post-SNF discharge. Future work could risk stratify post-acute SNF care patients and examine whether the benefit of timely PCP follow-up concentrates in the highest risk groups. Additionally, an examination of whether the timing and type of outpatient visit (e.g., PCP vs. specialist) may have varying effects on different post-acute care subpopulations is warranted.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Sample Characteristics Among Older Adults by Receipt of Primary Care Provider Services within 7 Days of Skilled Nursing Facility Discharge

	PCP Visit ≤ 7 Days of SNF Discharge?		
	YES N: 15,379	NO N: 9,978	p-value (χ^2 or ANOVA)
	Mean (SD) or %	Mean (SD) or %	
Outcomes post-SNF Discharge			
Perfect 30-Day Home Time	80.6	88.3	<0.001
Hospital Stay in 30 Days	16.4	9.6	<0.001
SNF Stay in 30 Days	7.4	3.3	<0.001
Died Within 30 Days	2.6	2.2	0.095
Patient Factors			
Age	81.8 (8.5)	81.4 (8.4)	<0.001
Female	65.2	67.5	<0.001
White	84.7	84.1	0.209
Married	34.7	34.5	0.803
Medicaid Dual Eligible	26.3	22.9	<0.001
Alzheimer's Disease/Dementia	20.0	18.0	<0.001
Brief Interview for Mental Status Score	13.0 (3.3)	13.2 (3.2)	<0.001
Functional Status Scale (ADL Score)	15.0 (5.6)	14.7 (5.6)	<0.001
Number of Diagnoses	6.1 (3.8)	5.7 (3.4)	<0.001
Surgical Hospitalization Prior to SNF Stay	39.8	46.4	<0.001
Days Spent in Qualifying Hospital Stay	7.1 (6.1)	6.7 (6.1)	<0.001
Days in SNF	27.5 (18.9)	27.9 (19.0)	0.161
Receipt of Home Health Services Within 7 Days of Discharge	70.7	68.0	<0.001
SNF Factors			
For Profit	46.8	49.7	<0.001
Occupancy	0.9 (0.3)	0.9 (0.2)	0.359
5-Star Overall Rating:			0.131
1 Star	6.6	6.4	
2–4 Stars	49.6	48.6	
5 Stars	43.5	44.9	
Ratio of RN/Total Nursing Hours Per Resident Day	0.40 (0.08)	0.40 (0.07)	<0.001
County Factors			
Urban	93.7	93.7	0.882
Primary Care Physicians per 100,000 People Age 65 Years or Older	594.4 (211.2)	623.6 (217.1)	<0.001
Non-Primary Care Physicians per 100,000 People Age 65 Years or Older	2,745.6 (1,883.8)	2,915.9 (1,881.7)	<0.001
Advanced Practice Nurses per 100,000 People Age 65 Years or Older	498.4 (273.8)	515.4 (278.7)	<0.001

Notes: PCP = primary care provider. SD = standard deviation. SNF = skilled nursing facility.

Table 2

Patient, Skilled Nursing Facility, and County Factors Associated with Having a Primary Care Provider Visit within 7 Days of Skilled Nursing Facility Discharge

	Adjusted Odds Ratio	95% Confidence Interval	p-value
Patient Factors			
Age	1.00	(1.00, 1.01)	0.217
Female	0.93	(0.88, 0.99)	0.019
White (Ref = non-White)	1.11	(1.03, 1.21)	0.007
Married (Ref = Not Married)	1.03	(0.97, 1.10)	0.264
Medicaid Dual Eligible (Ref = Not Dual Eligible)	1.17	(1.09, 1.25)	<0.001
Alzheimer's Disease/Dementia (Ref = No Dementia)	1.05	(0.97, 1.14)	0.244
Brief Interview for Mental Status Score	1.00	(0.99, 1.01)	0.336
Functional Status Scale (ADL Score)	1.01	(1.00, 1.01)	0.023
Number of Diagnoses	1.03	(1.02, 1.03)	<0.001
Surgical Hospitalization Prior to SNF Stay (Ref = Medical Hospitalization)	0.79	(0.75, 0.84)	<0.001
Days Spent in Hospital Prior to SNF Stay	1.01	(1.01, 1.02)	<0.001
Days in SNF	0.998	(0.996, 0.999)	0.004
Receipt of Home Health Services Within 7 Days of Discharge	1.14	(1.08, 1.21)	<0.001
SNF Factors			
For Profit (Ref = non-Profit)	0.90	(0.85, 0.95)	<0.001
Occupancy	1.00	(0.90, 1.11)	0.950
5-star Overall Rating (Ref = 2–4 Stars)			
1 Star	1.18	(1.05, 1.32)	0.005
5 Stars	0.94	(0.88, 0.99)	0.025
Ratio of RN/Total Nursing Hours per Resident Day	1.95	(1.33, 2.88)	0.001
County Factors			
Urban (Ref = Rural)	1.26	(1.12, 1.42)	<0.001
Primary Care Physicians per 100,000 People Age 65 Years and Older (expressed in units of 250)	0.76	(0.72, 0.81)	<0.001
Non-Primary Care Physicians per 100,000 People Age 65 Years and Older (expressed in units of 250)	1.02	(1.01, 1.03)	<0.001
Advanced Practice Nurses per 100,000 People Age 65 Years or Older (expressed in units of 250)	0.91	(0.87, 0.95)	<0.001
Observations	23,601		

Notes: RN = registered nurse

The adjusted logistic regression model includes all the covariates listed in this table with the outcome being whether an older adult had a PCP visit in 7 or fewer days (dichotomized as yes or no) since skilled nursing facility discharge.

Table 3

Patient, Skilled Nursing Facility, and County Factors Associated with Perfect Home Time During the 30-Days Following SNF Discharge Among Patients with No Primary Care Provider Visit within 7 Days of Skilled Nursing Facility Discharge

	Adjusted Odds Ratio	95% Confidence Interval	P-Value
Patient Factors			
Age	0.99	(0.98, 1.00)	0.138
Female	1.31	(1.14, 1.51)	<0.001
White (ref = non-White)	0.95	(0.78, 1.15)	0.586
Married (ref = Not Married)	0.92	(0.80, 1.07)	0.294
Medicaid Dual Eligible (ref = Not Dual Eligible)	0.85	(0.73, 1.00)	0.057
Alzheimer's Disease/Dementia (ref = No Dementia)	1.02	(0.85, 1.24)	0.816
Brief Interview for Mental Status Score	1.02	(1.00, 1.05)	0.048
Functional Status Scale (ADL Score)	0.94	(0.93, 0.95)	<0.001
Number of Diagnoses	0.98	(0.96, 1.00)	0.024
Surgical Hospitalization Prior to SNF Stay (ref = Medical Hospitalization)	2.07	(1.78, 2.40)	<0.001
Days Spent in Hospital Prior to SNF Stay	0.96	(0.95, 0.97)	<0.001
Days in SNF	1.003	(0.999, 1.007)	0.103
Receipt of home health services within 7 days of discharge	1.39	(1.21, 1.60)	<0.001
SNF Factors			
For Profit (ref = non-Profit)	0.99	(0.86, 1.14)	0.890
Occupancy	1.04	(0.68, 1.60)	0.842
5-star Overall Rating (ref = 2–4 Stars)			
1 Star	0.73	(0.56, 0.95)	0.018
5 Stars	1.21	(1.05, 1.40)	0.010
Ratio of RN/Total Nursing Hours per Resident Day	0.94	(0.32, 2.70)	0.902
County Factors			
Urban (ref = Rural)	0.87	(0.65, 1.17)	0.371
Primary Care Physicians per 100,000 People Age 65 Years and Older (expressed in units of 250)	1.06	(0.91, 1.25)	0.436
Non-Primary Care Physicians per 100,000 People Age 65 Years and Older (expressed in units of 250)	0.99	(0.97, 1.02)	0.550
Advanced Practice Nurses per 100,000 People Age 65 Years or Older (expressed in units of 250)	1.01	(0.91, 1.12)	0.851
Observations	9,320		

The adjusted logistic regression model includes all the covariates listed in this table with the outcome being whether an older adult had perfect 30-day home time (dichotomized as yes or no) in the 30 days following skilled nursing facility discharge.