Incidence and Characteristics Associated with Hospital Readmission after Discharge to Home Hospice

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Abstract

Background: Home hospice is designed to provide comfort to patients at the end of their life and hospital readmission is incongruent with this goal.

Objective: The purpose of this study was to investigate the incidence of and characteristics associated with hospital readmissions from home hospice over a two-year period.

Design/Subjects: This was a retrospective cohort study of 705 inpatients discharged from a quaternary academic medical center to home hospice from January 1, 2016 to December 31, 2017. Measures: The primary outcome was incidence of hospital readmission after discharge to home hospice. Multivariate regression with stepwise forward selection was used to identify characteristics associated with readmission.

Results: The incidence of readmission was found to be 10.50% ($n=74$), and the median days from discharge to readmission were 32.50 days (interquartile range = 14.00, 75.00). Reasons for readmission were: unanticipated new medical issue ($n=33$, 44.59%), uncontrolled symptoms ($n=25$, 33.78%), misunderstanding of hospice status ($n=12$, 16.22%), and caregiver distress ($n=4$, 5.41%). The following characteristics were associated with readmission: female versus male (odds ratio [OR] = 1.96; 95% confidence interval [CI]: 1.16–3.32), non-white versus white (OR = 2.40; 95% CI: 1.36–4.24), and hospice diagnosis of cardiac disease versus all other diagnoses (OR = 4.40; 95% CI: 2.06–9.37).

Conclusions: Compared with prior studies, our findings showed a lower incidence of readmission, 10.50%, from home hospice. In addition, those who are female, non-white, or have a hospice diagnosis of cardiac disease are more likely to be readmitted.

Keywords: home hospice; hospice; palliative care; readmission; rehospitalization

Introduction

HOSPICE IS A SUBCATEGORY of specialized care designed with quality of life at its core. The primary intent is to help patients and their families during the natural course of advanced or life-threatening disease. As such, hospice care aims for comfort rather than cure by addressing the physical, psychological, social, spiritual, and emotional needs of patients and their families. A meta-analysis of patients receiving hospice care in the setting of their homes, nursing homes, or hospices showed overall greater patient satisfaction with care, reduced usage of health care, and lower costs.¹ Particularly, a randomized controlled trial of 298 patients in home hospice demonstrated 93% patient satisfaction, reductions in

emergency department visits and rates of hospital admission, and lower average cost per day per patient.² In addition, many patients prefer to spend their last days in the comfort of their own homes. In an observational cohort study of 458 patients, 75% stated that they would prefer to stay at home, but a few actually die at home with a concordance rate of 37%.³

Ideally, where patients die should align with their preferences for end-of-life care and if they have chosen home hospice then readmission to the hospital may not align with their goals of care. Among patients admitted to the hospital from hospice, 46% ultimately die in the hospital,⁴ and readmission continues to be a prominent issue in hospice care. In a retrospective review of 163 patients discharged to home hospice, 46 (28.22%) were readmitted to the hospital within

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a seven-day period.⁵ Other studies have focused on readmission within the first 30 days of hospice admission and found readmission rates as low as 4.1% in heart failure patients and as high as 32.20% in elderly patients.^{6–9}

Previous studies have identified some characteristics associated with readmission from home hospice: younger, non-white, non-English speaking, and any insurance type (including Medicaid and dual eligibility) except Medicare.⁵ Patients with lower socioeconomic status and complicated health issues were also more likely to have higher readmission rates.⁵ Palliative care consultation was not associated with a lower readmission rate in hospice patients.⁹ Other studies of palliative care consultation for all qualifying patients, hospice as a subset of the study population, have also demonstrated no significant effect on readmission rates.^{10–12}

The primary purpose of this study is to determine the incidence of hospital readmission for all inpatients discharged to home hospice and to identify characteristics associated with readmission at our institution. Previous studies had a limited sample size or focused on a specific patient population. Our study examines a large number of patients with a variety of hospice qualifying diagnoses.

Methods

This study was approved by the Institutional Review Board (IRB) at our institution. This was a retrospective cohort study conducted in a quaternary care hospital with 898 beds. The medical records of patients discharged to home hospice over a two-year period were reviewed by five medical students under the supervision of a palliative care physician. In cases when the reason for readmission was not readily apparent, the reviewer flagged the chart; it was reviewed by a second student; and the two reviewers reached consensus about which category to use. A third student was available as a final arbiter if the two could not reach consensus.

The list of patients was provided by the Healthcare Enterprise Repository for Ontological Narration (HERON) data repository.¹³ The HERON query tool extracted all patients with a discharge disposition of “Home with Hospice” from a required field in the discharge summary from January 1, 2016 to December 31, 2017. The following inclusion criteria were applied to the patients: 18 years of age or older regardless of diagnoses, severity, or comorbidities, verified discharge disposition of “Home with Hospice,” and a verified inpatient admission during the study period.

The following information was extracted from the Epic electronic medical record for each patient: age at discharge, sex, race/ethnicity, primary language, marital status, insurance status, palliative care consultation, first discharge date, first discharging service, hospice diagnosis, readmission date, admitting service, reason for readmission, second discharge date, second discharging service, disposition at second discharge, and place of death. Data were then stored in REDCap, which is a secure web application for building and managing online surveys and databases.¹⁴

The primary outcome was readmission after discharge to home hospice, defined as the first readmission any time after the first discharge to home hospice to the time of chart review in October 2018. A variety of hospice agencies was utilized by our hospital system and was not specifically coded. In the event of readmission, the history and physical note provided

the readmission date, admitting service, and reason for readmission.

The reason for readmission was classified into four pre-determined categories based on the recommendations of a palliative care provider: uncontrolled symptoms, unanticipated new medical issue, misunderstanding of hospice status, and caregiver distress. Uncontrolled symptoms included those related to the hospice diagnosis, such as worsening edema in the case of congestive heart failure. Unanticipated new medical issues were those not related to the hospice diagnosis, for example, the development of pneumonia, falls, or accidental disconnection of the feeding tube.

Misunderstanding of hospice status and caregiver distress was selected only if explicitly documented in the readmission history and physical. Misunderstanding of hospice status was defined as either patient or family misunderstanding of hospice goals, such as prioritizing comfort over cure and mistaking symptom control as a method for hastening death, such as the more liberal use of morphine for pain. Caregiver distress may result from the caregiver’s overestimation of the patient’s abilities and was not prepared to manage the increasing demands in care as functional decline worsens.

If the reason for readmission remained unclear, the palliative care consult note, if present, was searched to determine the cause for readmission. If there was no palliative care consult note or the reason continued to be ambiguous, the reason for readmission was then determined by the initial reviewer’s consultation with at least one other research personnel. The corresponding readmission discharge summary was reviewed to determine the discharge date, service, and discharge disposition. Characteristics associated with the primary outcome included age, sex, race/ethnicity, primary language, marital status, insurance status, palliative care consultation during the first admission, and hospice diagnosis.

Statistical analysis

All statistical analyses were completed by using SAS version 9.4 (SAS Institute, Inc., Cary, NC). Descriptive statistics for all baseline characteristics were generated by using frequencies and means/medians. These include: age at discharge, sex, race/ethnicity, primary language, marital status, insurance status, palliative care consultation, and hospice diagnosis.

The incidence of readmission was defined as any participant with a readmission before the end date of data collection divided by all patients meeting the inclusion criteria. Median days to readmission and length of stay were calculated, as was the frequency of reasons for readmission and discharge disposition from the readmission.

To examine characteristics associated with the primary outcome of readmission, baseline characteristics were analyzed by using binary logistic regression. A forward stepwise multivariate model was built by using data-driven methods and included all characteristics with a *p*-value <0.40 in the bivariate analysis. Several categories were collapsed during analysis due to sample size constraints and to be consistent with prior literature: race/ethnicity into white and non-white, which includes all other races; primary language into English and non-English, which includes all other languages; marital status into married and unmarried, which includes single, divorced, widowed, and unknown; insurance status into Medicare,

Medicaid, Medicare and Medicaid combination, and others, which includes all other insurance types and uninsured; and hospice diagnosis into cardiac disease, cancer, and all other diagnoses. Age was analyzed per 10-year increments.

Results

The HERON query identified 814 patients with a discharge disposition of “Home with Hospice” from January 1, 2016 to December 31, 2017. A total of 109 charts were excluded, resulting in 705 eligible participants. The main reason for exclusion ($n=81$) occurred when the chart review revealed that, although recorded as “Home with Hospice,” these patients had a different discharge disposition. Other reasons for exclusion included being less than 18 years of age, no admission during the date range, and duplicate charts (Fig. 1). This hospital does not provide General Inpatient hospice care (GIP), and none of the readmissions was for this type of care.

Baseline characteristics

The majority of patients discharged to home hospice were male (56.45%), white (75.60%), and married (57.16%). The mean age was 66.69 years ($SD=13.89$). Most patients had Medicare (57.16%). Nearly three-fourths (73.90%) of patients received a palliative care consult while admitted. The most common hospice diagnosis was cancer related (60.43%). The distribution of patient characteristics is summarized in Table 1.

Readmission

Of the 705 eligible participants, 74 (10.50%) were readmitted. The median time from first discharge to home hospice to readmission were 32.50 days (interquartile range [IQR] 14.00, 75.00). The median length of stay during readmission was 3.00 days (IQR = 2.00, 6.00). The most common reason for readmission was an unanticipated new medical issue ($n=33$, 44.59%), followed by uncontrolled symptoms ($n=25$, 33.78%), then misunderstanding of hospice status ($n=12$, 16.22%), and caregiver distress ($n=4$, 5.41%). After readmission, patients most frequently returned to home hospice

($n=38$, 51.35%), followed by home with home health ($n=8$, 10.81%), inpatient hospice ($n=7$, 9.46%) death ($n=7$, 9.46%), home with self-care ($n=6$, 8.11%), skilled nursing facility ($n=4$, 5.41%), inpatient rehabilitation ($n=2$, 2.70%), long-term nursing facility ($n=1$, 1.35%) and hospice house ($n=1$, 1.35%).

Characteristics associated with readmission

Characteristics found to be significant ($p<0.05$) at the bivariate level included sex, race/ethnicity, marital status, and hospice diagnosis. Primary language and a palliative care consult were not significant at the bivariate level but were included in the multivariate model, because the p -value was less than 0.40. Age and insurance status were neither significant nor included in the multivariate model. At the multivariate level, three characteristics were found to be significantly associated with readmission: females (odds ratio [OR]=1.96; 95% confidence interval [CI]: 1.16–3.32), non-white patients (OR=2.40; 95% CI: 1.36–4.24); and those with a hospice diagnosis of cardiac disease (OR=4.40; 95% CI: 2.06–9.37). Marital status and a cancer diagnosis were no longer significant. The results are summarized in Table 2.

Discussion

Within our institution, we determined that incidence of readmission from home hospice is 10.50% and that female sex, non-white race/ethnicity, and hospice diagnosis of cardiac disease are all characteristics independently associated with readmission. The largest strength of association with readmission was a hospice diagnosis of cardiac disease. Among patients who were readmitted, 9.46% died while in the hospital.

Data regarding readmission rates from hospice are highly variable. Although there is a reported readmission rate lower than that of our institution, 4.1%, the study consisted only of heart failure patients.⁶ Most other studies also tend to focus on a specific subset of hospice patients, such as heart failure, cancer, or elderly patients. When considering all home

FIG. 1. Flowchart of patient selection.

TABLE 1. DEMOGRAPHICS OF PATIENT POPULATION

<i>Characteristic</i>	<i>Total n = 705 n (%)</i>	<i>Readmitted n = 74 n (%)</i>	<i>Non-readmitted n = 631 n (%)</i>
Age at discharge, mean (SD)	66.69 (13.89)	65.72 (15.03)	66.80 (13.76)
Sex			
Female	307 (43.55)	45 (14.66)	262 (85.34)
Male	398 (56.45)	29 (7.29)	369 (92.71)
Race/ethnicity			
White and European	533 (75.60)	40 (7.50)	493 (92.50)
Black and African Americans	91 (12.91)	22 (24.18)	69 (75.82)
Hispanic and Latino	41 (5.82)	8 (19.51)	33 (80.49)
Asian	17 (2.41)	2 (11.76)	15 (88.24)
Native Americans and Alaska Natives	2 (0.28)	0 (0.00)	2 (100.00)
Native Hawaiians and other Pacific Islanders	1 (0.14)	0 (0.00)	1 (100.00)
Middle Easterners and North Africans	1 (0.14)	0 (0.00)	1 (100.00)
Two or more races	1 (0.14)	1 (100.00)	0 (0.00)
Other	18 (2.55)	1 (5.56)	17 (94.44)
Primary language			
English	664 (94.18)	68 (10.24)	596 (89.76)
Spanish	24 (3.40)	4 (16.67)	20 (83.33)
Other	17 (2.41)	2 (11.76)	15 (88.24)
Marital status			
Married	403 (57.16)	31 (7.69)	372 (92.31)
Single	142 (20.14)	18 (12.68)	124 (87.32)
Divorced	56 (7.94)	9 (16.07)	47 (83.93)
Widowed	99 (14.04)	16 (16.16)	83 (83.84)
Unknown	5 (0.71)	0 (0.00)	5 (100.00)
Insurance status			
Medicare	403 (57.16)	42 (10.42)	361 (89.58)
Medicaid	49 (6.95)	7 (14.29)	42 (85.71)
Medicare and Medicaid	10 (1.42)	1 (10.00)	9 (90.00)
Commercial	195 (27.66)	18 (9.23)	177 (90.77)
VA	15 (2.13)	3 (20.00)	12 (80.00)
Uninsured	33 (4.68)	3 (9.09)	30 (90.91)
Palliative care consult			
Yes	521 (73.90)	51 (9.79)	470 (90.21)
No	184 (26.10)	23 (12.50)	161 (87.50)
Hospice diagnosis			
Cardiac disease	100 (14.18)	25 (25.00)	75 (75.00)
Cancer	426 (60.43)	36 (8.45)	390 (91.55)
Lung disease	34 (4.82)	4 (11.76)	30 (88.24)
Liver disease	49 (6.95)	6 (12.24)	43 (87.76)
Kidney disease	9 (1.28)	2 (22.22)	7 (77.78)
Dementia	23 (3.26)	0 (0.00)	23 (100.00)
Other	64 (9.08)	1 (1.56)	63 (98.44)

SD, standard deviation.

hospice patients, the readmission rate was 28.22%.⁵ Therefore, we observe that our readmission rate for all patients discharged to home hospice is lower than in the current literature.

We have also found that females are more likely than their male counterparts to be readmitted. The reason for this finding is unclear and would require further qualitative analysis to determine the underlying cause. Females are more often associated with a lower socioeconomic status,¹⁵ which has been shown to contribute to readmission⁵; however, it is unlikely that this is the sole contributing factor for their higher readmission rate in this overall patient population.

Another robust finding was race/ethnicity, with non-white patients being 2.40 times more likely to be readmitted. Al-

though the highest proportion of patients readmitted to the hospital were white, this is due to a significantly higher population of white patients in our study. The highest readmitted non-white race/ethnicity was black/African Americans, which is concurrent with Solomon et al. findings of overall hospital readmission for black patients with metastatic cancer (hazard ratio, 1.26).⁸ Higher readmission may be due to lower socioeconomic status among non-white race/ethnicity compared with white race/ethnicity.¹⁶ In addition, there may be a language barrier to communication as language is closely related to race/ethnicity and although language itself is not significant in this study, it may be inferred by an attenuated effect of race/ethnicity in the multivariate model. Along with language, cultural differences can be a

TABLE 2. BINARY AND MULTIPLE LOGISTIC REGRESSION

Comparison	Bivariate analysis		Multivariate analysis	
	OR (95% CI)	p	OR (95% CI)	p
Age at discharge				
Per 10 years	0.95 (0.80–1.13)	0.53	—	—
Sex				
Female vs. male	2.19 (1.34–3.58)	<0.01*	1.96 (1.16–3.32)	0.01*
Race/ethnicity ^a				
Non-white vs. white	3.04 (1.85–4.98)	<0.0001*	2.40 (1.36–4.24)	<0.01*
Primary language				
Non-English vs. English	1.50 (0.61–3.70)	0.38	1.01 (0.37–2.76)	0.98
Marital status ^a				
Unmarried vs. married	1.99 (1.22–3.25)	<0.01*	1.34 (0.78–2.30)	0.29
Insurance status ^a				
Medicare	1.06 (0.63–1.80)	0.84		
Medicaid	1.52 (0.62–3.76)	0.47	—	—
Medicare and Medicaid	1.01 (0.12–8.35)	0.89		
Other (reference)	1.00	—		
Palliative care consult				
No vs. yes	1.32 (0.78–2.22)	0.30	1.68 (0.96–2.94)	0.07
Hospice diagnosis ^a				
Cardiac disease	4.26 (2.06–8.78)	<0.0001*	4.40 (2.06–9.37)	<0.0001*
Cancer	1.18 (0.61–2.28)	0.03*	1.37 (0.69–2.71)	0.12
All other diagnoses ^b	1.00	—	1.00	—

*Statistically significant.

^aCollapsed categories: non-white = all other race/ethnicity; non-English = all other languages; unmarried = single, divorced, widowed, and unknown; other insurance status = commercial, VA, and uninsured; all other diagnoses = lung disease, liver disease, kidney disease, dementia, and other.

^bCollapsed because of small numbers, see Table 1.

CI, confidence interval; OR, odds ratio.

barrier to communication and can influence patients' decision making, as they can impact how they view death and medical treatment. Race and ethnicity are highly complex and the contribution to higher rates of readmission may be due to multiple reasons.

A hospice diagnosis of heart disease had the strongest association with readmission in our study and concurs with previous studies that have demonstrated heart failure as a leading cause of readmission.^{6,17} Patients with heart disease tend to be medically complex and riddled with multiple comorbidities. High comorbidity burden was shown to be associated with a higher readmission rate.⁵ Perhaps because comorbidities increase patients' needs, this leads to sub-optimal symptom management, inability for caregivers to provide adequate care at home, and the need for a higher level of care, particularly in the instance of rapid onset of chest pain or dyspnea. Further, some hospice agencies may not be equipped to handle such complex patients. However, because our hospital uses multiple hospice agencies, confounding is minimized in this regard.

Marital status was significant at the bivariate level, but not at the multivariate level, suggesting that it was confounded by another characteristic such as race/ethnicity, insurance, or both. Patients from non-white backgrounds tend to have more family and friends involved in their decision making,¹⁸ thus perhaps being more reliant on family and friends for their care. Most primary caregivers were spouses, 51.4%, followed by adult children, 24.0%.¹⁵ Respite care for caregivers provided by insurance may relieve some pressures on family members.

Characteristics that remained statistically insignificant throughout our study included age, primary language, insurance status, and palliative care consult. In contrast to the study by Wilson et al.,⁵ we did not find age to be a significant predictor of readmission. This could be because age was fairly homogenous in our population. Primary language was not associated with higher readmission and this may be because English was spoken by the vast majority of patients, 91.89%, in the readmitted group and 94.45% in the admitted group, which may mask any effects of language. Contrary to a study by Whitney and Chuang, dual insurance status did not affect readmission⁷ and neither did any other insurance status as seen in previous studies.^{5,8}

Our analysis showed that palliative care consultation was not significantly associated with readmission, which is consistent with prior studies.^{9–12} However, there may be some reduction of readmission rates when the consult is initiated early in hospitalization, especially within the first six days.^{19,20} We did not investigate palliative care consult by time. In addition, palliative care consultation was associated with greater patient satisfaction, increased hospice admission rates and length of stay, more deaths occurring at home, and decreased health care costs.^{10,12,21} Although palliative care seemed to have the greatest impact on patients' view of hospice and overall comfort, palliative care consultation may not have a major role in readmission within our study, because the dominant reason for patients returning to the hospital was a new unanticipated medical issue.

Strengths and limitations

The strengths of our study included a large sample size that is not restricted to a specific group of patients based on diagnosis and covers all inpatient services. In addition, various studies have addressed the problem of readmission in hospice patients, but the lack of established data beyond 30 days identifies a gap of knowledge. Our broader period provides a better picture of the incidence of readmission among the home hospice population. In addition, smaller windows of time may only account for acute issues such as new illnesses, whereas issues such as caregiver distress may take time to develop.

A limitation of our study was that we had to condense several categories of hospice diagnoses into an “all other diagnoses” category, which may omit some key findings associated with other diagnoses. We also lack qualitative data to determine the cause of readmission, especially when due to caregiver distress or misunderstanding of hospice services, given that current documentation requirements are not suited toward understanding patients’ home experiences but are intended to document medical problems. In addition, this study was institution specific and, therefore, the conclusions may not be generalizable. We also only considered readmission, but not visits to acute care or emergency departments, which can provide more insight into gaps of care in home hospice. Patients may also have been readmitted to another hospital and we may not know unless records were provided. Quality of care and patient satisfaction were not evaluated in our study, which may confound some results and is an area best served with a qualitative study.

Conclusion

Overall, this study is informative to providers regarding the incidence of home hospice readmissions and the associated characteristics. We reported a relatively low readmission rate, and this may be due to changes in the hospice experience or might be institution specific. Further multicenter studies of readmission after home hospice may elucidate whether this is a regional or national trend. This study also helps define characteristics associated with readmission, which can assist providers in tailoring their goals-of-care discussion with patients, family members, and caregivers.

Regarding race/ethnicity, providers might be mindful of cultural differences and incorporate them into the discussion. Knowing that the most common reason for readmission is a new issue, providers perhaps can try to predict and develop a plan with patients and caregivers. However, further investigation into the common medical issues that arise can assist providers in this aspect. For example, if providers know pneumonias are a common reason for readmission, they can anticipate and inform caregivers on the clinical symptoms and management before discharge from the hospital.

In addition, more in-depth research is needed to examine whether certain patient characteristics may have greater influence on reasons for readmission and how each characteristic may influence patients’ decision making regarding their health care. This may also help providers individualize discussions with patients and their families before home hospice discharge.

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