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Original Article

The Impact of a Hospital-Community Based Palliative Care Partnership: Continuum from Hospital to Home

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Abstract

Objectives: To discuss the outcomes of a formalized care transition process for palliative care patients from the hospital to the community.
Background: Patients who received inpatient palliative care services from the specialist palliative care team in the hospital or who were identified as needing community palliative care services have inadequate support on discharge.
Methods: A retrospective review of the medical records of patients admitted to the community based palliative care (CBPC) program, Arizona Palliative Home Care (AZPHC) over a 12-month period (June 2018 to May 2019) was undertaken with a focus on the frequency and pattern of hospital events pre- and postadmission to the program. Patient/family satisfaction data obtained from telephone surveys were evaluated. The medical records from patients ($n = 294$) with advanced complex illnesses who were admitted to AZPHC from the five Honor Health Network hospitals were included in this study.
Results: Of the 294 patients' records reviewed, 80% were in the 65 and older age group and had a mean length of stay on AZPHC of $\sim$40 days. Comparing acute care utilization pre and post AZPHC admission, there was a reduction of 68.95% at 60 days and 68.22% at 90 days. In addition, 128 avoided hospital events were recorded, and 86% of patients were very likely to recommend AZPHC to family or friends.
Discussion: Collaboration between a hospital palliative care team and a CBPC program resulted in high quality transitions across care settings and reduction in acute care utilization.

Keywords: acute care utilization; care transition; community based palliative care; palliative care

Introduction

PALLIATIVE CARE is increasingly available to patients who are seriously ill in the inpatient hospital setting. An estimated 72% of U.S. hospitals with at least 50 beds and 94% of hospitals with more than 300 beds[1] have an inpatient palliative care program.

The 2014 *Dying in America: Improving Quality and Honoring Individual Preferences Near the End of Life*[2] report explicitly states that care outcomes are optimized when palliative care begins early after the diagnosis of a serious illness and is available in all settings of care. The report further notes that a poorly managed transition of care from one setting to the next can result in a preventable readmission to the hospital or visit to the emergency department.[3–5]

The seriously ill patient population will experience a greater number of transitions as their disease progresses and they approach the end of their lives. Among Medicare fee-for-service decedents, health care transitions during the last three days of life increased from 10.3% in 2000 to 14.2% in 2009 and then decreased to 10.8% in 2015.[6] Out of concern for the financial burden on the health care system of the increasing number of late life transitions, combined with the negative impact on patient and family experience of care,[7–11] the Center for Medicare and Medicaid Services introduced a penalty that reduces payments to hospitals with a disproportionate readmission

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rate for key chronic illnesses. Subsequently, the Medicare readmission rate began showing a downward trend.[12,13]

While the risk of poorly managed transitions, particularly from acute care to home settings, has been generally acknowledged in the health care industry, there remains a limited availability of robust community based palliative care (CBPC) programs to manage high-risk patients who transition from the acute care setting.[14–17]

Methods

Setting

Our study was conducted in Maricopa County, Arizona with Arizona Palliative Home Care (AZPHC) and Honor Health Network inpatient palliative care teams. AZPHC offers coordination of care to late-stage, chronically ill patients struggling with daily living and disease management. Working concurrently with the patient's personal physicians, AZPHC engages the patient and family wherever the patient lives—at home, assisted living, or extended care facility. The AZPHC program integrates the structure and processes of care outlined by the National Coalition for Hospice and Palliative Care[18] as the basis for a robust, interdisciplinary CBPC service that bridges health care providers.

Table 1. Arizona Palliative Home Care Patient Eligibility Criteria

Patients who have primary medical diagnoses with high utilization of emergency department or hospital services are the target population for this interdisciplinary community-based intervention. Patients with poorly controlled, chronic medical diseases resulting in two or more hospital events[a] within a 12-month period are candidates to consider for palliative care.
Common diagnoses/conditions include • Cancer • COPD • Heart, liver or kidney failure • Advanced dementia • Advanced neuromuscular disease
Exclusions include • Patients with primary psychiatric diagnoses and/or chronic pain, who do not have life-limiting medical conditions • Patients who experience a one time, high cost event such as organ transplantation, CABG, joint replacements, and trauma

[a]Hospital events include inpatient hospital, emergency department and observation days.

CABG, coronary artery bypass grafting; COPD, chronic obstructive pulmonary disease.

Intervention

The AZPHC team consists of a Provider (Physician/Nurse Practitioner), Registered Nurse (RN) Case Manager, Social Worker, and Nursing Assistant. By engaging patients at home, the team has a front row seat to the human condition and can identify any social determinants that could lead to overutilization. The entire team is proficient in goals of care conversations and conduct these in an often more relaxed environment than the acute care setting. Supporting this team is a 24/7 telephonic service, where patients and their caregivers have access to a nurse who can triage their needs, including coordinating an urgent RN visit if indicated, irrespective of time of day.

The Honor Health Network includes five acute care hospitals, plus clinics and outpatient facilities. One of the areas of focus of Honor Health Network's quality improvement initiative has been to reduce hospital readmissions through effective care coordination, integration of inpatient palliative care programs in their acute care hospitals, enhanced communication and care planning between the hospital and primary care physicians, and ensuring safe well-managed transitions to postacute care settings.[19–21]

Collaboration between AZPHC and Honor Health Network inpatient palliative care programs began at the end of 2017 with a pilot at one of the acute care hospitals. The goal of the pilot was to evaluate how such a partnership, with a consistent referral process of identified high risk patients, would impact transitions of care and acute care utilization. A formalized process for transition of care for palliative care patients from the hospital to the community was established. Eligibility criteria for admission to the AZPHC program were disseminated to both teams (Table 1), and patients were identified by the hospital palliative care team or by case management. The referral was initiated by the hospital team, and the patient and family met with an AZPHC nurse while still in the hospital. If the patient desired services from AZPHC, they were admitted before discharge from the hospital.

Study inclusion

This study was conducted as a pre–post design without a control group. All patients who were referred to the AZPHC program from a participating Honor Health Hospital and who met the admission criteria for AZPHC were included in the retrospective medical record analyses.

Analysis of acute care utilization

Honor Health and AZPHC's electronic medical record systems (EMRs) were used to capture the frequency and patterns of each patient's acute care utilization pre- and postadmission to AZPHC. A report was built to collate all the data on an individual patient basis and capture the delta in utilization. In the pilot acute care utilization at 90 days pre- and postadmission was evaluated. When the length of stay (LOS) was found to be closer to 60 days, the decision was made to collect data 60 days pre- and postadmission moving forward.

An emergency department visit or hospital admission is an event that is easy to count, and cost is readily quantifiable. An event that does not occur—an avoided hospital event—is more challenging to document, although the cost savings and impact on patient well-being are apparent to palliative care professionals.[22–29]

The AZPHC interdisciplinary team has established a unique method to measure the avoided hospital event, which requires a consistent and reliable process with shared language and interdisciplinary input (Table 2). Data are gathered through clinician notes and reports in the EMR, verification using the Health Information Exchange (HIE), with the ultimate decision of whether an event has occurred determined by the medical director of the program, thereby establishing consistency.

Table 2. Avoided Hospital Event Criteria

1. Patient/family/caregiver specifically reference calling 911/going to the hospital
2. Patient is reporting symptoms that previously required hospital event
3. Non-scheduled visit is made during business or after hours
4. Transition to hospice care from home without terminal hospital event
5. Provider changes plan of care/medications due to AZPHC intervention
6. Social work interventions provided to patients who have demonstrated past overutilization due to social determinants of health

AZPHC, Arizona Palliative Home Care.

Statistical analyses

The frequency and patterns of hospital events for each patient, pre- and postadmission to the AZPHC program, were evaluated using a retrospective cohort design. A set of custom tools was developed to extract and present aggregated data from the EMRs. Each observation within the dataset contained the patient's admission date, discharge date, primary diagnosis, gender, and the count of hospital events pre- and postadmission within specified date ranges. Each patient was enrolled in the AZPHC program immediately following an anchor hospitalization, which was counted as a preadmission event. This evaluation aimed to test the null hypothesis that no difference exists in hospital event frequency between pre- and postadmission time frames.

After exclusionary criteria were taken into account, a total of 294 patients were identified over a 12-month period (June 2018 to May 2019) for analyses. A simple linear regression was used to examine if the patient's age and LOS on the program were significant factors in driving the decrease in hospitalization rates observed. Further analysis was conducted using analysis of variance to estimate the effects of these confounding variables on the differences in hospitalization frequency between pre- and postenrollment.

Significance was evaluated utilizing a generalized linear regression model, and the *p*-values were calculated using a paired *t* test with patient enrollment status as the independent variable. No attempts were made to develop predictive parameters or to evaluate the impact of multiple comorbidities on repeated hospital events. Significance was only evaluated for the frequency of hospital events pre- and postadmission. *p*-Values <0.05 were considered statistically significant, and results are reported with 95% confidence intervals.

Results

Pilot data analysis leads to expansion of collaboration

The initial collaboration was conducted between one Honor Health Network Inpatient Palliative Care hospital team and the AZPHC program. The pilot ran from November 27, 2017 to May 31, 2018 with a total of 64 admitted patients. Of those 64 patients, 26 transitioned to hospice and 3 died. Ninety-day pre- and postutilization data were captured. There were a total of 91 events pre- and 23 post AZPHC admission (a 75% decrease in utilization). The pilot was deemed successful and expanded to all acute care hospitals in the Honor Health Network starting June 1, 2018, utilizing the same process and criteria for admission as established in the pilot. Results are reported in Figure 1.

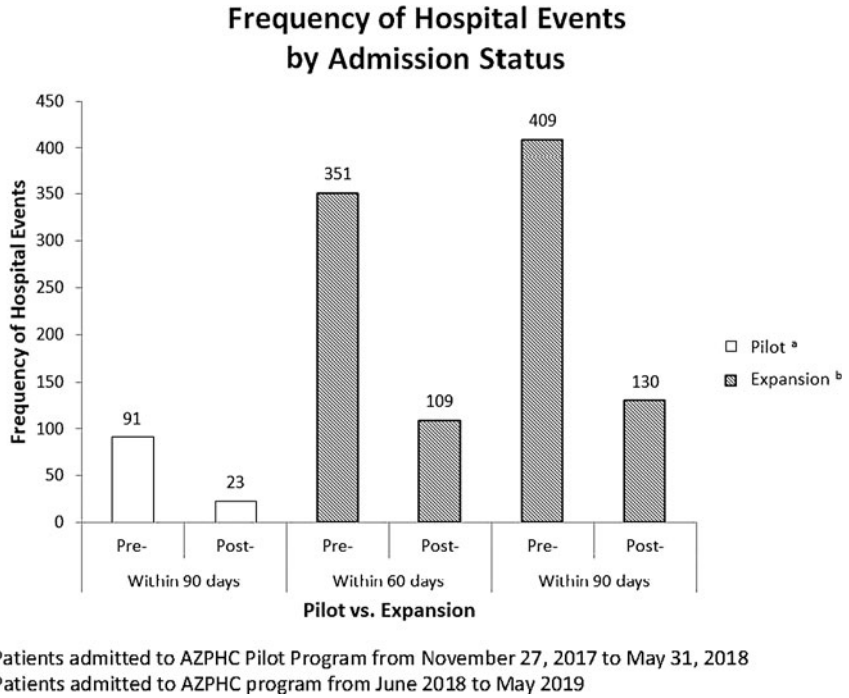

FIG. 1. Frequency of hospital events by admission status. [a]Patients admitted to AZPHC Pilot Program from November 27, 2017 to May 31, 2018. [b]Patients admitted to AZPHC program from June 2018 to May 2019. AZPHC, Arizona Palliative Home Care.

Cohort admission and baseline characteristics of studied population

Two hundred ninety-four patients were admitted to the AZPHC program from the five Honor Health Network hospitals. Eighty percent were in the 65 and older age group and had a mean LOS on AZPHC of 40 days. The short LOS reflects the severity of illness of this population. The top three diagnoses were cancer, heart disease, and pulmonary disease, as illustrated in Table 3.

Table 3. Patient Characteristics and Demographics

Characteristic (n = *294*)[a]	*Mean ± SD (range) (95% confidence, α: 0.05)*	*Frequency (%)*
Age		
Female	77.04 Years old	
Male	76.62 Years old	
15–44		13 (4.42)
44–64		45 (15.31)
65+		236 (80.27)
Gender		
Male		136 (46.26)
Female		158 (53.74)
LOS		
Male	43.62 ± 8.00 Days	
Female	38.80 ± 5.31 Days	
Diagnosis group		
Cancer/malignant neoplasm		116 (39.46)
Heart disease/failure, malformation of heart		53 (18.03)
Pulmonary diseases (COPD, respiratory failure)		37 (12.59)
Neurodegenerative diseases (Dementia, Alzheimer's, Parkinson's/ multiple sclerosis)		28 (9.52)
Kidney disorders/ ESRD		21 (7.14)
Other diagnoses		12 (4.08)
Stroke/ cerebrovascular disease		10 (3.40)
Cirrhosis/hepatic failure		8 (2.72)
Diabetes		5 (1.70)
GI disorders		2 (0.68)
Infection/sepsis		2 (0.68)
Discharge reasons		
Admitted to hospice		132 (44.89)
Patient goals met		50 (17.00)
Services no longer desired		38 (12.93)
Needs met by other programs		25 (8.50)
Unable to contact/no response		25 (8.50)
Patient expired		23 (7.82)
Moved out of service area		1 (0.34)

[a]Patients admitted to AZPHC program from June 2018 through May 2019.

ESRD, end-stage renal disease; GI, gastrointestinal; LOS, length of stay; SD, standard deviation.

AZPHC program services provided and staff contacts

The number of visits per individual discipline, including the number of outbound and inbound phone calls by an AZPHC Telehealth RN, was counted for each weekday. After-hours visits and phone calls (from 5 PM to 8 AM Monday through Friday and on Saturday, Sunday, and holidays) were tallied separately. The total number of patient contacts by each discipline was recorded for each patient's full LOS on the AZPHC program (Table 4).

Acute care utilization

The count of avoided hospital events was based on previously mentioned criteria (Table 2). The analyses revealed that there was a significant reduction in acute care utilization across the board. A total reduction from 351 to 109 and from 409 to 130 hospital events was observed at 60 and 90 days pre- and postadmission to AZPHC, respectively (Fig. 1). This trend continued after adjusting for other covariates, including the patient's age and LOS on the program; these variables had a negligible impact on driving a decrease in hospitalization frequency within 60 days of enrollment. A small correlation can be observed between LOS and decreased acute care utilization at 90 days postenrollment (p-value: 0.01); however, a deeper investigation must be made to understand what other confounding factors may drive this decrease (Table 5).

Table 4. Services Provided and Utilization by Patients

Services provided/utilization by patients	*Frequency*	*Mean*[a]
Staff contacts		
Physician/nurse practitioner	103	0.4
Physician/nurse practitioner (telemedicine visits)	12	0
Social worker	141	0.5
Social worker (phone visit)	11	0
Nurse (RN)	368	2.4
Nursing assistant	11	0
AZPHC Hospital Liaison	179	0.7
Telehealth RN contacts		
Inbound	151	0.6
Outbound	255	1.0
Total count	406	
After-hours contacts		
After-hours visits	51	0.2
After-hours calls	151	0.6
Total count	202	

[a]Mean number of services provided to all patients admitted to AZPHC program ($n = 294$) from June 2018 through May 2019 where each contact by staff disciplines is counted as one event. No adjustments are made for patient's LOS.

RN, Registered Nurse.

Table 5. Hospital Event Comparison

Hospital event comparison[a]	*Mean ± SD (range)(95% confidence, α: 0.05)*	*Frequency*[b]
Within 60 days		
Preadmission	1.198 ± 0.128	351
Postadmission	0.372 ± 0.082	109
Reduction in hospital events	*p*-value: <0.001	68.95%
Within 90 days		
Preadmission	1.396 ± 0.157	409
Postadmission	0.444 ± 0.098	130
Reduction in hospital events	*p*-value: <0.01	68.22%
Avoided hospital events[c]		Count
Captured between May 2018 and June 2019		128

[a]Patients admitted to AZPHC program from June 2018 to May 2019 ($n = 294$).
[b]Total hospital events include inpatient hospital, emergency department, and observation bed days.
[c]Sum of all avoided hospital events for patients within the date range.

Patient satisfaction

Volunteers contacted patients through telephone and asked five patient satisfaction questions. Patients were contacted 60 days after admission to the program to ensure adequate exposure to the services. Caregiver responses were solicited for patients unable to effectively communicate. The results of the patient satisfaction survey were overwhelmingly positive. In our net promoter score, 86% (31 of 36 respondents) were very likely to recommend AZPHC to family or friends (Table 6).

Discussion

Having a robust CBPC program for follow-up of patients referred by the hospital palliative care teams was associated with an increase in quality transitions with reduced acute care utilization. Many of the patients seen in the inpatient setting had medical conditions that met criteria for hospice enrollment, but they were not yet ready to make the transition during that hospital admission. Community-based follow-up with these patients by the AZPHC team allowed for an extension and furthering of the goals of care conversations and 24/7-interdisciplinary team support. The key components of the AZPHC program are: (1) a community based interdisciplinary team, (2) ongoing goal conversations, and (3) 24/7 RN support with visits as needed. A critical success factor was a RN liaison embedded within the hospital to meet with the patient before discharge and introduce the AZPHC program, thus building trust and improving patient retention.

A terminal hospital event is an inpatient event, which often results in poor outcomes at a high cost to the patient, families, payers, and hospitals.[30–36] A number of surveys and studies have shown that over 70% of Americans would prefer to die at home.[37–39] One of the goals of this collaboration is to avoid the terminal hospital event and allow for appropriate transitions before end of life, in the home setting.[40]

Many factors influence a patient's return to the hospital; however, a correlation between a reduction in the incidence of hospital events and participation of high-risk patients in a robust CBPC program is reasonable to assume.[41] Complex analytic tools and obtaining complete claims data can be expensive and untimely. A simple tally of hospital events can effectively stand in, absent claims data, to quantify the impact of a CBPC program. The reduction in utilization with the AZPHC program was significant.

CBPC can help the patient avoid an entire hospital event through earlier involvement and better management of care in the community setting.[42] For the hospital, the avoided readmission will reduce the risk of financial penalties and lowered quality ratings. For the health care payer, an avoided hospital event results in avoided or reduced expenditures, with presumably less expensive outpatient and community-based care provided instead.

Anecdotal evidence indicates that a CBPC may extend hospice LOS[43,44]; however, we did not see this with our patient cohort. We calculated the mean and median hospice LOS as 32 and 10 days, which is less than our hospice agency standard of 62 and 11 days, respectively. There is likely selection bias as the patients admitted to AZPHC are often very sick and self-selected with aggressive goals. The robust services provided by the AZPHC program may also delay transition to hospice.

The success of the AZPHC program is related to the robust nature of the service delivery model, where services are provided based on patient need and not on which services are

Table 6. Patient Satisfaction Survey Data

Satisfaction survey[a]	*Excellent*	*Good*	*Fair*	*Poor*	*N/A*
#1: How effective has AZPHC been in providing you with information about your illness?	18	12	2	1	3
#2: How effective has AZPHC been at providing support and education to your family and/or caregivers?	18	12	2	1	3
#3: How well has AZPHC staff done at responding to your concerns?	18	12	2	1	3
#4: How effective has AZPHC been at providing support and education regarding your health care goals?	18	11	2	1	4
		Very likely	*Maybe*	*Very unlikely*	*Don't know*
#5: Based on your experience, how likely would you be to recommend AZPHC to family or friends?		31	1	1	3

[a]Patient satisfaction survey data; satisfaction surveys were collected by volunteers at 60 days postadmission.

individually reimbursed. AZPHC has successfully negotiated a payment structure for enrolled beneficiaries with six Medicare Advantage and Medicaid plans, although there is no comparable funding for individuals enrolled in traditional Medicare.[45–47] For future models to be sustainable, all health plans will need to support CBPC programs for their covered lives.[48]

Limitations

Despite the data suggesting that CBPC may reduce the hospital event frequency of admitted patients, there are several caveats within the study design that should be acknowledged. Results of pretest/post-test study designs are subject to the potential for mean reversion bias. Furthermore, with such a complex population of patients, it is difficult to adequately address omitted-variable bias, as the effects of possible missing variables within our calculations may only be estimated by the variables that are included. To address this issue, a generalized linear regression model was utilized in our analyses; further studies should aim to utilize patients who were referred but ultimately not admitted to the program as a naturalistic control.

The count of both pre- and postadmission hospital events is dependent on the institution reporting data to the Arizona HIE. Reliance on the HIE may result in an undercount of both pre- and postadmission hospital events, as reporting to the state HIE is voluntary. While most major hospital systems participate in the HIE, notable exceptions include the Mayo Clinic Hospital, the Veteran's Administration Hospital, and out-of-state institutions. To mitigate the effect of this during statistical analyses, criteria were developed to exclude patients who were primarily receiving care at or had an anchor hospitalization at one of the aforementioned facilities. After exclusion of those patients, and those who opted out of personal reporting to the HIE, a final sample size of $n = 294$ patients was obtained and utilized for subsequent analyses.

The number of patients surveyed for patient satisfaction was low, due to limitations with the survey process. Volunteers were utilized to call patients once they had been on the program for 60 days, in anticipation that the patient and caregiver would have a good understanding of the program within that time period. However, with the mean LOS on AZPHC of ~ 40 days, this invariably impacted the number of patients contacted.

Conclusion

Collaboration between inpatient palliative care teams and CBPC programs can lead to high quality transitions across care settings for patients and their families. Meeting a patient in their own environment allows for a higher level of engagement and insight into social determinants of health. A greater level of team support and continued goal conversations can reduce acute care utilization and, where appropriate, allow for a smooth transition to hospice, thus avoiding a terminal hospital event.

In line with IHI's Triple Aim,[49] this type of collaboration should ultimately lead to improved experience of care, quality of life, and reduced cost for this very sick population of patients. Currently, literature on collaborations between inpatient palliative care teams and CBPC programs is sparse, and the true generalized effect on reduction in hospital events and the comprehensive nature of these programs remains to be explored.

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