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Reducing preventable hospitalizations: A study of two models of transitional care

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REDUCING PREVENTABLE HOSPITALIZATIONS: A STUDY OF TWO MODELS
OF TRANSITIONAL CARE

A Thesis Presented

by

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of

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ABSTRACT

Purpose: Transitional care is an emerging model of health care designed to decrease preventable adverse events and associated utilization of healthcare through temporary follow-up after hospital discharge. This study describes the approach and outcomes of two transitional care programs: one is provided by masters-prepared clinical nurse specialists (CNS) with a chronic disease self-management focus, another by physicians specializing in palliative care (PPC). Existing research has shown that transitional care programs with intensive follow up reduce hospitalizations, emergency room visits, and costs. Few studies, however, have included side-by-side comparisons of the efficacy of transitional care programs varying by health care providers or program focus.

Design: This is a retrospective cohort study comparing the number of Emergency Department (ED) visits and hospitalizations in the 120 days before and after the intervention for patients enrolled in each transitional care program. Each program included post-hospitalization home visits, but included difference in program focus (chronic disease vs. palliative), assessment and interventions, and population (rural vs. urban). Data from participants in the CNS program 9/2014 – 12/2014 were analyzed (n=98). The average age of participants was 69 and they were 65% female. Data was collected from patients from the PC program from 9/2014 to 4/2015 (n=71). Thirty participants died within 120 days after the intervention and were excluded, the remaining 41 were included in the analysis. Participants had an average age of 81 and were 63% female.

Methods: For the CNS program, a secondary analysis of existing data was performed. For the PC program, a review of patient charts was done to collect encounters data. A Wilcoxon Matched-Pair Signed-Rank test was performed to test for significance.

Findings: Patients in the CNS intervention had significantly fewer ED visits ($p < 0.005$) and hospitalizations ($p < 0.005$) in the 4 months post-intervention than the 4 months before the intervention. Patients in the PC program had a non-significant reduction in ED visits ($p = 0.327$) and a significant reduction in hospitalizations post-intervention ($p = 0.03$).

Conclusions: Both transitional programs have value in decreasing health care utilization. The CNS intervention had a more significant effect on ED visits for their target population than the PC program. Further study with randomized control trails is needed to allow for a better understanding of the healthcare workforce best fitted to enhance transitional care outcomes. Future study to examine the cost savings of each of the interventions is also needed.

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CHAPTER 1: INTRODUCTION

Introduction

There is growing recognition that the US healthcare system is costly, poorly coordinated and does not provide consistently high quality care to all citizens (IOM, 2001). These gaps in quality have been attributed to the increasing complexity and fragmentation of care along with the lack of significant advancement in information technologies allowing communication between health care providers. There is growing concern as healthcare costs continue to rise precipitously, health disparities grow, and many errors and deaths continue to be attributed to gaps in quality.

Health care reform in recent years has focused on ways to increase quality while decreasing costs, with increased efforts to improve care coordination and information sharing through electronic health records. Due to the growth of the aging population and those with multiple chronic conditions, there has been an increase in individuals with complex needs moving between multiple specialties and settings, also called care transitions. Care transitions are defined as a change in the setting of the provision of care, which most commonly refers to movement from the hospital to the community, but can also include other shifts such as a move to long term care (Coleman, 2003). They are significant as a time of increased risk for adverse events that contribute to higher rates of health care utilization and spending (Forster et al., 2003). Thus an emerging area of focus, and the subject of this study, is improving transitions of care.

Transitional care is defined as “a broad range of time-limited services designed to ensure health care continuity, avoid preventable poor outcomes among at-risk

populations, and promote the safe and timely transfer of patients from one level of care to another or from one type of setting to another” (Naylor et al., 2011, p. 747). Transitional care serves a distinct but complementary role to other services (primary care, care coordination, discharge planning, case management) in its time-limited nature and specific focus on managing the adverse outcomes of transitions. This care has been proven to effectively reduce hospitalizations (Verheagh et al., 2014) and in recent years many models of delivery have been examined to determine the most effective ways to deliver transitional care (Naylor et al., 2011). This study will examine the effectiveness of two models of care designed to ease transitions and reduce unnecessary rehospitalizations in the post-hospitalization period.

The scope of the problem

The publication of the IOM’s reports *To Err is Human* (1999) and *Crossing the Quality Chasm* (2001) created an increased awareness of gaps in patient safety and quality of care in the US. These reports outlined a system in which medical errors are prevalent and lead to increased morbidity, mortality and wasteful spending. These reports estimated costs associated with medical errors as high as between 19 and 26 billion dollars per year. The central cause for these errors is the fragmented, decentralized, and disorganized nature of the healthcare system which include “layers of processes and handoffs that patients and families find bewildering and clinicians view as wasteful” (IOM, 2001, p. 28), with one study finding that of up to eighty percent of errors are likely to be caused by poor hand-offs between care providers (Solet et al., 2005).

Poor communication between care settings is common during care transitions, and has been especially well-studied in the post-hospitalization transition period. Continuity of care, or seeing the same provider across healthcare settings (for example seeing a primary care provider in the hospital), has decreased in recent years (Sharma et al., 2008). One contributing factor is the rise in the use of hospitalists to manage hospitalized patients rather than community providers, which has benefits in reducing lengths of stay and increasing leadership in quality improvement, but increases the number of providers needed for patient hand-offs and continues to deepen the divide between inpatient and outpatient care (Pham et al., 2008). A systematic review of studies of inpatient and outpatient physicians' communication showed staggering deficits, with only 3-20% having direct communication (Kripalani et al., 2007). It also found that discharge summaries were largely unavailable at the first post-discharge visit, and when they were available often lacked crucial information such as diagnostic test results, treatment and hospital course, tests pending at discharge, and follow-up plans. Similar disconnects are seen in the communication between inpatient and home care nurses, who receive incomplete patient and discharge information (Hellesø, Lorensen & Sorensen, 2004).

This lack of communication contributes to the high number of adverse events in the post-hospital discharge period. Adverse events, defined as injury as a result of medical management rather than caused by disease, are estimated to occur in up to a quarter of patients post-discharge, with half of these events being preventable or ameliorable with appropriate follow-up (Forster et al., 2003; Forster et al., 2004). The most common are adverse drug events, which account for two thirds of adverse events

post-hospitalization (Forster et al., 2003). These adverse drug events can often be attributed to discrepancies between how medications were prescribed and taken. In a study of 375 community-dwelling older adults recently discharged from the hospital (Coleman et al., 2005), 14% of patients had a discrepancy with at least one medication post-discharge, at least half of which were due to system-related causes. These discrepancies increase with the number of medications taken and also, significantly, with heart failure, a diagnosis commonly leading to readmission. Post-discharge medication discrepancies are far more common in older adults over 65, with estimates ranging from 30 to 73% (Beers, Sliwowski & Brooks, 1992; Mansur et al., 2008).

A frequent and costly outcome of post-hospital adverse events is rehospitalization. In a study of all Medicare beneficiaries hospitalized from 2003-2004, for example, nearly one fifth were readmitted within 30 days, 34 percent were rehospitalized within 90 days, and 67 percent within one year, with only 10 percent of these readmissions likely to have been planned (Jencks, Williams & Coleman, 2009). The estimated costs of these rehospitalizations were about 17 billion dollars in 2004. The Medicare Payment Advisory Commission (MedPAC) estimates that up to two thirds of these readmissions may be preventable (MedPAC, 2007). A study of Medicaid beneficiaries showed a similarly high prevalence and cost of readmissions; they are roughly 9% of all admissions and costing each state an average of \$77 million in 2010 (Trudnak et al., 2014). Patient factors associated with readmission include previous readmissions, disease severity, multiple chronic conditions (Tilson & Hoffman, 2012), older age and functional limitations (Garcia-Perez et al., 2011), diagnoses of heart failure

(HF), chronic obstructive pulmonary disease (COPD), and psychosis (Jencks, Williams & Coleman, 2009), hospital-acquired acute kidney injury (Koulouridis et al., 2015), living in a high-poverty neighborhood, and a lack of social support (Hu, Gonsahn & Nerenz, 2014). Systems predictors of rehospitalizations include inadequate inpatient nursing staffing (McHugh, Berez & Small, 2013) and work-up error, defined as tests or procedures recommended at discharge that are failed to be followed up on in the outpatient setting (Moore et al., 2003).

The birth of transitional care

As a response to these challenges facing the health care system, advance practice nurses (APNs) were the first to develop and study transitional care. The earliest study of transitional care was directed at clinical nurse specialist (CNS) follow-up after early discharge of very-low-birth-weight infants (Brooten et al., 1986). The program included counseling and preparation for discharge, follow-up telephone contact, home visits and daily on-call availability. The infants who received the intervention were discharged an average of 11 days before infants in the control group without a difference in outcomes or utilization, which achieved an average net savings of \$18,560 per infant. The success of this program led Brooten et al. (1988) to create a more generalized model in which masters prepared nurses (APNs or APRNs) with specialization with a specific patient population would provide care from the point of discharge planning to the time of expected physiologic recovery. They proposed that this care would allow earlier hospital discharge, decreasing iatrogenic and social impacts of hospitalization, while also mitigating the possible adverse events following discharge.

This model was subsequently applied to elderly patients by Naylor and colleagues (1990). They described the intervention as “comprehensive discharge planning” by APNs, which began with a comprehensive assessment of discharge needs within 48 hours of admission and continued with telephone and home follow-up for two weeks post-discharge. A randomized control trial studying the effectiveness of the intervention (Naylor et al., 1994), showed that for the first six weeks following discharge, the experimental group had decreased hospitalizations and emergency room (ER) visits, increased time between hospitalizations, and decreased cost of care as compared with controls. This model evolved to become the Transitional Care Model (TCM), a key program to the spread of transitional care. This program and other key models will be explored in greater depth in Chapter II.

Theoretical framework

Transitions, proposed as a central concept to the discipline of nursing, (Chick & Meleis, 1986; Meleis & Trangenstein, 1994; Schumacher & Meleis, 1994), provide the conceptual framework for this research. Transitions were first defined in the nursing literature in a concept analysis by Chick and Meleis (1986) as “a passage from one life phase, condition, or status to another” (p.239). They describe basic elements of transitions, such as its three phases (entry, passage, and exit) and seven dimensions by which they can be described: duration, scope, magnitude, reversibility, effect, whether the transition was anticipated and voluntary, and whether it has clear boundaries. This concept analysis laid the groundwork for the development of the middle-range theory of transitions (Meleis et al., 2000), which characterized the nature of transitions by three

components: types, patterns, and properties. Types of transitions may be developmental, situational, health/illness related, or organizational. Patterning varies between single, multiple, sequential, simultaneous, related, and unrelated, and may interact with other transitions, such as a transition within the hospital or other healthcare provider organization (Geary & Schumacher, 2012). Properties of a transition include awareness of the transition experience, level of engagement in the process, change occurring and meaning of the change for the patient, confronting difference between expectation and reality, the time span of the transition, and critical points and events (for example for a family with cancer, the diagnostic period and cycles of chemotherapy). Within the framework of this theory, nursing interventions can be directed at any of the elements of transition process to improve patient responses and outcomes.

Integrating transition theory with complexity science, Geary & Schumacher (2012) developed the situation-specific theory of care transitions, defined as “hospital discharge or movement from one health care setting to another” (p. 236). Within this theory, the health care system is regarded as a complex system, meaning a system that is composed of entities who act individually according to a set of prescribed set of behaviors but collectively demonstrate complex behavior patterns. Within the context of care transitions, the agents within the complex system are multiple healthcare providers, the patient and family or caregivers, and the system exists within the context of societal and socioeconomic factors that can impede or facilitate the flow of information between these entities. By creating an open system with strong links between each of these entities and seeing the full picture of the complexity of a patient’s situation, nursing interventions

can create the “continuous healing relationships” (IOM, 2001) that are necessary for successful patient care transitions.

Statement of purpose

Transitional care is an empirically supported method to reduce readmissions post-hospitalization and many new financial incentives exist for hospitals to reduce these readmissions (Verhaegh et al. 2014). Thus, continued study of the effective elements of transitional care are needed to provide a strong evidence base for cost-effective programs as hospitals develop evidence-based practices to reduce readmissions. While transitional care using a variety of providers and models of care has been widely studied (Naylor et al., 2011), few studies offer a side-by-side snapshot of the effectiveness of different types of transitional care or compare different providers (Jeangsawang, Malathum, Panpakdee, Brooten, & Nityasuddhi, 2012).

The current study will describe the interventions and effectiveness of two intensive home visiting programs providing transitional care at two medical centers in a small rural state. The programs differ by providers, with one headed by APNs, specifically CNS's, the other by physicians. They also vary in focus, with the APN-directed program on chronic disease management, and the physician-led program on palliative care. The programs will be described in depth and patient outcomes will be evaluated by a retrospective study comparing the number of ER visits and rehospitalizations in the 120 days before and after the transitional care interventions.

Chapter II: Literature Review

This literature review will provide an overview of the breadth of research on the topic of transitional care. It will begin with a broad look at the political and economic context, specifically the pitfalls in the current system creating the need for transitional care and the policy incentives designed to encourage its use. The effectiveness of various models of transitional care will also be explored, as well as research into the differences between the care delivered by different healthcare providers. The review will conclude with a look at the recommendations put forth by systematic reviews of the literature and a research question in light of the evidence put forth in the review.

Financial and policy incentives to coordinate care

Poor care coordination is largely seen as a product of the current fee-for-service method of reimbursement to providers, which rewards volume over quality, effectively de incentivizing communication and coordination between providers (IOM, 2001). Before 2013, there were little financial incentives to increase quality of care to avoid preventable readmissions, as all readmissions were reimbursed unless the patient returned in 24 hours with the same diagnosis (Tilson & Hoffman, 2012). In fact, hospitals may lose income by preventing readmissions by reducing the number of billable discharges. Although Medicare has a condition of participation (COP) that hospitals have a discharge-planning process identifying patients at risk post-hospitalization and needs for post-acute services, many deficits persist in discharge planning and communication as outlined above.

Healthcare reform – Provisions of the Affordable Care Act

Recognizing that the payment system is a main contributor to fragmentation of care, health reform in recent years has worked to increase quality while reducing costs by providing financial incentives to reduce readmissions and improve transitional care. The Affordable Care Act (ACA) created the Hospital Readmission Reduction Program (HRRP), which beginning in 2013 penalized hospitals for higher than expected all-cause readmission rates within 30 days of discharge (Tilson & Hoffman, 2012), initially targeting select diagnoses of HF, pneumonia (PN) and acute myocardial infarction (AMI). In 2015 additional diagnoses of COPD, total hip arthroplasty (THA), and total knee arthroplasty (TKA) were added to the HRRP (Centers for Medicare & Medicaid Services (CMS), 2014). As of 2015 penalties for excess hospitalizations have been increased to 3% of base payments by Medicare (Tilson & Hoffman, 2012) and readmissions for these diagnoses are also treated as an indicator of the quality of a hospital's care and are publicly reported and available to consumers (CMS, 2014). Criticism for this program highlights the arbitrary nature of the 30 day readmission period and all-cause rather than preventable readmissions, as well as the potential harm in penalizing hospitals that serve challenging patient populations (Naylor, 2012). Recent research has shown that safety net hospitals (SNHs) are more than twice as likely than those who do not serve low income patients to be penalized by the HRRP (Marks, Loehrer & McCarthy, 2013). Despite the program's shortcomings and unintended consequences, it is seen as a driver of increasing development of transitional care programs to reduce preventable hospitalizations (Naylor, 2012).

The ACA also created the Medicare Shared Savings Program (MSSP), which allows Medicare providers to form Accountable Care Organizations (ACOs) which provide further financial incentive for providers to improve care coordination and prevent readmissions. An ACO “is a provider-led organization whose mission is to manage the full continuum of care and be accountable for the overall costs and quality of care for a defined population” (Rittenhouse, Shortell, & Fisher, 2009). Accountable Care Shared Savings Programs create financial incentives to keep costs of care low by allowing participants (providers) to capture shared savings when they keep costs below those projected for their patient population. The amount of savings they capture is determined by how well they meet quality objectives, which is designed to ensure that the quality of care remains high. Preventable hospital admissions for COPD, HF, and asthma are among the quality indicators for ACOs. The MSSP also provides support to improve communication between primary care, specialists, and hospitals serving the same patient population through financial incentives for technology improvements and care coordination (Morrison, in press). In the next generation ACO model, which begins to accept applications this year, providers will assume higher levels of financial risk for the cost of care, adding further incentive to keep costs of care low (CMS, 2015).

Financial incentives for improving electronic health records (EHRs) and for creating Health Information Exchanges (HIEs) to improve the ability to share patient information among health care providers are also among the provisions of the ACA. Financial incentives are dependent upon EHRs meeting objectives for meaningful use, which include criteria such as recording an updated list of active medications and

problems, built in drug-drug interaction checks, and generating lists of patients with chronic conditions for use in quality improvement. HIEs have been proven to assist in identifying patients who are frequent users of emergency rooms (Shapiro et al., 2013) so that interventions can be targeted to this population. The creation of the HIE has potential for improving transitional care by facilitating information sharing among inpatient and outpatient providers.

Another policy initiative to reduce readmissions through financial incentives currently being tested is bundled payments, a payment model in which itemized FFS payments are consolidated to a single payment to a provider. Starting in 1984, Medicare began to pay for acute hospitalizations according to a fixed fee prospective payment system (PPS) based on the patient's diagnostic related group (DRG) rather than on a FFS basis. This change was intended to incentivize reducing the length of stay and use lower cost services, but studies following its implementation showed that patients had an increased likelihood of being discharged in an unstable condition (Rogers et al., 1990). Thus the current PPS may contribute to the high rates of rehospitalization. Under some of the new models being test by the Bundled Payments for Care Improvement (BPCI) Initiative, the bundled reimbursement for care also covers readmissions within 30 days (Centers for Medicare and Medicaid Innovation (CMMI), 2012), meaning there would not be an additional reimbursement for short-term readmissions and thereby incentivizing increased innovation in reducing hospitalizations.

Improving upon existing models of transitional care is also addressed specifically by the ACA through the creation of the Community Based Care Transitions

Program (CCTP), which tests models to improve care transitions for high risk Medicare beneficiaries from inpatient care to other settings. The program began in 2011 and plans to spend \$500 million over five years to reduce readmissions and document measurable savings (Tilson & Hoffman, 2012). Eligible programs include hospitals with high readmission rates and community based organizations (CBOs) that provide at least one transitional care service. Examples of these services include: contact no later than 24 hours prior to discharge, timely post-discharge follow-up, comprehensive assessments, communication with outpatient providers, coordination and referrals to community services, engaging patients and families in chronic disease self-management, and comprehensive medication review (Naylor et al., 2011).

Models of transitional care

Within this economic and policy milieu, research has been focused on how to improve transitional care to prevent readmissions and other adverse events in a cost-effective manner. Many models of transitional care have been proposed, varying greatly by intensity, health care providers involved, constellation of services provided, and approach to care. The intensity of programs ranges from providing a single follow-up phone call (Kind et al., 2012; Dudas, Bookwalter, Kerr & Pantilat, 2001) to multiple home visits over an extended period of time (Naylor et al., 2004). While programs are generally focused on chronically ill patients at high risk for adverse events and readmissions, approaches to care vary, with emphasis commonly on chronic disease self-management (Naylor et al., 2004) and palliative care (Lukas, Foltz, & Paxton, 2013). The majority of transitional care programs in the literature are multidisciplinary teams with

care directed by advance practice nurses (Naylor et al., 1999), while other models rely primarily on registered nurses (Kwok et al., 2008), pharmacists (Dudas, Bookwalter, Kerr & Pantilat, 2001), social workers (Watkins, Hall & Kring, 2012), and physicians (Reese et al., 2003).

Model frameworks

The two most studied models of transitional care are Naylor's Transitional Care Model (TCM) and Coleman's Care Transitions Intervention (CTI). These models will be described in depth before exploring other models of transitional care.

Transitional care model. The TCM is the most often cited and studied model of transitional care (Naylor et al., 1994; Naylor et al., 1999; Naylor et al., 2004; Bradway et al., 2012; Naylor et al., 2014). The TCM protocol has evolved to contain several key elements outlined below. The care is directed by master-prepared APNs specializing in gerontology or knowledgeable about conditions affecting older adults. The TCM nursing patient visits begin on admission and continue daily during hospitalization, during which a comprehensive assessment of patient and caregiver needs, including goals, health status, health behaviors and skills, and social support takes place. The APN coordinates with providers to form a discharge plan, coordinate home health services, and build trust with the patient and caregiver.

Within 24 hours of discharge, the APN begins home visits, conducting assessments of the home environment and changes to health status to anticipate early warning signs. The APN also provides a bridge to the primary care provider, working collaboratively to optimize symptom management. APNs work with patients and

caregivers to increase their understanding of their illness, treatments and symptoms. Home visits continue weekly for the first month, then bimonthly, and APNs are available by phone seven days per week. The length of the intervention is the element which has changed the most over the course of the model's evolution, with early versions lasting two (Naylor et al., 1994) and four (Naylor et al., 1999) weeks post-discharge, which was later extended to three months (Naylor et al., 2004) or longer based on APN assessment for readiness for discharge from the program (Bradway et al., 2012). At discharge from the program, the patient, caregiver, and providers are provided with summaries of progression towards goals, unresolved issues, and recommendations.

Studies of the model, as applied to cognitively intact older adults (Naylor et al., 1994; Naylor et al., 1999), patients with heart failure (Naylor et al., 2004), and cognitively impaired older adults (Naylor et al., 2013), have consistently shown reductions in readmissions, ER visits, and costs of care. For example, in the RCT with heart failure (Naylor et al., 2004), the program led to an average savings of \$4845 per patient. The heart failure trial also showed short-term improvements in quality of life, physical quality of life, and patient satisfaction.

Qualitative study of the TCM model applied to cognitively impaired adults by Bradway and colleagues (2012) revealed themes of the barriers and facilitators to implementing care and ways that APNs go "above and beyond" in delivering this care. The three major themes that they encountered were 1) Having the necessary information, 2) Care coordination and 3) Caregiver experience. TCM APNs identified deficits in these

areas and acted as a bridge to heal the gaps through their clinical expertise and relationship building with patients and caregivers.

Care transitions intervention. The Care Transitions Intervention (CTI) was created in response to the IOM recommendation that care be patient-centered and multi-disciplinary. Its structure was generated based on the results of focus groups of the target population of older adults with chronic and acute-on-chronic health conditions. They reported that the major hurdles that they faced were poor information transfer between institutions, inadequate caregiver and patient preparation and self-management support, and a lack of personal empowerment to assert preferences. The resulting structure of the CTI is a focus on patient self-management guided by a Transition Coach (a geriatric nurse practitioner or RN) and four pillars guiding its implementation: medication self-management, using a patient centered health record, primary care and specialist follow-up, and knowledge of red-flags (Parry, Coleman, Smith, & Frank, 2003). The Patient Health Record (PHR) is a key part of the operationalization of the four pillars, as it encourages self-management and interdisciplinary communication leading to a consistent plan of care between providers. It is updated by the patient and contains information about medications, follow-up instructions, red flags, and patient concerns or questions. The goal of the Transition Coach is not to manage care for the patient, but to act as support and information to empower patients and caregivers and facilitate contact with other providers. The Transition Coach first makes contact during hospitalization, makes a visit at home within 24-48 hours of discharge, and phone calls at days 2, 7, and 14 post-

discharge. This general structure is applied to patients with various chronic conditions, stages of illness, information, and readiness for self-management.

Results of an RCT of 750 patients enrolled in the CTI showed the program to significantly decrease rehospitalizations at 30 and 90 days and reductions disease-specific rehospitalizations at 90 and 180 days as compared with controls (Coleman EA, Parry C, Chalmers S, & Min S, 2006). Further study of the cost effectiveness of the program in a retrospective cohort study of six Rhode Island hospitals showed that the program saved an average of \$3752 as compared with matched internal controls in the six months after hospitalization. Significantly, costs did not appear to be shifted to other types of healthcare utilization (Gardner et al., 2014).

Other models of transitional care

These two programs have created frameworks on which many programs have built upon or modified for their target patient populations and communities. While intensive chronic disease self-management has been the cornerstone of these programs, other programs have chosen other foci in their attempt to decrease rehospitalizations.

Restorative model. Given that one of the predictors of rehospitalizations is poor functional mobility, some transitional care programs have taken on a restorative model to rebuild functional capacity post-hospitalization. A study that compared standard home care with a restorative home care model that targeted physical impairments and ADLs with the goals of maximizing self-care found that participants in restorative care had decrease in hospital readmissions by one-third and required shorter lengths of home care episodes. In an RCT by Courtney et al. (2009), an exercise-based model that included an

assessment and plan of care developed by a physiotherapist and nurse as well as nursing telephone and home follow-up also showed significant reductions in readmissions as well as improvements in quality of life.

Palliative care model. The rates of rehospitalizations are high near the end of life, and costs of care for this population are high: the 5% of Medicare recipients who die during a given year account for 25% of all Medicare spending (Hogan, Lunney, Gabel & Lynn, 2000). Palliative care, with its focus on symptom management and patient-centered goals for quality of life, has been proposed as an alternative to reflexive aggressive treatment at the end of life. Transitional models of care have been proposed to improve accessibility of palliative care services in the home setting and to decrease hospitalizations that are inconsistent with patient goals for care (Stuart, 2003).

Palliative transitional care models have a similar format to the other home-based transitional care models, but include a focus on symptom management, care directed at patient goals, and advance care planning. In addition to outcomes measures of the programs' ability to reduce rehospitalizations and costs, they also consider outcomes such as how well symptoms were managed, whether they had advance directives in place, and whether the patient died at home (Labson et al., 2013). A retrospective study of a home-based palliative care consulting service provided by nurse practitioners showed significant reductions in hospitalizations, hospital days, probability of 30-day readmissions, and costs, but not ER visits (Lukas, Foltz & Paxton, 2013). A randomized control trial of 298 terminally ill patients receiving in-home palliative care vs. usual care showed that the in-home care led to greater satisfaction with care, decreased likelihood of

hospitalizations and ER visits, decreased costs, and increased likelihood of dying at home (Brumley et al., 2007).

Low-intensity models. Programs aiming for a more minimalist, low-cost approach have attempted hospital-based models in improving patient transitions, often involving telephone follow-up post-discharge. Dudas, Bookwalter, Kerr & Pantilat (2001) found that a follow-up call from a pharmacist two days after discharge asking whether they had obtained and understand their medications resulted in resolving medication discrepancies, increased patient satisfaction with their care and significantly decreased hospitalizations. A program initiated by the Veterans Affairs health care system targeted patients living in remote areas less accessible by home visits. Under this model, a registered nurse case manager has a single visit with the patient during hospitalization and one to four telephone follow-up calls, with goals of care adapted from the “four pillars” of the CTI model. A retrospective study of this program implemented when at a single Midwestern medical center showed that it decreased 30 day readmissions by about one-third and had savings of an average of \$1855 per veteran for the 18-month enrollment period (Kind et al., 2012). In a study of cognitively impaired elders, Naylor and colleagues (2014) found that a low intensity “Resource Nurse” intervention involving a hospital-based RN trained in managing transitions for this population was not as effective as the TCM intervention in reducing hospitalizations and did not show significant differences from controls. Other attempts to take transitional and rehabilitation services outside the home, such as a day hospital rehabilitation program,

have been shown to *increase* rehospitalizations and caregiver strain as compared with home rehabilitation programs (Crotty et al., 2008).

Variation in providers.

While many of the programs above have been directed by APNs, transitional care programs have used a variety of other providers to deliver care, with mixed results.

Registered nurses. Transitional care provided by registered nurses (RNs) has been found to be beneficial, with more limited effects on health care utilization and costs than programs headed by APNs. A study of community nurses providing transitional care to patients with HF in Hong Kong showed greater independence with ADLs and a lower median hospitalization rate but no significant decrease in costs as compared with randomly matched controls (Kwok et al., 2008). Further research showed no differences in hospitalizations but did find shorter hospital stays and an increased health related quality of life for those enrolled in the program (Yu et al., 2015). In a study directly comparing transitional care provided by novice RNs, expert RNs and APNs in Thailand (Jeansawang et al., 2012), the only difference found was a higher level of satisfaction for the care provided by APNs, without differences in hospitalizations, complications or functional ability. The authors did note, however, that the patients assigned to APNs had higher complexity health needs, which may predispose them to higher health care utilization.

Physicians. Study of physician-only transitional care is limited. A Hospitalist Home Visit Program (HHVP) was initiated with the rationale that perhaps non-physician health care professionals introduce a “problem of communication” to the primary care

provider (Reese et al., 2003). In a small pilot study the program was successful in identifying medication errors, with discrepancies found in 67% of patients, but did not show significant decreases in 15 day readmission rates or ER utilization. The authors noted that communication with the primary care provider was a persistent challenge despite their prediction that using physicians would facilitate information-sharing, suggesting that the difficulty in communicating to primary care is a problem inherent in the system rather than provider knowledge.

Pharmacists. Pharmacists have been utilized in transitional care to attempt to remedy medication discrepancies, highlighted above as a major reason for medical errors and readmissions. In addition to the pharmacist phone follow-up intervention described above (Dudas et al., 2001), a nurse-pharmacist partnership, in which a pharmacist collaborated with a visiting nurse association to provide medication discrepancy resolution, was also found to increase medication discrepancy resolution and decrease hospitalizations and outpatient visits by participants in the program (Setter et al., 2009).

Social work. Transitional care by social work has focused on the older-adult population making a safe transition from hospital to home. A Hospital to Home program appointed “frail elder navigators” who arranged services to transition to home during hospitalization, then visited within 72 hours of discharge to review discharge orders and medications, arrange follow-up, and evaluate safety risks in the home environment (Watkins, Hall & Kring, 2012). The program also provided for services such as transportation to medical appointments and homemaker assistance. The outcomes of the program showed a 61% reduction in hospital admissions as compared with the average

for county residents over 65 and an estimated cost reduction of \$628,202 per year. A lower intensity intervention involving telephone follow-up post discharge with a psychosocial assessment and reminders for follow-up did not impact hospital readmission or caregiver stress, but did increase post-discharge PCP follow-up as compared with usual-care controls (Altfield et al., 2013).

Lay volunteers. A study of a collaborative program with a nurse case manager and trained volunteers also had an impact on hospitalization rates (Wong, Ho, Yeung, Tam, & Chow, 2011). In a health-social partnership program, a nurse case-manager and volunteers trained in healthy lifestyle coaching, home safety, and community resources alternated visiting elders at home post-hospitalization. Results of the program showed significantly lower readmission rates among participants at 28 days as compared with controls, as well as increases in self-efficacy, satisfaction and quality of life.

Effective components of transitional care

Systematic reviews of this body of research have found key elements common to successful transitional care programs. In a systematic review of 21 transitional care programs, Naylor et al. (2011) found that the nine programs that effectively reduced admissions utilized nurses as the manager of care and six of those programs included in-person home visits. The programs that reduced readmissions for at least six to twelve months also emphasized patient self-management and connected acute and primary care providers. Another recent systematic review of 26 randomized control trials of transitional care interventions found that only high intensity models were effective in reducing short term (30 days or less) readmissions (Verhaegh et al., 2014). High intensity

interventions were defined by whether they reached at least a nine on a 16 point scale considering the following elements: an in-hospital component, self-management education, caregiver involvement, discharge planning, ongoing care coordination by a nurse, telephone follow-up, home visit within three days of discharge, number of scheduled home visits or telephone follow up, and the total duration of interventions. Their other findings were similar to the Naylor et al. (2011) review: programs that included a home visit within three days, care coordination by a nurse, and communication between the acute and primary care providers were the most effective in reducing hospitalizations. Other meta-analyses of programs to reduce 30-day readmission rates have not found consistent evidence to form recommendations (Hansen et al., 2011; Leppin et al., 2014). Recommendations from expert panels are summarized in the Appendix.

Summary of literature review

In summary, transitional care is a proven method to decrease healthcare utilization and costs for those at risk for rehospitalizations, and current political and economic forces support its development and implementation. The review of the literature endorses the effectiveness of programs headed by APNs with a chronic disease management focus, which consistently shown decreases in hospitalizations, ER visits, and costs. Other types of programs and those headed by other providers have shown to be beneficial but without a high level of evidence to support them. Lower intensity interventions based in the hospital have not been shown to be as effective as high intensity home visits.

Research question

No studies to date have directly or indirectly compared transitional care programs across program focus and very few have compared across provider type (Jeansawang et al., 2012). This study intends to fill this gap in the literature with a side-by-side description of two transitional care programs. Based on the current strength of the evidence supporting the use of APNs in transitional care, the APN-led program is expected to have significant outcomes in reducing healthcare utilization. As physician-only transitional care programs have not been widely studied, mixed results are predicted for this program based on previous study of palliative-focused transitional care.

REDUCING PREVENTABLE HOSPITALIZATIONS WITH TWO MODELS OF
TRANSITIONAL CARE

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Abstract

Purpose: Transitional care is an emerging model of health care designed to decrease preventable adverse events and associated utilization of healthcare through temporary follow-up after hospital discharge. This study describes the approach and outcomes of two transitional care programs: one is provided by masters-prepared clinical nurse specialists (CNS) with a chronic disease self-management focus, another by physicians specializing in palliative care (PPC). Existing research has shown that transitional care programs with intensive follow up reduce hospitalizations, emergency room visits, and costs. Few studies, however, have included side-by-side comparisons of the efficacy of transitional care programs varying by health care providers or program focus.

Design: This is a retrospective cohort study comparing the number of Emergency Department (ED) visits and hospitalizations in the 120 days before and after the intervention for patients enrolled in each transitional care program. Each program included post-hospitalization home visits, but included difference in program focus (chronic disease vs. palliative), assessment and interventions, and population (rural vs. urban).

Data from participants in the CNS program 9/2014 – 12/2014 were analyzed (n=98). The average age of participants was 69 and they were 65% female.

Data was collected from patients from the PPC program from 9/2014 to 4/2015 (n=71). Thirty participants died within 120 days after the intervention and were excluded, the remaining 41 were included in the analysis. Participants had an average age of 81 and were 63% female.

Methods: For the CNS program, a secondary analysis of existing data was performed. For the PC program, a review of patient charts was done to collect encounters data. A Wilcoxon Matched-Pair Signed-Rank test was performed to test for significance.

Findings: Patients in the CNS intervention had significantly fewer ED visits ($p<0.005$) and hospitalizations ($p<0.005$) in the 4 months post-intervention than the 4 months before the intervention. Patients in the PPC program had a non-significant reduction in ED visits ($p=0.327$) and a significant reduction in hospitalizations post-intervention ($p=0.03$).

Conclusions: Both transitional programs have value in decreasing re-hospitalizations. The CNS intervention also significantly reduced ED visits for their target population. Further study with randomized control trails is needed to allow for a better understanding of the healthcare workforce best fitted to enhance transitional care outcomes. Future study to examine the cost savings of each of the interventions is also needed.

Clinical Relevance: Transitional care programs have the potential to prevent unnecessary utilization of healthcare at the critical periods of transition that leave patients vulnerable to adverse events and poor outcomes.

Introduction

As countries throughout the world face increases in aging populations and chronic conditions, health care reform in recent years has focused on ways to increase quality while decreasing costs and improve care coordination and information sharing through electronic health records (Berwick, Nolan, & Whittington, 2008). A key area of focus is on individuals with complex needs moving between multiple specialties and settings, also called care transitions. Care transitions are defined as a change in the setting of the provision of care, which most commonly refers to movement from the hospital to the community, but can also include other shifts such as a move to long term care (Coleman, 2003).

Transitions are significant as a time of increased risk for adverse events that contribute to higher rates of health care utilization and spending (Forster, Murff, Peterson, Gandhi, & Bates, 2003). In a study of all Medicare beneficiaries hospitalized from 2003-2004, nearly one fifth were readmitted within 30 days, 34 percent were re-hospitalized within 90 days, and 67 percent within one year, with only 10 percent of these readmissions likely to have been planned (Jencks, Williams, & Coleman, 2009). The estimated costs of these re-hospitalizations were about 17 billion dollars in 2004, and the Medicare Payment Advisory Commission (MedPAC) estimates that up to two thirds of these readmissions may be preventable (MedPAC, 2007).

As a response to these challenges facing the health care system, advance practice nurses (APNs) were the first to develop and study transitional care, an empirically supported method to reduce readmissions post-hospitalization (Verhaegh et

al., 2014). Transitional care is defined as “a broad range of time-limited services designed to ensure health care continuity, avoid preventable poor outcomes among at-risk populations, and promote the safe and timely transfer of patients from one level of care to another or from one type of setting to another” (Naylor et al., 2011, p. 747). This care serves a distinct but complementary role to other services in its time-limited nature and specific focus on managing the adverse outcomes of transitions.

With the provisions of the Affordable Care Act (ACA), many new financial incentives exist for hospitals to develop programs to reduce hospital readmissions. The ACA created the Hospital Readmission Reduction Program (HRRP), which beginning in 2013 penalized hospitals for higher than expected all-cause readmission rates within 30 days of discharge (Tilson & Hoffman, 2012), initially targeting select diagnoses of heart failure, pneumonia (PN) and acute myocardial infarction (AMI). In 2015 additional diagnoses of COPD, total hip arthroplasty (THA), and total knee arthroplasty were added (Center for Medicare and Medicaid Services (CMS), 2014). As of 2015 penalties for excess hospitalizations have been increased to 3% of base payments by Medicare and readmissions for these diagnoses are also treated as an indicator of the quality of a hospital’s care and are publicly reported and available to consumers. The ACA also created the Community Based Care Transitions Program (CCTP), which tests models to improve care transitions for high risk Medicare beneficiaries from inpatient care to other settings. The program began in 2011 and plans to spend \$500 million over five years to reduce readmissions and document measurable savings (Tilson & Hoffman, 2012).

Due to these emerging incentives, in recent years many models of delivery have

been examined to determine the most effective ways to deliver transitional care (Naylor et al., 2014). The most consistently tested models of transitional care are the Care Transitions Intervention (CTI) (Gardner et al., 2014) and Transitional Care Model (TCM) (Naylor et al., 2014). Studies of the TCM model, as applied to cognitively intact older adults (Naylor et al., 1994; Naylor et al., 1999), patients with heart failure (Naylor et al., 2004), and cognitively impaired older adults (Naylor et al., 2014), have consistently shown reductions in readmissions, ER visits, and costs of care. For example, in the RCT with heart failure (Naylor et al., 2004), the program led to an average savings of \$4845 per patient.

Other models have varied greatly by intensity, health care providers involved, constellation of services provided, and approach to care. The intensity of programs ranges from providing a single follow-up phone call (Dudas, Bookwalter, Kerr, & Pantilat, 2001; Kind et al., 2012) to multiple home visits over an extended period of time (Naylor et al., 2004). The majority of transitional care programs in the literature are multidisciplinary teams with care directed by advance practice nurses (Naylor et al., 1999), while other models rely primarily on registered nurses (Kwok, Lee, Woo, Lee, & Griffith, 2008; Yu et al., 2015), pharmacists (Dudas, Bookwalter, Kerr & Pantilat, 2001), social workers (Watkins, Hall, & Kring, 2012), and physicians (Reese et al., 2003). Models expanding the focus from chronic disease self-management have focused on palliative (Lukas, Foltz, & Paxton, 2013) and restorative care (Courtney et al., 2009).

Systematic reviews of this body of research have found key elements common to successful transitional care programs. In a systematic review of 21 transitional care

programs, Naylor and colleagues (2011) found that the nine programs that effectively reduced admissions utilized nurses as the manager of care and six of those programs included in-person home visits. The programs that reduced readmissions for at least six to twelve months also emphasized patient self-management and connected acute and primary care providers. Another recent systematic review of 26 randomized control trials of transitional care interventions found that only high intensity models were effective in reducing short term (30 days or less) readmissions (Verhaegh et al., 2014). Similarly to the above study, programs that included a home visit within three days, care coordination by a nurse, and communication between the acute and primary care providers were the most effective in reducing hospitalizations.

Continued study of the effective elements of transitional care are needed to provide a strong evidence base for cost-effective programs as hospitals develop evidence-based practices to reduce readmissions. While transitional care using a variety of providers and models of care has been widely studied (Naylor et al., 2011), few studies offer a side-by-side snapshot of the effectiveness of different types of transitional care or compare different providers (Jeangawang, Malathum, Panpakdee, Brooten, & Nityasuddhi, 2012)

The current study will describe the interventions and effectiveness of two intensive home visiting programs providing transitional care at two medical centers in a small rural state. The programs differ by providers, with one headed by masters-prepared clinical nurse specialists (CNS), the other by physicians. They also vary in focus, with the APN-directed program on chronic disease self-management, and the physician-led

program on palliative care and managing complex chronic conditions. The programs will be described in depth and patient outcomes will be evaluated by a retrospective study comparing the number of ER visits and re-hospitalizations in the 120 days before and after the transitional care interventions.

Based on the current strength of the evidence supporting the use of APNs in providing transitional care, the APN-led program is expected to be effective in reducing healthcare utilization. As physician-only transitional care programs have not been widely studied, mixed results are predicted for this program based on previous study of palliative-focused transitional care.

Methods

Study Design

This is a retrospective descriptive study of patients who received one of two transitional care interventions: A CNS-led transitional care model (CNS) and a physician-led palliative care program (PPC). The study used a pre-post single-patient design without controls. The CNS program was evaluated using a secondary analysis of existing data. A chart review of encounters data for the patients of the PPC intervention was also utilized for data collection.

Interventions

CNS-led program (CNS).

Setting. The CNS program is based in a small rural community hospital in a town surrounded by a rural area in a small rural state. The median household income \$50,221 for this county and 13.9% of citizens live below the poverty level (US Census

Bureau, 2015a)

Clinicians. The providers of CNS are three masters-prepared clinical nurse specialists (CNS). They previously acted as the CNS's for the Emergency, Intensive Care, and Medical/Surgical Departments of the hospital and each have more than 35 years of clinical experience in these areas. They each have been trained in the University of Pennsylvania Transitional Care Nursing Program.

Participants. Patients in the CNS program were patients of one of six primary care practices from the surrounding community of the hospital. Each nurse collaborates with two primary care providers (PCPs) with the goal of enhanced coordination and communication and facilitating patients' willingness to accept the intervention.

Exclusionary criteria included: those with severe dementia who are unable to participate in self-management teaching, those who have behavioral health issue as their primary diagnosis, those who do not have risks for re-hospitalization, or who live in a long-term care facility. Patients who were not generally involved but were not as a rule excluded were those who are receiving home health services or are on hospice.

Program organization. Referrals generally came from the inpatient huddle with the case management nurse, but requests were also taken from collaborating PCPs and nursing homes. Visits began in the hospital, the first hospitalization day if possible, and continued daily until discharge. The goals of hospital visits were to establish contact, introduce patients to the transitional care program, and request that they would allow a home visit. The first home visit occurred 24-48 hours post-hospitalization, with a goal of initiation before the first office visit with the patient's PCP. Patients were seen at home or

a rehabilitation facility.

The initial assessment included a complete problem list and list of medications, risk factors for re-hospitalization, details of medication management, and a physical exam. Social support systems, patient understanding of their treatment plan, and self-management learning needs were also assessed. Goals were created for a safe transition home and a follow-up plan of care. Interventions included: medication reconciliation, review of discharge instructions, chronic disease self-management education, and evaluation of necessary services like housing, food, and transportation. The CNS may also have gone to primary care or other appointments with program participants to facilitate communication and common goals of care.

Visits generally occurred once per week for the first four weeks, then biweekly, with an average of two to three months until discharge. Some patients were only be seen once and discharged if their goals were met or they do not want further visits. The transitional care nurses were available by phone during weekday office hours. Patients were discharged when goals for follow-up and disease self-management were met and the CNS was confident that they would follow through with the plan created. A further description of the origin of the program and case studies of patients enrolled in the program is provided by Fels et al., (2015).

Physician-led Palliative Program (PPC)

Setting. The PPC program was based in an academic medical center in the principal city of a metropolitan area in a small rural state. The median household income is \$63,989 in this county, with 11.2% of citizens living below the poverty level (US

Census Bureau, 2015b).

Clinicians. The clinicians providing care were two physicians with specialization in Internal Medicine and Palliative care who had 26 and 10 years of experience in these fields. They concurrently acted as the medical directors of a sub-acute rehabilitation/long-term care facility and a hospice program, respectively. Both PPC clinicians had previous experience providing house calls to patients in their own practices.

Participants. Participants in PPC may have been patients of any PCPs, but lived in the surrounding communities of the academic medical center. There were no exclusions based on the patients' participation in home health, hospice, or living at long term care and they did not have to be previously hospitalized to receive the service.

Program Organization. Sources for referrals to PPC included the patient's PCP, hospitalists, or specialist physicians, hospital case manager, home health professional, or family member. The urgency of the referral is discussed with the referring source and the timing of the visit is planned accordingly. Hospitalized patients were not seen by the PPC physician prior to discharge. PPC visits were made wherever the patients reside, including home, residential care settings and nursing facilities.

At the first visit, immediate needs were assessed. There was not a standardized assessment applied to each patient. Interventions included treatment of acute illness, disease management, symptom management, medication management, home safety, goal clarification, advance care planning, and referrals to a higher level of care. The physicians prescribed medications or other interventions directly or made

recommendations to the patient's PCP. For selected home-bound patients with life-limiting illnesses for whom clinic burdens were overly burdensome, PPC physicians took on the role of PCP.

The number of home visits varied from one to 19; the mean number of visits was approximately three. The PCP office remained the point of contact for the patient and family throughout the PPC involvement in the case, and office staff facilitated communication with the PPC physician as needed. Discharge from the program occurred when the objectives of the PPC intervention were been met. Consultation is available during business hours Monday to Friday.

Analysis

Data from participants in the CNS program 9/2014 to 12/2014 were analyzed. Patients who died before the 120 day period after the intervention had already been removed from the data pool before the researchers received the data. Data was collected from patients from the PPC program from 9/2014 to 4/2015.

Patients' age and sex were collected. The outcome variables examined were the number of hospitalizations and ED visits 120 days before and after the interventions began. For the PPC program, data was also collected regarding date of death. A Wilcoxon Matched-Pair Signed-Rank test for non-parametric data was performed to test for significance. Means were reported rather than medians due to several medians being zero.

Ethics

The University Committees on Human Subjects approved the research project.

Research certification from the academic medical center was obtained to access patient charts and approval was obtained from the medical center's Nursing Research Committee.

Results

Patient Characteristics

For the CNS intervention, data was collected from 98 participants from the secondary data source. The average age of participants was 69 and there were slightly more females than males (65% female). For the PPC intervention, a chart review of 72 participants was completed. 32 of these participants died within 120 days after the intervention and thus were excluded from the analysis. The remaining 40 that were included had an average age of 81 and were 63% female.

Hospital and ED utilization

CNS. The mean number of hospitalizations per patient in the 120 days before the intervention was 1.03 per patient and 0.21 hospitalizations per patient after the intervention. Mean ED visits per patient were 0.93 in the pre-intervention period and 0.22 post-intervention. A Wilcoxon signed rank test indicated that there were significantly fewer hospitalizations in the 4 months post-intervention than the 4 months before the intervention ($p < 0.005$). This was also true for ED visits ($p < 0.005$).

PPC. Patients in the PPC program had a mean of 0.72 hospitalizations in the 120 days before the intervention and 0.34 in the post-intervention period. The mean ED visits were 0.67 pre-intervention and 0.28 post-intervention. A Wilcoxon signed rank test for significance showed that there were significantly fewer hospitalizations post-

intervention ($p=0.03$) and that the reduction in ED visits was not significant ($p=0.327$). See Table 1 for a summary of the results.

Discussion

This study documents the characteristics of two very different approaches to transitional care and despite these differences gives empirical support for each program's ability to reduce hospitalizations. One difference in outcomes is that the CNS program also showed a statistically significant decrease in ED visits, while the PPC program did not. While a direct comparison between the programs cannot be drawn due to multiple differences in patient populations, providers, and program structures, it is possible to explore the differences and characteristics of each program and comment on ways they may have contributed to the success of each program.

One clear difference is seen in the patient population, with the PPC program having an older population. A likely contributor to the increased age of the PPC participants is the palliative expertise of the providers and that individuals needing at home physician visits are more likely to be homebound and at the end of life. Previous study of an at-home palliative care consulting program provided by nurse practitioners similarly showed a decrease in hospitalizations but not ED visits post-intervention, and concluded that increasing on-call availability may improve the program's ability to reduce ED visits (Lukas et al., 2013). While there is evidence that palliative care reduces healthcare utilization at the end of life (Smith, Brick, O'Hara, & Normand, 2014), there is mixed evidence that palliative care effectively reduces ED visits (DiMartino, Weiner, Mayer, Jackson, & Biddle, 2014). Since it is not known how the ED visits for PPC

patients would have progressed without the intervention, further study with randomized controls is needed to determine whether it prevented increased utilization.

Another key difference is the providers' training and scope of practice. Nursing traditionally has taken on the role of care coordination and developed skill sets in this area, which may be why previous study of transitional care provided by masters-prepared APNs have yielded similar results of reductions in ED visits and hospitalizations (Naylor et al., 2014; Naylor, Aiken, Kurtzman, Olds, & Hirschman, 2011). There has been very little study of physician-only transitional care for comparison (Reese et al., 2003). Previous study of differences between nursing and physician approaches to care have found that nurses are more oriented toward rule-based or protocol-oriented care (McDonald, Waring, Harrison, Walshe, & Boaden, 2005). This difference is apparent in the design of the two transitional care programs, with CNS using a comprehensive assessment applied to each patient and a standardized visit schedule, while the physician-only program leaves the assessment and visit schedule open to their discretion. The structured nature of the CNS program, which identified patients during hospitalization and had a set schedule of visits, may be a contributor to the success of the CNS program at reducing ED visits and hospitalizations.

Another factor is the region, with the CNS program being in a more rural area with more limited resources and a population with a lower income and challenges to social determinants of health. The results of the CNS program are particularly significant given the variation of the socioeconomic status of their patients and the nurses own reports of managing social determinants of health.

Limitations

One methodological limitation of the study is the absence of a randomized control design, limiting the ability to conclude that the intervention directly led to the outcomes. Especially for PPC program patients with complex conditions who may have been declining more rapidly, a control arm would have been helpful. Control groups with similar illness trajectories would make it more clear whether utilization was prevented and whether the intervention was the driver of the decrease in post-intervention hospitalization.

The restrictions of the CNS program to exclude those receiving home health and hospice (a compromise made with local home health agencies to get community buy in and to prevent duplication of services), those with cognitive impairment, and those with primary mental health diagnoses may have left out some key groups at risk for re-hospitalization (Callahan et al., 2015; Piraino, Heckman, Glenny, & Stolee, 2012), which limits the generalizability of the findings.

The wide variety of differences between the two programs and their patient populations also limits a direct comparison of the two program's effectiveness. Risk adjustment was a potential option for direct comparison, but it was felt that it would not adequately account for the complexity of differences between the two patient populations. Future study with programs with more similar patient populations can give a clearer picture of the most effective components of transitional care.

Another limitation is that data on cost has not been collected which limits the ability to draw a conclusion that the programs have reduced costs. An assumption is

made that fewer ER visits and re-hospitalization decrease costs; however, further research with cost data could determine whether the programs were cost-effective by comparing the cost of salaries and support of the clinicians with the cost of health care utilization.

Conclusion

Despite these limitations, this study shows the potential for a variety of transitional care programs to decrease unnecessary utilization of healthcare at the critical periods of transition that leave patients vulnerable to adverse events and poor outcomes. A potential criticism of transitional care is that it creates yet another layer of provider hand-offs, further complicating care, leading to the question of whether adding extra providers is necessary or beneficial. Perhaps, improved primary care would eliminate the need for transitional care. This study contributes to the growing body of evidence that in our currently fragmented healthcare system, there is a critical need for transitional care programs which bridge a gap and prevent unnecessary and costly utilization of ER services and hospitalizations.

CNS	PPC
Led by a team of 3 clinical nurse specialists with expertise in inpatient care and training in transitional care	Led by two physicians with expertise in Internal Medicine and Palliative care
Small rural community hospital	Academic medical center in small city in metropolitan area
Focus on chronic disease self-management	Focus on managing complex chronic illnesses, palliative care
Hospital-based, see patients inpatient daily during hospitalization	Community-based, no visits during hospitalization
Standardized assessment and home visit schedule	No standardized assessment or home visit schedule
Patients seen at home or acute rehab, not if live at long term care. Patients on hospice or receiving home health usually excluded	Patients seen at home or long term care. Patients may be on hospice or receiving home health
Patient mean age 69	Patient mean age 81

Figure 1: Descriptions of the two transitional care programs

Table 1: Outcomes of ED visits and hospitalizations for CNS and PPC

Outcomes	Transitional Care Programs					
	CNS n=98			PPC n=41		
	Mean before	Mean after	p	Mean before	Mean after	p
ED visits	0.93	0.22	< 0.005	0.67	0.28	0.33
Inpatient stays	1.03	0.21	< 0.005	0.72	0.34	0.03

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Appendix – Panel recommendations

From 2008 to 2011, Medicare Quality Improvement Organizations (QIOs) collaborated with providers in local communities in 14 states to determine the underlying causes of readmissions and strategies for interventions targeted at improving the quality of transitional care (Tilson & Hoffman, 2012). Their findings were that the fundamental causes of patient readmissions were 1) poorly managed declining health conditions, 2) inappropriate medication use 3) and inappropriate use of emergency rooms. They attributed these problems to 1) a lack of patient and family engagement in post-acute care self-management, 2) a lack of standardized process for transferring medical responsibility for patients, and 3) ineffective and unreliable sharing of information among providers. To meet these challenges, Medicare QIOs recommended that organizations improve transitions by: 1) engaging and activating patients, 2) developing standardized discharge processes that include scheduling follow-up, and 3) ensuring that providers have timely information about the patient's condition and plan for follow-up care.

In 2009 the American College of Physicians (ACP), Society of Hospital Medicine (SHM), Society of General Internal Medicine (SGIM), American Geriatric Society (AGS), American College of Emergency Physicians (ACEP) and the Society for Academic Emergency Medicine (SAEM) published a Consensus Policy Statement addressing the need for improved transitional care (Snow et al., 2009). This report established a set of principles to address gaps in quality of transitional care and standards describing necessary elements for implementing these principles. The principles they outline included accountability; clear, direct, and timely communication of treatment

plans between providers; involving patients and family members at all stages and ensuring their awareness of their medical home and who is responsible for their care at each stage; and development of national standards to guide the establishment and quality improvement of transitional care. They propose standards that coordinating clinicians so that the current provider receives information in a timely way to be able to effectively treat the patient, timeliness being depending on contingent factors such as acuity and setting. They also develop a minimal set of data points that should be included on every transition record, including problem and medication lists, cognitive status, and pending test results. Further, this communication should be delivered on standardized communication forms that are accessible to patients. Responsibility is maintained by the sending provider until full communication is transferred to the receiving provider.