Preventing Hospital Readmissions: Evaluation of a Transitional Care Management Program

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A Project Report Submitted to
the Faculty of The School of Nursing at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the
Doctorate of Nursing Practice

Greensboro
2022

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Table of Contents

Dedication and Acknowledgements

I have been blessed with an army of people that have supported me throughout my nursing journey, but none so enthusiastically as my husband, Darren Moody. He is prouder of me than I am of myself and has been patient beyond measure for the past 13 years as I turned our lives upside down in the name of education. I'm done, honey, I promise (I hope), and I dedicate this paper to you. Thank you to Sue Rutland, my clinic supervisor, and Dr. Lara Pons, my supervising physician, for encouraging me to pursue my doctorate. I look forward to using the experience to keep searching for new and better ways to enhance outcomes for our patients. Finally, my heartfelt appreciation to Dr. Julia Kordsmeier, my faculty mentor at UNCG. Her gentle guidance helped me construct a doctoral project of which I am exceedingly proud. The lessons I have learned during my DNP program will serve me well as I strive to provide my patients with innovative and effective evidence-based care.

Abstract

Background: In 2012, the Centers for Medicaid and Medicare Services (CMS) introduced the Hospital Readmissions Reduction Program (HRRP). HRRP encouraged hospitals to improve rates of unplanned readmissions by reducing CMS payments to institutions that exceeded predetermined readmission rates for certain conditions. In 2018, a 457-bed suburban hospital in the southeastern United States launched a transitional care (TC) program to provide outpatient support during the first 30 days after hospital discharge and prevent unplanned hospital readmissions. **Purpose:** A summative evaluation of processes at a TC program was completed to identify the impact of the program on unplanned 30-day hospital readmissions. **Methods:** Questionnaires were completed by inpatient and outpatient program staff members to obtain details describing methods for referring patients to the program and interventions used to curtail unplanned readmissions. Electronic medical records of 608 patients discharged after hospitalization for sepsis, pneumonia, or chronic obstructive pulmonary disease in 2017, 2019, and 2020 were manually reviewed to compare readmission rates for program participants and non-participants. **Results:** Analysis of readmission rates were mixed. In 2019, readmission rates for both participants in the program (15.79%) and non-participants (16.25%) improved, with a statistically significant reduction for those in the transitional care program. In 2020, readmission rates for participants in the program increased (25%), though rates for non-participants continued to decline (13.79%). **Conclusions:** This TC program was comparable in structure to successful programs described in the literature. However, like the existing literature, impact of the program on readmissions was mixed.

Background and Significance

Healthcare costs in the United States are rising at an exponential rate. In 2016, national health expenditures in the U.S. exceeded $3 trillion, more than twice that of 2000 (Centers for Disease Control and Prevention, 2017a). The Affordable Care Act (ACA) of 2010 was implemented with the goals of expanding health insurance coverage and supporting innovative care delivery methods to decrease healthcare costs (HealthCare.gov, n.d.). The approval of the ACA prompted health insurance providers to design reimbursement strategies to ensure healthcare was effective while also being efficient.

As the nation's leading health insurance provider, the Centers for Medicaid and Medicare Services (CMS) cover almost 57 million enrollees at a cost of over $670 billion a year, including payments for inpatient hospital stays that have exceeded $135 billion dollars annually since 2010 (Centers for Disease Control and Prevention, 2017b). In 2012, as part of a nationwide initiative to reduce healthcare costs, CMS introduced the Hospital Readmissions Reduction Program (HRRP). The goal of HRRP was to encourage hospitals to improve their rate of unplanned readmissions by reducing CMS payments to institutions that exceeded a predetermined readmission rate for specific conditions including acute myocardial infarction, chronic obstructive pulmonary disease, coronary artery bypass surgery, elective total hip or knee arthroplasty, and pneumonia (Centers for Medicaid and Medicare Services, 2020).

Since the enactment of HRRP, readmission rates have exhibited some improvement. A study of hospital trends among Medicare beneficiaries showed a decrease in early readmission rates in conditions targeted by HRRP from 21.5% in 2007 to 17.8% in 2015 (Zuckerman et al., 2016). Additionally, the Medicare Payment and Advisory Commission stated that between 2010 and 2016, after the enactment of HRRP, readmission rates for acute myocardial infarction fell

3.0 percentage points, heart failure 2.2 percentage points, and pneumonia 1.7 percentage points (2018). HRRP, however, is not without its critics. Some state that HRRP ignores emergency department (ED) visits and observational stays and while inpatient readmissions may have decreased, ED visits and observational stays after hospital discharge have increased (Wadhera et al., 2019). Others assert that by focusing only on hospital readmissions, HRRP does not promote the recognition of and interventions for other cost-reducing patient-centered outcome measures such as functional status, patient's interest in self-management, number of falls, non-healing sores, etc. (Reeves et al., 2021).

After HRRP was introduced, hospitals across the United States began focusing on the discharge process to reduce unplanned readmissions and ensure patients avoid the negative impact of rehospitalization and healthcare systems avoid monetary penalties. Some hospital initiatives targeted specific objectives such medication adherence by providing counseling from a clinical pharmacist before discharge (Aniemeke, et al., 2017) or bringing medications to the bedside before discharge to improve medication compliance (Zillich et al., 2020). Others focused on improving nursing processes by using tools and checklists as part of discharge planning (Tah, 2019). Some hospitals redesigned their entire discharge process, (Mitchell et al., 2016), with some creating links to their electronic medical records (EMR) systems to increase consistency and reduce errors (Buckler et al., 2017). Now, some institutions are turning their attention to the days and weeks following discharge when the patient is transitioning back home.

Transitional care (TC) is a patient management concept that focuses on the 30 days immediately following discharge with a goal of ensuring the patient has the education and tools to stay healthy after hospitalization (Naylor et al., 2011). In 2013, CMS implemented billing codes for transitional care management (TCM) to better recognize and compensate follow up

contact with patients immediately after hospitalization. One examination of Medicare claims data showed TCM codes increased from 476,307 in 2013 to 1,358,697 in 2018, an increase of over 285% (Marcotte et al., 2020). The use of codes to identify TCM activities opened the door for hospitals and clinics to develop distinct TC programs.

Purpose

In 2018, a 457-bed community hospital in a suburban community in the southeast United States launched a program designed to provide close follow up care for the first 30 days after discharge to all patients considered at substantial risk for readmission. The program was an expansion of a successful initiative already in place for heart failure patients. The purpose of this DNP project was to perform a summative evaluation of this expanded transitional care program.

Review of Current Evidence

A literature review was conducted to identify strategies used as part of TC programs to prevent unplanned hospital readmissions. The CINAHL, PubMed, and Cochrane databases were used for the literature search. For the CINAHL and PubMed databases, the terms “transitional care,” “transition of care,” “readmission prevention,” and “readmission reduction” for years 2017 to 2022 were used. Additional filters included full text articles with abstracts in English language publications aimed at interventions for adults ages 18 and older. The PubMed search also specified articles detailing meta-analysis, randomized control trials, and systematic reviews. The search of the Cochrane database used the same timeframe but only included the term “readmission” since the terms listed above produced so few articles. The initial search yielded 532 articles from CINAHL, 5129 from PubMed, and 85 from Cochrane. After a review of the titles from all the CINAHL and Cochrane articles and the first 800 recommendations from PubMed, a total of 122 were chosen for abstract review. From these, 69 were selected for full

article review. Ultimately, 19 studies were deemed appropriate for inclusion in the program evaluation.

Current State of Knowledge

Although preventing readmissions has garnered substantial attention since the introduction of the HRRP by CMS in 2012, efforts to enhance the discharge process have been documented for decades. The importance of discharge planning and instructions for the prevention of hospital readmissions were discussed in detail in the early 1940's (Atkins, 1943), and the notion of transitional care was discussed in the literature in reference to psychiatric patients in the late 1970's (Furedy, Crowder, and Silvers, 1977). Since 2000, literature exploring transitional care interventions for the purpose of reducing readmissions and post-discharge emergency department visits has increased significantly resulting in a variety of comprehensive systematic and scoping reviews detailing various interventions designed to prevent readmission.

The TC programs found in the literature ranged from simple, single-person, one-time contact to complex systems of multidisciplinary calls paired with home visits and office visits. The following sections examine the most common outpatient interventions. Additionally, there is a brief discussion of other infrequent but notable interventions.

Interventions by Category

Phone Contact

Phone contact was the most common intervention. Early contact within 48 hours of discharge was seen in multiple studies (Mora, et al., 2017, Reese et al., 2019, Sherlock and Rounds, 2019, and Snyder et al., 2020). Frequency of phone contact varied between studies. Some used weekly calls for several weeks (Bailey, et al., 2019, Kim and Thyer, 2015, Reese et al., 2019, McWilliams et al., 2019), while others only conducted a single phone call (Kripilani, et

al., 2019, and Sherlock and Rounds, 2019). One study performed weekly phone calls for 4 weeks then monthly calls for an additional 20 weeks (Finlayson et al., 2018).

Phone call content varied between studies. Medication reconciliation was a frequent reason for phone contact (Bailey et al., 2019, Kripilani et al., 2019, LeBerre et al., 2017, Leppin et al., 2014, Mora et al., McWilliams et al., 2019, Reese et al., 2019, Snyder et al., 2020, Taylor, et al., 2020, and Tomlinson et al., 2020). In other readmission prevention programs, the phone contact was to assess needs the patient may have and perform additional education (Kripilani et al., 2019, Mora, et al., 2017, McWilliams et al., 2019, Reese et al., 2019, Rotenstein et al, 2021, Sherlock and Rounds, 2019, and Taylor et al., 2020). Others used phone contact to schedule or verify primary care or other office follow ups (McWilliams et al., 2019, Mora, et al., 2017, Rotenstein et al., 2021, and Taylor et al., 2020).

A variety of healthcare professionals were involved in phone contact. Nurses were used most frequently with advanced practice nurses (APNs) (Kim and Thyer, 2015, Leppin et al., 2014, Mora, et al., 2017, and Weeks et al., 2018), registered nurses (Kamermayer et al., 2017, LeBerre et al., 2017, Reese et al., 2019, Rotenstein et al., 2021, Sherlock and Rounds, 2019, Tomlinson et al., 2020, and Weeks et al., 2018) and licensed practical nurses (LPNs) (Bailey et al., 2019) conducting the phone contact in several studies. Finlayson et al. (2018) employed a specialized gerontic nurse. In some studies, specially trained transition coordinators performed the phone follow ups (Kim and Thyer, 2015, and Kripilani et al., 2019). Occasionally licensed pharmacy technicians or pharmacists performed the calls (Bailey et al., 2019, Leppin et al., 2014, Snyder et al., 2020, and Tomlinson et al., 2020). Clinical secretaries and social workers made the calls for some programs (Sherlock and Rounds, 2019 and Weeks et al., 2018).

Home Visits

Though not as common as phone follow ups, home visits were used in a few TC programs. Some home visits were performed within 48 hours of discharge (Mora et al., 2017) while others waited up to 4 weeks (Kim and Thyer, 2015). Some programs included multiple home visits at weekly or biweekly intervals to focus on education, medication reconciliation, care coordination, social needs assessments or exercise (Bailey et al., 2019, Kripilani et al., 2019, Leppin et al., 2014, and Mora et al., 2017).

Home visits were often performed by APNs (Kim and Thyer, 2015, Leppin et al., 2014, and Mora et al., 2017). Other members of the healthcare team such as LPNs, licensed pharmacy technicians, and social workers visited the home (Bailey et al., 2019, and Weeks et al., 2018). Occasionally, primary care providers, public health nurses and "care managers" performed the visits (Leppin et al., 2014 and Roper et al., 2017). One program used a paramedicine service for home visits (McWilliams et al., 2019) while another used a specialized gerontic nurse and an exercise physiologist (Finlayson et al., 2018).

Office Visits

The least common intervention seen in the literature was the office visit. The visits were planned for within 2 weeks of discharge (Layman et al., 2020, Mora et al., 2017, and Sherlock and Rounds, 2019) or as far out as 4 weeks after discharge (McWilliams et al., 2019, Mora et al., 2017, and Rotenstein et al., 2021). One study arranged follow up within a week of discharge with an advanced practice nurse, followed by a physician follow up 10 days later (Sherlock and Rounds, 2019).

Miscellaneous

There were less common but intriguing interventions in the literature. Several programs offered "transition hotlines" or some type of phone support for patients 7 days a week (LeBerre

et al., 2017, Mora et al., 2017, and Roper et al., 2017). Other programs automatically routed hospital records directly to the primary provider to facilitate continuity of care (LeBerre et al., 2017 and Roper et al., 2017). Some programs used peer mentors to improve self-care (Leppin et al., 2014). Others provided an exercise-based plan for elderly patients (Finlayson et al, 2018 and Leppin et al., 2014). One program provided home telemonitoring which sent daily information on vital signs to the primary care provider (Kim and Thyer, 2015). Another study used a transition care coordinator to facilitate and confirm early follow up with the primary care provider (Kripilani et al., 2019). In one program, an advanced practice nurse, who acted as a comprehensive transition coordinator, accompanied the patient and family to the primary care appointment (Mora et al., 2017). Lastly, one program conducted "complex case conferences" each week on recently discharged patients and offered routine palliative care counseling to patients (Roper et al., 2017).

Notable Observations from the Systematic Reviews

The systematic reviews included several interesting observations. One systematic review found that some studies had higher readmissions in the intervention (TC) group (Kamermayer et al., 2017). The theory for this unexpected result was that because the patients had easy access to medical follow up, they may have been directed back to the emergency department for early treatment. The authors posited that although this may not have prevented readmissions, it may have reduced length of stay of subsequent readmissions and overall cost (Kamermayer et al., 2017). Another study found a reduction not only in readmissions but in overall mortality at 3, 6, 12, and 18 months in those provided with TC services (LeBerre et al., 2017). Several systematic reviews determined that the more complex TC strategies (multidisciplinary programs including multiple phone calls with the patient plus home visits, etc.) reported the highest readmission

reductions (Dautzenberg et al., 2021, Leppin et al., 2014, Mora et al., 2017, Morkisch et al., 2020, and Ridwan et al., 2019). One systematic review concluded that transitional care interventions lasting more than one month were not statistically more effective at preventing rehospitalization than programs lasting one month or less (Weeks et al., 2018).

Impact on Readmissions

Overall, TC interventions improved hospital readmission rates, but the studies showed varying degrees of impact. The readmission rate under the TC program by Bailey et al. (2019) was reduced by 31% but the program was only used with high-need Medicaid, Medicare, and dual eligible patients that were high utilizers of inpatient and emergency services. Layman et al. (2020) noted decreased readmissions for COPD patients with 17% readmitted within 30 days of discharge in the control group versus 13% in the TC group. Snyder et al. (2020) also noted a reduction in readmissions for their pharmacist-based intervention with 15% readmissions in the control groups versus 9% in the intervention group. The LeBerre et al. systematic review (2017) showed no improvement in 30-day readmissions, though they noted lower readmission rates at 3, 6, 9, and 18 months. Kamermayer et al. (2017) and Morkisch et al. (2020) showed readmission improvement in some of their studies but *increased* readmissions after TC in others. Kripilani et al. (2019) showed a reduction in 30-day readmissions of 9.4%. McWilliams et al. (2019) did not see an overall difference in 30-day readmissions but did find a reduction in readmissions specifically in patients with primary diagnosis of sepsis. However, McWilliams et al. (2019) found that patients that had participated in the program were less likely to require admission to the intensive care unit (ICU) if they were readmitted. Mora et al. (2017) found statistically significant readmission reduction in 50% of studies in their systematic review. Though not reported as a percentage reduction, Leppin et al. (2014) noted improvement in the relative risk of

readmission, and Weeks et al. (2018), Reese et al. (2019), and Ridwan et al. (2019) showed improvement in the odds-ratio of readmission after TC interventions. Finlayson et al. (2018) noted improvement in 30-day readmissions, but the findings were only statistically significant for those in the most comprehensive version of the program.

In general, the literature demonstrated that transitional care interventions can reduce hospital readmission rates, but results vary widely, and no single plan guaranteed a specific level of readmission reduction that can be generalized to all patient populations. Transitional care programs ranged from simple to complex and any program must be developed based on available financial and personnel resources and tailored to the population for which it is designed. The evidence suggested that a readmission prevention strategy that included a multidisciplinary approach using phone calls, office visits, home visits typically provided the highest reduction in readmissions.

Conceptual Framework

HRRP tasked hospitals with reducing avoidable readmissions through improved communication and care coordination at the time of discharge (Centers for Medicare & Medicaid, n.d.). While this directive was well-intentioned, the acute care setting does not always allow for the comprehensive evaluation of a patient's unique set of circumstances to best address the factors that might lead to an early readmission. The Cumulative Complexity Model (CuCoM) developed by Shippee and colleagues (2012) theorized that patient outcomes are driven by the interaction of the demands on a patient such as job, family, self-care, caring for others, transportation, and attending appointments, known as *workload*, versus their resources and limitations such as literacy, social and financial support, stress, and physical limitations from a disease state, known as *capacity*. As health improves and deteriorates, resources change, and

responsibilities shift over time, workload and capacity fluctuate. An individual's workload and capacity at any given point are an accumulation of these fluctuating factors and can have a profound impact on their resilience to a medical challenge.

According to the CuCoM, careful consideration of the patient's current physical state, including the impact of comorbidities, and the ability to adhere to discharge instructions, such as obtaining new medications and attending follow up appointments, combined with myriad other challenges, have a direct impact on the patient's ability to weather an illness and stay out of the hospital. Though the medical issue that prompted hospitalization may be stable enough to warrant discharge, these other unidentified challenges may confound a successful post-discharge course. As a result, it often falls to resources in the outpatient setting to address challenges identified during hospitalization and discover and manage additional obstacles to health maintenance. CuCoM provided the conceptual framework needed to understand how and why barriers are formed so that the most appropriate resources can be assembled. Using CuCom as a guide, a properly designed transitional care program should include interventions that address both a patient's workload and capacity.

Methods

Design

This project was a summative evaluation of a transitional care program. The objectives were two-fold: 1) determine if the processes in place were supported by evidence-based literature, and 2) determine if patients participating in the program showed a lower rate of all-cause hospital readmissions. The data examined was both qualitative and quantitative. Qualitative data included descriptions of the staff roles and the duties performed in each role. The qualitative data were gathered using questionnaires developed by the project director. The

quantitative data included the all-cause 30- and 60-day readmission rates for patients ages 18 and up discharged with an initial primary diagnosis of pneumonia (PNA), chronic obstructive pulmonary disease (COPD), or sepsis. Quantitative data were gathered using a retrospective file review.

Translational Framework

Program evaluations should adhere to the standards of utility, feasibility, propriety, accuracy, and accountability (Yarbrough, et al., 2010). Utility means the evaluation is useful to the stakeholders. Feasibility is the level of effectiveness and efficiency of the evaluation. Propriety in an evaluation ensures the assessment is conducted in a proper, fair, and just manner. Accuracy certifies the results are truly representative of the findings from the evaluation. Accountability means the evaluation is conducted in manner that allows for and encourages internal and external meta evaluation (Yarbrough, et al., 2010). With these standards in mind, Daniel Stufflebeam's CIPP Model for Evaluation (CIPP) was chosen for this DNP project.

CIPP requires the assessment of context, inputs, processes, and products. To assess context, the initial concept proposal for the program was reviewed to understand stakeholder values. To assess inputs, a literature search was conducted to identify the disciplines used in effective transitional care programs and compared those to roles identified in the questionnaires completed by staff members at the program. To assess processes, the staffing model, information systems, office environment, and leadership used for the clinic were studied. A survey of members of different hospital disciplines to better understand how and why patients are referred to the program was conducted. Additionally, electronic health records were analyzed to track the frequency of utilization of the various services offered at the program. For the product evaluation, 30- and 60-day readmission rates of patients discharged in November and December

of 2017, before the program opened, were compared to readmission rates of patients discharged in November and December of 2019, after the program had been opened for over one year, and readmission rates of patients discharged in November and December of 2020, after the program had been opened two years and during face-to-face visit restrictions prompted by the COVID-19 pandemic.

One of the most attractive features of the CIPP model was its utility for both formative and summative evaluations. Although the primary aim of this project was to provide a retrospective evaluation of the program, the information gleaned from this assessment was used to understand what works and what does not work and identify ways the clinic can be valuable that may not have been considered during its original inception. The evaluation provided direction on additional goals for the clinic and helped develop a framework for ongoing evaluation and improvement.

Setting

The program evaluated was a clinic designed to reduce unplanned readmissions for any condition within 30 days of discharge for patients at high-risk of readmission. This grant-funded program was launched in January 2018 as a stand-alone outpatient clinic associated with a suburban hospital in the southeast United States. The clinic provided services to adult patients ages 18 and up discharged from the hospital after treatment for pneumonia, COPD, sepsis, or heart failure, or patients deemed to be at high risk of readmission due to advanced disease, multiple co-morbidities, frequent hospital or emergency department visits, or financial and social barriers to care. Services included physical exams and disease management by a nurse practitioner and additional support services by a registered nurse, pharmacist, respiratory therapist, registered dietician, social worker, and palliative care registered nurse. The clinic had

five exam rooms and had electrocardiogram and spirometry testing available. The clinic maintained a limited supply of antihypertensive and diuretic medications and intravenous fluids. Patients requiring additional management were transported to the emergency department at the parent hospital.

Sample

Two types of samples were used for this program evaluation: a patient sample and a staff sample. For the patient sample, information and analytics services available at the parent system for the hospital provided a Microsoft Excel spreadsheet with a list of patients discharged with a diagnosis of COPD, sepsis, or pneumonia for three different time periods: November and December of 2017, November and December of 2019, and November and December of 2020. The full list of ICD-10 codes used for the query is available in Appendix A. From these lists, random samples of distinct patients were generated using the random number generator tool on Microsoft Excel. All patients were age 18 or older and were discharged from the hospital with a primary diagnosis of COPD, sepsis, or pneumonia. There were no other exclusion criteria.

The staff samples came from both the staff members of the program clinic and hospital inpatient services. The program sample included all staff members in the clinic from all disciplines except for the advanced practitioners for heart failure patients. The heart failure patients were managed under the direction of a separate cardiology clinic and were not appropriate for inclusion in the study. The inpatient services sample from the hospital was a convenience sample of different disciplines that referred patients to the program. The sample included one internal medicine nurse navigator, two COPD navigators, two case managers, and one inpatient services provider.

Data Collection

Procedures

The program staff data and inpatient services staff data were collected using separate questionnaires designed specifically for two distinct groups (Appendices B and C). The questionnaires were emailed to the staff members' work email accounts. If there was no response within 2 weeks, the staff member was sent a remainder email with another link to the questionnaire. The staff members were given a total of 3 weeks to respond. Only the project director had access to the questionnaires and all data collection and analysis was performed by the project director. The questionnaires were scanned into a password-protected electronic storage location and hard copies were destroyed at the end of the project.

Patient data was reviewed and collected solely by the project director. Using the original spreadsheet provided by the information and analytics team from the hospital's parent system, the information was divided into three spreadsheets by year 2017, 2019, and 2020. Using the random number generator function available in Microsoft Excel, a random sample of approximately 200 cases was created for each time period. Each case was given an alphanumeric identifier based on discharge date. For example, a patient discharged on November 19, 2017, was identified as 171119A, with additional patients discharged on the same day assigned B, C, etc. No personally identifiable information was captured. A set of datapoints was then collected on a separate set of spreadsheets to be used for results analysis (Appendices D and E). All spreadsheets were stored in a password-protected digital storage environment.

Instruments

The project director developed all instruments used for this project. The staff questionnaires were designed to understand staff roles, interactions with patients, and workflow for comparison with best practices from the literature. Samples of the questionnaires are in

Appendices B and C. The data collection spreadsheet for the patient data captured age, sex, diagnosis (captured as COPD, PNA, or sepsis), number of co-morbidities (categorized as 0, 1, 2, or 3 or more), and number of readmissions. These same data points were gleaned from both the pre-program (2017) and post-program (2019 and 2020) data runs. Additionally, for the post-program files (2019 and 2020), details of how frequently ancillary services were used at the clinic was captured. See Appendices D and E for examples of the spreadsheets.

Data Analysis

Frequency statistics for Tables 1 and 2 were calculated using Microsoft Excel. Pearson Chi-squared and Fisher's Exact test calculations were performed with IBM SPSS Statistics version 28.0.1.0 (142). A p-value of 0.05 was used to determine statistical significance.

Results

The Program

According to the original project proposal, the program was an expansion of an already successful initiative developed for heart failure patients. The mission of the program was to improve the quality of life, outcomes, and readmission rates for patients with complex medical and social profiles by treating medical issues, addressing social barriers, and transitioning patients to the appropriate outpatient longitudinal care setting using a multidisciplinary approach. There was particular interest in patients with a hospital length of stay of 6 days or more and those with a history of two or more hospital stays in the previous 12 months, especially if the patient was discharged home or with home health. The clinic used the existing advanced care practitioner and pharmacist from the heart failure program, added a second advanced care practitioner, increased the dietician to full-time hours, and added a part-time social worker, full-time respiratory therapist, full-time medical office assistant, and full-time receptionist.

Patients followed by the program were adults ages 18 and older discharged from the hospital within the previous 30 days. The staff included two nurse practitioners (NPs), one Doctor of Pharmacy, one full-time clinical registered nurse (RN) that acted as an inpatient nurse navigator, one full-time clinical RN, one full-time palliative care RN, one full-time clinical respiratory therapist, one full-time medical office assistant, one part-time social worker, and one part-time registered dietician. Additionally, the program had access to a paramedicine service (PM), which provided home visits on as as-needed basis for medication reconciliation, blood draws for lab tests, patient education, and limited patient assessments. In the 2019 sample, 38 of 198 patients (19.19%) had at least one in-person visit at the program. In the 2020 sample, 32 of 206 patients (15.53%) had at least one phone, virtual, or in-person visit at program.

Procedures

Referrals

Patients presented to the clinic by referral only. Referrals were initiated in several ways. A nurse navigator (NN) employed by the program reviewed patient lists generated based on primary diagnosis and hospital utilization (number of inpatient stays or emergency department visits in a specified timeframe). The NN contacted the patient by phone during the hospital stay or soon after discharge to discuss program services and schedule an appointment. Case managers employed by the hospital referred patients based on insurance status, lack of primary care resources, social barriers to care, complex medical conditions, or increased hospital utilization. They contacted the NN or the program directly to arrange the appointment. Pulmonary navigators referred COPD and pneumonia patients or patients with social barriers to care by contacting the clinic, the NN, or adding the referral directly to the discharge instructions. Lastly,

inpatient providers could also originate referrals at their discretion by contacting a case manager, the NN, or adding the referral directly to the discharge instructions.

Clinic Roles

Each role at the clinic had a distinct function as part of the program's multidisciplinary model. In addition to scheduling appointments and fielding referrals, the NN scheduled PM visits and tracked readmissions. The medical office assistant gathered and documented vital signs, checked medication lists, and arranged free transportation when needed. The NP performed all clinical exams, adjusted medications, ordered and interpreted diagnostic tests, and initiated referrals to specialty providers. The pharmacist performed medication reconciliations, including comparing existing medications to recommendations from the latest medical guidelines, coordinated applications for patient assistance programs for medications, and facilitated communication with local pharmacies. The case manager facilitated referrals to community resources such as primary care options, programs for medication assistance, and provided resources for transportation, food, and shelter. Additionally, the case manager educated patients on Medicare, Medicaid, and disability processes, including providing extra one-one-one assistance filling out paperwork for those with literacy barriers. The clinical RN provided discharge teaching for the management of disease processes and medications, scheduled follow up appointments, performed dressing changes, administered oral medications and intravenous fluids when ordered, and fielded triage calls with patients in between appointments. The palliative care RN met with patients and their families at the discretion of the NP to discuss Do Not Resuscitate (DNR) status and goals of care and facilitate referrals for palliative and hospice services. The respiratory therapist provided pulmonary therapy equipment and education for incentive spirometers and positive expiratory pressure devices, facilitated walk tests for home

oxygen qualification, performed pulmonary function tests, and administered nebulizer treatments. Community paramedic (PM) visits were ordered routinely for all patients referred by the NN. Additionally, PMs made home visits to perform assessments, medication reconciliation, education, and blood draw for lab work at the discretion of the NP. The registered dietician provided disease-specific nutritional counseling for patients with heart failure and diabetes and provided nutritional counseling at the discretion of the NP for other concerns such as cachexia in pulmonary disease, failure to thrive, or obesity. Table 1 details the incidence of patients using the various disciplines during their time in the program.

Program Readmission Rates

The hospital developed the program to improve quality of life for recently discharged patients. There are myriad ways to define quality of life, but few of these definitions lend themselves to statistical measurement. Others may be measurable but require capturing data beyond the scope of the clinic's resources. As a proxy for quality of life, hospital readmission rates within 30 days of discharge and 31-60 days after discharge for the 2017, 2019, and 2020 samples were calculated. For 2019 and 2020, overall numbers and percentages for each time period as well statistics for those patients who had at least one visit with the program (Program) and patients that did not have contact with the program (No Program) were tabulated. Using 2017 as a baseline, 30-day readmission rates improved in 2019 for both those who used the program and those that did not, with those using the program showing slightly lower readmissions (Table 2). The improvement in readmissions for those participating in the program was statistically significant with a Pearson Chi-squared value of 0.005. In 2020, readmission rates continued to decline for those who did not participate in the program. For patients who participated in the program there was an increase in readmissions (Table 2). Although the 30-day

readmission rates for program participants patients were higher than anticipated, the readmissions from 31-60 days were lower than the 2017 baseline and lower than the patients participating in the program in both 2019 and 2020 (Table 2).

Due to the unexpected results for the 2020 sample, the project director performed an additional analysis of all patients participating in the program in November and December 2020 for any diagnosis. This extended analysis showed lower readmission rates for program participants in 2020 compared to 2019, but still showed a higher readmission rate than those not participating in the program in 2020 (Table 2).

Discussion

In 2012, CMS enacted the HRRP with the goal of reducing healthcare costs by penalizing entities that experienced excess hospital readmissions. Hospitals across the country began exploring interventions designed to reduce readmissions. The goal of this DNP project was to assess this program compared to other hospital readmission programs in the literature and determine if this program reduced unplanned readmissions at this hospital.

Comparison with the Literature

This program was very comprehensive compared to programs in the literature. The program used a variety of disciplines and offered home, phone, and office visits. In particular, the presence of a respiratory therapist and registered dietician were unique to this program. While having different disciplines in a program is not uncommon, having a dedicated pharmacist, social worker, and palliative care RN on staff in a single program was unique. The standard of care at the program was to follow patients for the first 30 days after discharge and most patients had 1 or 2 interactions with clinic personnel (Table 1). This was like most programs discussed in the literature, as was limiting follow up to the first 30 days after discharge.

Program effectiveness, defined as improvement in hospital readmissions within 30 day or discharge or 31-60 days after discharge, was mixed, with 2019 showing improvement in readmissions for program participants, but 2020 showing an increase in readmissions for program participants.

The results for 2020 were unexpected but there may be several explanations. In November and December of 2020, hospitalizations were at a peak during the COVID-19 pandemic. This could have resulted in patients waiting until they were more ill to present to the hospital for care, which could put them at a higher-than-usual readmission risk. Similarly, perhaps only the most ill patients decided to use the program since those that were feeling better may have decided not to risk clinic visits during the pandemic. Additionally, due to concerns about COVID-19 transmission, more phone visits were performed which resulted in less opportunities for an in-person physical assessment and different disciplines had to perform separate phone calls rather than work with a patient during a single in-person visit. The disjointed nature of the visits may have reduced the effectiveness of the program.

CuCom Framework

In the context of the Cumulative Complexity Model (CuCoM) developed by Shippee and colleagues (2012), the program's multidisciplinary model addressed both the patient's workload and capacity to reduce hospital readmissions. In particular, the case manager played a key role in addressing workload by conducting interviews with the patients which uncovered patient responsibilities that might have otherwise never been discussed, such as a patient's job duties or their role as a caregiver for their own parents, children, or grandchildren. The case manager and pharmacist often worked in concert to better understand a patient's capacity by learning about the patient's financial constraints compared to medication and outpatient follow up costs. This

enabled them to bridge gaps by accessing public and other assistance programs. Additionally, the availability of a palliative care nurse allowed the patient to better assess their values and goals to determine the treatment options with which they would most likely comply.

Lessons Learned

The project director learned some valuable lessons because of this project. First, the data collection process for this project was very labor-intensive. Although individual file reviews were critical for gathering the level of detail needed for a comprehensive program evaluation, waiting several years to perform the first program evaluation resulted in reviewing fewer files for each time period, in this case November and December of each calendar year, rather than being able to perform a more comprehensive review for an individual year. Second, I should have been more organized during my literature search. I intended to be methodical in my search technique but when I went back to refresh my literature review for the most recent information, I had not documented my search methods and reasoning for keeping or eliminating articles as diligently as I thought which resulted in recreating my search a second time.

Limitations

There were several limitations with this project. Since the case review was limited to patients from one hospital with diagnoses of only sepsis, COPD, or pneumonia, the results may not be valid for other locations or medical diagnoses. Only cases from two months of each calendar year were reviewed. There may be different readmission patterns at various times of the year, for instance, higher rates of COPD exacerbations in the winter months versus the summer. Similarly, a patient's desire to attend medical appointments may be different at various times of the year which may impact compliance with the program. The patient list generated for this study was based on the ICD-10 code listed as the primary diagnosis at discharge as determined by the

discharging physician. As a result, there was the potential for human error in this process. Patients treated for sepsis, pneumonia, or COPD may have been given a primary diagnosis code for another disorder. For instance, a sepsis patient could have been coded as cellulitis for their primary diagnosis. As a result, the lists generated may not represent the entire population of pneumonia, sepsis, and COPD patients available during the time periods studied. Lastly, a single individual, the project director, compiled and assessed all the data. Due to resource and time limitations, it was not feasible to have a second individual check the accuracy of the data collected. Although the utmost care was taken to collect data precisely, there was room for human error.

Relevance and Recommendations for Practice

This DNP project was the first and only comprehensive program evaluation of this program since it launched in January of 2018. Any program designed to enhance patient outcomes should undergo the scrutiny of a formal program evaluation to ensure the appropriateness of the program elements compared to existing evidence and verify the change in patient outcomes. Leaders in nursing practice should be constantly focused on improving processes. Systematically evaluating programs can ensure that the latest research is being used and that goals are being met.

The program evaluation revealed opportunities for improvement. Several disciplines were involved in less than 50% of cases (Table 1). Revisiting current protocols may help refine the processes used to refer patients to the different clinic disciplines to ensure that all services are being used to their highest potential. It was also noted that only one inpatient provider responded to the staff survey. Additional “marketing” of the program to the inpatient providers and staff nurses involved in the discharge process would increase awareness of clinic services and the

nurse navigator. This direct line of contact could result in a more comprehensive understanding of complex patient needs and reduce delays in addressing those needs.

Although the program was very comprehensive, the literature review identified additional interventions that could be valuable for this program. The case conferences identified in one program in the literature (Kim and Thyer, 2015) could be a way to bridge the inpatient and outpatient settings by providing a systematic avenue for communicating patient care barriers that need to be addressed. Enhanced home visits are another area for consideration. There are home visits provided by a paramedic service on the program's behalf but none by a medical provider. Medically fragile patients that may not be able to easily attend a clinic visit but need an in-person evaluation could benefit from such a service. Although this would not be feasible for most patients, perhaps in-home provider visits could be arranged if a patient met a set of standardized criteria.

There could be benefit in exploring the impact of this transitional care program beyond readmission prevention. The diverse disciplines available through this program enable patients to receive not only close follow up on their conditions and medication reconciliation, but opportunities for nutrition counseling, access to community assistance programs, and goals of care planning. Potential areas of study could include frequency of emergency department visits, length of stay of future readmissions, success in establishing a primary medical home, filing healthcare powers of attorney, living wills, and do not resuscitate orders, or post-program surveys to assess medication adherence or general quality of life.

In the context of advanced practice nursing, this program evaluation highlighted the importance of taking a holistic approach to patient care. For both acute care and primary care practitioners, using a multidisciplinary approach can only serve to benefit the patient. When

medical providers access expertise from social workers, pharmacists, and other disciplines to identify and address the patient's needs in total, they have a better chance to improve patient compliance with the treatment plan and curtail acute care visits, including hospital readmissions.

Conclusion

When CMS enacted the HRRP in 2010, hospitals across the country were put on high alert regarding unplanned readmissions. This transitional care program was developed to provide extra support for recently discharged patients to prevent readmissions. This program evaluation revealed a very comprehensive approach to readmission prevention with a constellation of disciplines rarely seen in a single platform. Although the impact on readmission rates was mixed, the data from this program evaluation indicated that using a multidisciplinary approach in the days and weeks immediately following hospital discharge had a favorable impact on potential hospital readmissions.

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Table 1: Frequency of Services Used for Each Discipline

Discipline	2019		2020	
	n	%	n	%
Nurse Navigator[a]	6	16	24	75
Nurse Practitioner				
1 visit	14	37	16	50
2 visits	18	47	14	44
3 visits	6	16	2	6
Case Manager	13	34	10	31
Pharmacist	32	84	20	62
Palliative Care RN[b]	1	3	14	44
Respiratory Therapist	6	16	4	13
Community Paramedics	8	21	9	28
Registered Dietician[d]	n/a	n/a	n/a	n/a

[a]A dedicated RN nurse navigator was added in August 2020. [b]A dedicated palliative care RN was added in September 2020. [c] The registered dietician worked almost exclusively with heart failure and diabetes patients so that discipline was not tracked for this project.

Table 2: Readmission Statistics by Program Utilization Status

Time Period	Cases reviewed	Readmitted 30 days		Readmitted[a] 31-60 days	
		n	*%*	*n*	*%*
2017	204	37	18.14	11	5.39
2019	198	32	16.16	18	9.09
No Program	160	26	16.25	17	10.63
Program	38	6	15.79[b]	1	2.63[d]
2020	206	32	15.53	17	8.25
No Program	174	24	13.79	16	9.20
Program	32	8	25.00[c]	1	3.13[e]
2020 All Program Participants	151	23	15.33	6	4.00

[a]If a patient was readmitted within 30 days and again 31-60 days after discharge, they are only counted in the 30-day numbers.
[b]Pearson Chi-squared value 0.005. [c]Fisher's Exact test value 0.116.
[d]Fisher's Exact test 0.206. [e]Fisher's Exact test 0.138.

Appendix A: ICD-10 Codes Used for File Identification

A40.9 – Streptococcal sepsis, unspecified

A41.0 – Sepsis due to Staphylococcus aureus

A41.5 – Sepsis due to other Gram-negative organisms

A41.8 – Other specified sepsis

A41.9 – Sepsis, unspecified organism

J15.6 – Pneumonia due to other Gram-negative bacteria

J15.9 – Unspecified bacterial pneumonia

J16.8 – Pneumonia due to other specified infectious organisms

J18.9 – Pneumonia, unspecified organism

J44.0 – Chronic obstructive pulmonary disease with (acute) lower respiratory infection

J44.1 – Chronic obstructive pulmonary disease with (acute) exacerbation

J44.9 – Chronic obstructive pulmonary disease, unspecified

Appendix B: Outpatient Staff Questionnaire

This questionnaire will be used as part of a DNP Project evaluating this hospital's readmission prevention program. This information will be used for the sole purpose of comparing roles at this clinic with those used by other transition care management and readmission prevention programs. No personally identifiable information will be gathered. The information in this questionnaire will not be used for individual performance reviews. All questionnaires will be destroyed after data analysis.

Participation is completely voluntary. By completing this questionnaire, you are giving permission to the project director to use the information for a program evaluation DNP project.

1. Job Title _____

2. Has this role been in place since the clinic opened in January 2018? _____ If not, when was the role added? _____

3. How many days a week do you work? _____ How many hours a week do you work? _____

4. Does your role require interactions with patients? _____ If No, proceed to question 9.

5. What % of patients do you estimate you have direct interactions with?
    a. Less than 25%
    b. 25-50%
    c. >50%

6. Of the patients with whom you interact, what % require multiple interactions over the course of their time with the clinic?
    a. Less than 25%
    b. 25-50%
    c. >50%

7. What % of interactions are in person?
    a. Less than 25%
    b. 25-50%
    c. >50%

8. What would be the % of in-person interactions without COVID restrictions?
    a. Less than 25%
    b. 25-50%
    c. >50%

9. The program was developed to prevent avoidable hospital readmissions and everyone on staff is integral to this process. What is it about what you do that you believe can have an impact on readmissions?

Appendix C: Inpatient Services Questionnaire

This questionnaire will be used as part of a DNP Project evaluating this hospital's readmission prevention program. No personally identifiable information will be gathered. The information in this questionnaire will not be used for individual performance reviews. All questionnaires will be destroyed after data analysis.

Participation is completely voluntary. By completing this questionnaire, you are giving permission to the project director to use the information for a program evaluation DNP project.

Role (MD/DO, Nurse Navigator, Case Manager, Other) _____

1. Referral to Internal Medicine provider at the program prompted by ("x" all the apply):

   Pneumonia ___

   COPD ___

   Sepsis ___

   DKA ___

   Other Medical (specify) _____

   Multiple admissions ___

   Insurance status ___

   Lack of primary care ___

   Other Nonmedical (specify) _____

2. Do you use a tool to determine risk of readmission? If so, which one?

   Do you automatically refer patients to the program based on readmission risk classification?

3. How do you refer a patient for the program?

   Halo message to a nurse navigator ____

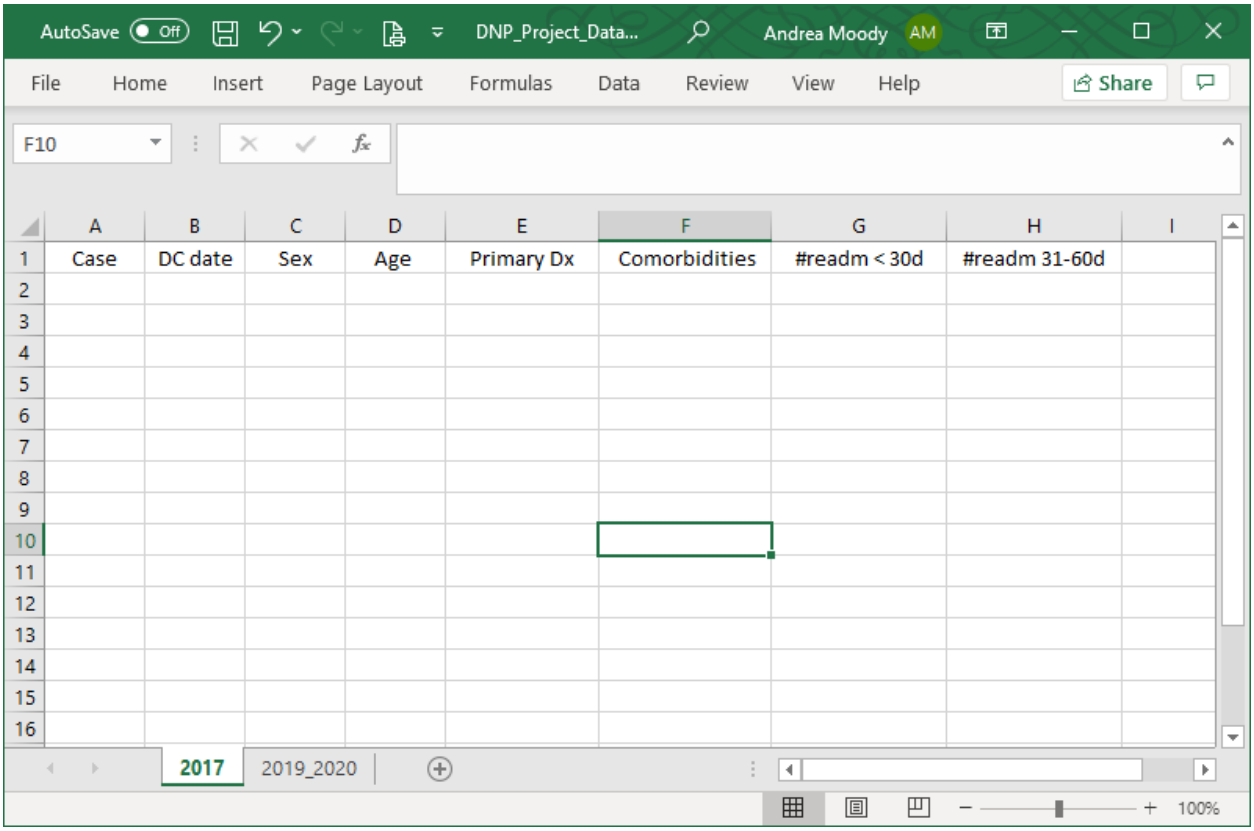
   Call directly to the program clinic ____

   Instruction given to floor nurse ____

   Added directly to discharge instructions (no other contact) ____

   Other (please specify) _____

Appendix D: Pre-Program Discharge Data



	A	B	C	D	E	F	G	H	I
1	Case	DC date	Sex	Age	Primary Dx	Comorbidities	#readm < 30d	#readm 31-60d	
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

Appendix E: Post-Program Discharge Data