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Evaluating a Discharge Bundle for Chronic Obstructive Pulmonary Disease

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MS, University of Maryland, Baltimore, 1992

BSN, Kent State University, 1986

Project Submitted in Partial Fulfillment

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Abstract

Acute exacerbation of chronic obstructive pulmonary disease (COPD) is one of the leading causes of hospital readmissions within 30 days. Frequent readmissions negatively affect hospital reimbursements and patient outcomes. Creative strategies, such as COPD care bundles, have been shown to reduce readmission rates according to existing studies. A COPD discharge bundle was developed and implemented at 1 community hospital in response to an identified problem with COPD readmissions. Evaluation of this quality improvement initiative was the purpose of this project study. The practice-focused question was: Have 30-day readmission rates changed following the implementation of a COPD discharge bundle prior to transitioning from hospital to home? The framework selected for this project was the model for improvement. Sources of evidence included existing hospital data to evaluate the change in readmissions. The chi-square test of independence was used to assess the difference in frequency of 30-day readmissions. Pre and post-bundle implementation comparisons of readmission rates showed a decrease for 3 out of the 4 groups compared; these results were not statistically significant. Analysis of the post-bundle intervention groups revealed lower 30-day readmissions for individuals who were bundle compliant versus noncompliant and for those who spoke with a pharmacist within 48 hours of discharge opposed to those who did not; these results were statistically significant. Continued use of the bundle and maintaining the role of the pharmacist was recommended. Reduction of readmissions within 30-days has positive social implications for hospitals through financial gains and for the COPD population by improving overall health outcomes.

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Dedication

As far back as I could remember, I have always been told that I could accomplish anything in life as long I was determined to do so. I would like to dedicate this DNP capstone to my parents who repeatedly told me that the "sky is the limit" and to whom I believe are responsible for starting me on the path that has led to this achievement. I am fortunate to have my mother for her continued love and support and also being able to share in this accomplishment. Although my father is no longer with us, I know he would be proud.

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Table of Contents

List of Tables

List of Figures

Section 1: Nature of the Project

Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive, nonreversible condition characterized by persistent airflow limitation that is not curable but is treatable (Global Initiative for Chronic Obstructive Lung Disease, 2016). It is the third leading cause of death in the United States and is responsible for approximately $50 billion dollars of annual health care spending (Prieto-Centurion et al., 2015). Acute exacerbation of COPD is identified as the leading cause of readmissions within 30 days of hospital discharge attributing to 800,000 hospitalizations per year affecting approximately 1 in every 5 patients (Krishnan et al., 2015; Prieto-Centurion et al., 2015). Ranked as the third highest expenditure among Medicare beneficiaries, COPD is associated with a substantial economic burden (Krishnan et al., 2015; Prieto-Centurion et al., 2015). The Affordable Care Act initiated the Hospital Readmission Reduction Program (HRRP) in October 2012 under the oversight of the Centers for Medicare and Medicaid (CMS) to reduce payments for all-cause readmissions within 30 days for acute myocardial infarction, heart failure, and pneumonia (CMS, 2016). In October 2014, the HRRP expanded its list of conditions to include acute exacerbation of COPD (CMS, 2016).

Payment incentives are driving healthcare organizations to develop creative solutions through the implementation of new programs or improving processes in the delivery of care (Krishnan et al., 2015). Development and implementation of evidence-based care bundles is a method identified in previous studies to decrease readmission

rates for patients with a diagnosis of COPD (Hopkinson et al., 2011; Matthews, Tooley, Nicholls, & Lindsey-Halls, 2013; Ospina et al., 2016; Parikh, Shah, & Tandon, 2016). Care bundles utilize established evidence-based guideline recommendations to address the patient education and self-management skills necessary to prepare a patient for discharge from an acute care setting (Hopkinson et al., 2011). Although high readmission rates are attributable to several factors, one of the most significant is inadequate preparation of patients and their caregivers during the discharge process (Kelly, 2011). Readmission rates can be lowered by 30% for patients who receive and understand their health care instructions upon discharge (Agency for Healthcare Research and Quality [AHRQ], 2014).

In *Crossing the Quality Chasm*, the Institute of Medicine (2001) recommended that organizations reform their delivery of care processes to mirror best practices to more effectively meet the healthcare needs of those with a chronic condition. Applying strategies such as instituting an evidence-based COPD care bundle upon discharge can be adopted to improve the process of acute care patient education and the preparation of the patient for self-management at home. Such an initiative can meet the challenges of COPD population health management, and therefore, impact positive social change within the community served.

Problem Statement

The problem I addressed with this doctoral project was the concern that readmission rates within 30 days for those patients with a diagnosis of COPD were higher than predetermined internal benchmarks at the project site. The site was a 281-bed, not-

for-profit, acute care community hospital located in the northeast region of the United States. As previously stated, financial penalties are implemented from CMS for COPD readmissions within 30 days, and this has potential to impact reimbursements for this acute care facility. From an economic perspective, maintaining readmission rates below the internal benchmark was the driving force behind this identified problem. However, the effects of frequent hospitalizations have been associated with poorer overall health outcomes of the individual as well. Acute exacerbations of COPD have been linked to deteriorating lung function, and therefore, hastening the progression of the disease (Criner et al., 2015; Guerrero et al., 2016). These exacerbation events lead to worsening dyspnea which has been found to negatively affect activities of daily living and health-related quality of life (Criner et al., 2015). Also, the risk of mortality is shown to have a progressive increase in COPD patients readmitted within 30 days compared to those who are not (Guerrero et al., 2016). Therefore, avoiding readmissions within 30 days can potentially not only lessen direct healthcare costs and financial penalties but also promote better health outcomes for the patient with a diagnosis of COPD. These health improvements are reflected in slowing the progression of declining lung function, decreasing mortality risk, and positively affecting health-related quality of life (Guarascio, Ray, Finch, & Self, 2013).

Avoidable readmissions are an indication of inefficient and poor-quality care (Kelly, 2011). The Doctor of Nursing Practice (DNP) role has the capacity as a leader to positively affect individual and population health outcomes through quality improvement initiatives (American Association of Colleges of Nursing, 2006). Evaluating approaches

for best care delivery, such as an evidence-based COPD discharge bundle, is an appropriate leadership role for the DNP. Excellence in practice is emphasized through the education of patients diagnosed with COPD regarding their disease management. Adherence to pharmacological and nonpharmacological treatment can reduce exacerbations, and therefore, slow disease progression and improve health-related quality of life (Bryant et al., 2015).

The Purpose Statement

The purpose of this scholarly project was to evaluate the application of a COPD evidence-based discharge bundle at the acute care project site. The practice-focused question was: Have 30-day readmission rates changed following the implementation of a COPD discharge bundle prior to transitioning from hospital to home? Before the initiation of the bundle, patient education and teaching of self-management skills were not standardized for patients admitted with a COPD diagnosis at this facility and neither were follow-up phone calls after discharge. It is the responsibility of the interdisciplinary team to provide COPD education and prepare the patient for discharge. Each member of the team focuses on what they perceive as most important, which may not be in alignment with established best practice guidelines. At times, valuable information may be omitted due to a lack in coordinated efforts. In an effort to close the gap between the existing patient discharge preparation practices and incorporate what is recommended by national and international guidelines, a multidisciplinary task force developed an evidence-based COPD bundle at this project site. The bundle components provide a

standard and collaborative approach to discharge preparation and promote adherence to evidence-based practice (Kirshnan et al., 2015).

Nature of the Doctoral Project

The sources of evidence I obtained for this doctoral project were from existing data collected by the hospital system and by the outcomes management department for this acute care facility on readmissions within 30 days. At the hospital system level, internal reports are generated by the hospital system on a monthly basis for all diagnoses impacted by HRRP, which includes COPD. Raw data are recorded for the number of readmissions and discharges per month for each hospital in the system. Percentages are obtained from this data and trended for two groups based on payment process defined as either all Medicare paying individuals or all other payment methods including Medicare. I obtained baseline data on 30-day readmissions rates from two timeframes and compared them to subsequent monthly reports post-implementation to determine if readmission rates changed following the adoption of the bundle.

At the project site level, the outcomes management department collected and maintained existing data specific to the COPD discharge bundle. This information served to evaluate if 30-day readmissions changed post-implementation for individuals receiving the bundle compared to those who had not. In addition, it permitted further assessment of specific bundle interventions on readmission rates. Standardization of the discharge process through the implementation of a COPD bundle has the potential to reduce readmissions, per results from documented studies (Hopkinson et al., 2011; Matthews et al., 2013; Ospina et al., 2016; Parikh et al., 2016).

Significance

Approximately 20% of all COPD discharges are re-hospitalized within 30 days due to an acute exacerbation event (Guerrero et al., 2016). Patients and their caregivers are important stakeholders as this issue affects them directly. Avoiding acute exacerbation events slows disease progression and improves health-related quality of life (Guarisco et al., 2013).

Nursing and other healthcare professionals on the interdisciplinary team at the project site are invested in facilitating the coordination of care and providing education during a hospital stay that prepares this patient population for self-care management at home. The intent of the bundle was to provide a practical approach to properly educate patients on disease self-management prior to discharge by employing evidence-based interventions. When patients understand their discharge instructions, the repeated utilization of hospitals and emergency rooms are less likely (AHRQ, 2014). Each readmission that is equal to 30 days or less is subject to financial penalties; consequently, the hospital administration team is another key stakeholder committed to resolving the problem. The literature has supported the implementation of COPD evidence-based bundles in preparing a patient for discharge and reducing readmission rates (Hopkinson et al., 2011; Matthews et al., 2013; Ospina et al., 2016; Parikh et al., 2016). If the implementation of the COPD bundle is successful in reducing readmission rates at this one acute care facility, the intervention has the potential for adoption throughout the affiliated hospital system. Sharing this quality project as a best practice initiative with the healthcare community through dissemination could impact positive social change for

the COPD patient population beyond this facility and hospital system by improving overall health outcomes as a result of less hospital readmissions.

Summary

COPD is a treatable but not curable chronic condition (Guarascio et al., 2013). According to HRRP (2016), acute exacerbation of COPD is the leading cause for hospital readmissions within 30 days and is subject to hospital reimbursement financial penalties. Avoiding acute exacerbation events can potentially be accomplished through appropriate patient education and self-management skills that are congruent with evidence-based practice recommendations during hospitalization in preparation for discharge (Prieto-Centurion et al., 2014). Development and implementation of an evidence-based COPD discharge bundle can be a useful strategy to address the needs of this patient population prior to transitioning from hospital to home because it encourages standardization of care and incorporates a multidisciplinary healthcare team approach. Improving the discharge process for patients with a COPD diagnosis can prove to be beneficial for this acute care facility.

The next section discusses the framework for this scholarly project, the relevance to nursing practice and the review of literature on disease specific recommended interventions for COPD patients to avoid hospital readmissions which includes care bundles. Additionally, section 2 defines the background and context for the development and implementation of a COPD discharge bundle at the acute care facility project site as well as an outline of the bundle components. It concludes with describing the role of the DNP student in this doctoral project.

Section 2: Background and Context

Introduction

According to Healthy People 2020, COPD is a chronic condition affecting approximately 13.6 million Americans (U.S. Department of Health and Human Services, 2015). This chronic condition contributes to frequent hospital readmissions and financial penalties from Medicare if hospitalized within 30 days of discharge (CMS, 2016). In addition to medical care costs, poorer health outcomes are associated with acute exacerbation of COPD events which require an inpatient admission (Criner et al., 2015; Guarascio et al., 2013). Application of an evidence-based COPD discharge bundle is an approach to address patient education and self-care management skills as well as facilitate a more effective means to prepare a patient for discharge from the hospital. The purpose of this project study was evaluating the implementation of such a bundle in a 281-bed acute care facility. The practice-focused question was: Have 30-day readmission rates changed after implementation of a COPD discharge bundle prior to transitioning from hospital to home?

Concepts, Models, and Theories

The framework that served as the foundation for this scholarly project was the model for improvement (Institute for Healthcare Improvement [IHI], 2016; U.S. Department of Health and Human Services, Health Resources and Service Administration [HRSA], 2011). This model is a frequently used guide for developing, testing, and implementing organizational change (HRSA, 2011). The model for improvement is a modification of the work of Deming's plan-do-study-act (PDSA) cycle

which originated from Shewhart's three-step scientific processes to obtain knowledge through specification, production, and inspection (Moen & Norman, 2010). In the 1990s, a planning step prior to the application of the PDSA cycle was added by Moen, Nolan, and Provost that incorporated the application of associated theory and prediction (Moen & Norman, 2010). The model for improvement evolved into a two-part framework with each segment holding an equal value (HRSA, 2011).

Initially, Part 1 of the model addresses three fundamental planning aspects that focus on guiding the improvement work, which include the project aim, the measurable outcome, and the change to be made that will affect improvement (HRSA, 2011). The next section is Part 2 which involves Deming's PDSA cycle, and this portion of the framework serves to facilitate testing for the change (IHI, 2016; HRSA, 2011). The *plan* stage incorporates how to move forward with testing the change by determining who is responsible for what and when as it ultimately guides the initiation of the cycle (IHI, 2016; HRSA, 2011). Next is actual testing of the change reflected in the *do* stage, which also serves to identify unanticipated findings via implementation and data collection (IHI, 2016; HRSA, 2011). Following these two stages is the *study* phase, which analyzes the results impacted by the change and was my focus in this doctoral project. If the process did not show improvement, then the organization is required to review the change tested and to revise it accordingly, which identifies the tasks for the *act* stage (HRSA, 2011). If there was an improvement, the process is reviewed to evaluate if it can be revised in any way to make it better. In either circumstance, the cycle repeats itself.

Utilization of the model for improvement provided me with a suitable approach for evaluating the effectiveness of an evidence-based COPD discharge bundle on altering readmission rates. The application of evidence-based practice can influence patient outcomes either individually or as a population (Stanik-Hutt, 2012). Outcomes are identified as the ultimate measure of quality and support this connection between the evidence-based discharge bundle and the selection of a quality improvement model (Stanik-Hutt, 2012). Avoiding readmissions related to an exacerbation of COPD will promote less of a decline in lung function, a decrease in mortality, and an improvement in health-related quality of life (Criner et al., 2015; Guarascio et al., 2013).

With regard to the application of the model for improvement's Part 1 to this project, the aim was to assess if a change occurred in COPD readmission rates within 30 days over a 3-month period. The criteria for measuring this alteration were available from existing data collected by the hospital system on readmission rates. The practice change initiated by the study setting was the adoption of an evidence-based COPD discharge bundle to standardize the method for preparing patients for transitioning care from hospital to home. Concerning the PDSA cycle portion of the model, the discharge preparation process was the issue necessitating improvement. Incorporated in the *plan* for this acute care facility was the development of a discharge bundle for patients with COPD based on the evidence researched within the literature. In addition, the task force members educated the interdisciplinary healthcare team on this practice modification which included an emphasis on the patient and family informational materials, documentation in the COPD education section of the record, and the after discharge

follow-up by a unit-based pharmacist. Implementation of the bundle conducted by the organization constituted the *do* PDSA phase of this framework. The *study* stage entailed the comparison of existing data on 30-day readmissions for a 3-month period which included baseline and post-implementation results following the adoption of the COPD discharge bundle into practice. The data analysis contributed to the evaluation of the process and generated the tasks regarding the necessary revisions for the *act.* This will impact the next cycle of PDSA and determine changes to the plan.

The primary focus of this doctoral project was on the *study* stage. It was during this stage of the model for improvement in which the analysis of data occurred by comparing the readmission rates within 30 days for patients with a diagnosis of COPD pre and post-implementation of an evidence-based discharge bundle. However, this evidence-based practice initiative also reflected the *act* stage. In this case, it validated whether the COPD discharge bundle should be implemented based on the analysis of data in the *study* stage and/or providing recommendations for the next cycle of PDSA.

Relevance to Nursing Practice

Individuals with chronic diseases such as COPD are more likely to require inpatient care and are associated with higher medical costs (Kelly, 2011). Inadequate preparation of a patient and their caregivers during the discharge process is a significant contributing factor for readmissions (Kelly, 2011). When patients understand their discharge instructions, including medication administration and the importance of follow-up appointments prior to a hospital discharge, they are 30% less likely to be readmitted or visit the emergency department (AHRQ, 2014). Among the key health care professionals

providing patient education, nursing is represented most often (Stoilkova, Janssen, & Wouters, 2013). The approach to preparing the patient with a diagnosis of COPD for discharge requires due diligence on behalf of the interdisciplinary healthcare team, including nursing, to address many educational and self-care interventions.

Disease-Specific Intervention Recommendations for COPD

A hospital discharge can be a complicated process and nurses, along with their health care professional counterparts, are challenged with addressing the most significant interventions because each discipline works independently in preparing a patient for discharge (Wong et al., 2011). Developing a systematic approach for discharging patients is a means to bring quality of care and efficiency to the process (Wong et al., 2011). However, research on the most effective interventions to avoid readmissions is insufficient (Kelly, 2011). After conducting a systematic review, Prieto-Centurion et al. (2014) concluded that inadequate evidence exists to support the recommendation of disease-specific interventions necessary to facilitate a decrease in readmissions within 30 days for patients admitted with a COPD exacerbation. In another systematic review, Lemmen, Nieboer, and Huijsman (2008) examined disease management programs for asthma and COPD patients. They discovered that these programs varied according to their design, interventions, combination of interventions, and outcomes measured. However, the patients participating in programs where a triple intervention was provided showed a reduction in hospitalization (Lemmen et al., 2008). In one more systematic review, Stoilkova, Jansssen, and Wouters (2013) explored the educational content of COPD programs and disclosed findings of diversity in the topics selected and delivery

methods as well as an inconsistent alignment of content with recommended evidence-based COPD guidelines. They did not review the effects on readmissions in their study. Inconclusive results to determine disease-specific intervention recommendations support the actions for developing an evidence-based discharge bundle tailored to the COPD patient.

In addition to the systematic reviews previously discussed other studies have been conducted where researchers focused on a single or combination of interventions, such as pulmonary rehabilitation, proper use of inhalers, or adherence to medications, to evaluate a variety of outcomes including impact on hospital readmissions (Benzo, Wetzstein, Neuenfeldt, & McEnvoy, 2015; Blee, Roux, Gautreaux, Sherer, & Garey, 2015; Bryant et al., 2013; Nici, Lareau, & ZuWallack, 2010; Ozyilmaz, Kokturk, Teksut, &Tatlicioglu, 2013; Press et al., 2010). However, there are a few distinct strategies that have been designed to improve efficiency in the hospital discharge process and positively affect readmission rates. One example was Project Reengineered Discharge (RED), which is an evidence-based program implemented upon a hospital admission and that utilizes a computer-generated patient advocate who interacts with the patient virtually (AHRQ, 2014; Enderlin et al., 2013). Project RED uses a list of 12 reinforcing components that reflect language assistance, medication review, education on diagnosis and post-discharge services, and other specific interventions (AHRQ, 2014; Krishnan, 2015). The Project RED service will contact a patient via a phone call within 72 hours of discharge but does not provide a home visit (Krishnan, 2015).

Another program is called Better Outcomes for Older Adults through Safe Transitions (BOOST), which is also an evidence-based approach and utilizes a universal discharge checklist for an established interdisciplinary team to improve the process of transferring a patient from hospital to home (AHRQ, 2014; Enderlin et al., 2013). Like Project RED, BOOST does not include a home visit but provides a phone call to the patient after discharge (Enderlin et al., 2013; Krishnan et al., 2015). Both programs produce reductions in hospital readmissions within 30 days but neither include recommended disease-specific interventions for the COPD population (Krishnan et al., 2015).

Care Bundles for COPD

The concept of creating a bundle of interventions for the patient with COPD provided an alternative strategy of effective interventions to reduce hospital readmissions. COPD care bundles encompass evidence-based guideline recommendations and a number of studies discussed their utilization in the acute care setting (Chalder et al., 2016; Hopkinson et al., 2011; Laverty, et al., 2015; Matthews et al., 2013; McCarthy et al., 2013; Parikh et al., 2016). Such a concept has the potential to fill the gap-in-practice that exists for this patient population. Interestingly, there are no two COPD care bundles that are alike as they have shown variability regarding purpose for implementation, the content or interventions included in each, and their influence on hospital and/or emergency department readmissions. The purpose for implementation in the majority of the studies was for the utilization of a COPD bundle to prepare patients for discharge (Chalder et al., 2016; Hopkinson et al., 2011; Jennings et al., 2014; Laverty,

et al., 2015; Matthews et al., 2013). On the other hand, two studies addressed a combination of admission and discharge COPD bundles (Chalder et al., 2016; Turner, Lim, Rodrigo, Welham, & Calvert, 2015). Lastly, Parikh et al. (2016) discussed a trial of a general care bundle while, McCarthy et al. (2013) utilized an emergency department-specific bundle.

Although the content within each of the bundle groups varied, similarities also existed. Proper inhaler technique was the only intervention incorporated in all the bundles targeting discharge preparation (Chadler et al., 2016; Hopkinson et al., 2011; Jennings et al., 2015; Laverty et al., 2015; Matthews et al., 2013; Parikh et al., 2016; Turner et al., 2015). Central to the pharmacologic treatment of COPD is the administration of inhaled therapies; therefore, if misuse occurs due to poor technique, the result is insufficient management or nonadherence to the medication regime which can lead to an exacerbation event and risk of hospitalization (Bades, 2012; Duncan, 2015; GOLD, 2016). Among the other interventions of the discharge bundles that were relatively consistent were smoking cessation, pulmonary rehabilitation referrals, post-discharge phone calls, and/or arrangements for a follow-up appointment with a pulmonologist (Chadler et al., 2016; Hopkinson et al., 2011; Jennings et al., 2015; Laverty et al., 2015; Matthews et al., 2013; Turner et al., 2015). A few bundles focused on pharmacological elements such as timeliness of antibiotics and steroids upon admission in addition to some similar nonpharmacological actions (McCarthy et al., 2013; Parikh et al., 2016).

As each care bundle provides a unique group of interventions, it also produces variability regarding its impact on hospital readmissions. A reduction in 30-day readmissions was shown in one study where a COPD care bundle was implemented and in two others where distinct discharge bundles were utilized (Hopkins et al., 2011; Matthews et al., 2013; Parikh et al., 2016). In another study, the researchers were able to show a declining trend in re-hospitalization within 30-days, which appeared to be, associated with decreased readmission rates (Laverty et al., 2015). The emergency department bundle did not show a significant improvement in 30-day readmissions (McCarthy et al., 2013), and one of the pre-discharge bundles resulted in no difference between bundle and control groups (Jennings et al., 2015). The perceived positive impact on readmissions in another of the care bundles were unable to be proven, but the bundle was able to show improved patient satisfaction and quality of care (Turner et al., 2015).

The creation of patient-focused interventions is linked to higher patient satisfaction and fewer readmissions as a result of positive health outcomes (Kelly, 2011). Bundles are not rigid and permit healthcare organizations to determine which group of evidence-based interventions will be most effective to achieve desired outcomes. Overall bundles offer a method to standardize care and reduce inconsistency in practice (Laverty et al., 2015).

Search Strategies

Sources of evidence within the literature that produced relevant published findings to address outcomes and research related to the practice problem were evidence-based practice guidelines, systematic reviews, a randomized control trial, mixed method

evaluations, and prospective study analyses. The Global Initiative for Chronic Obstructive Pulmonary Disease (2016) and the Acute Exacerbation of COPD Guideline (2015) are the references most cited for COPD evidence-based guidelines in the management and prevention of an exacerbation event (Criner et al., 2015; GOLD, 2016). The systematic reviews reflected the studies appraised to determine the most significant educational or self-management interventions in COPD. Finally, other aspects of the literature revealed studies on the development of a COPD bundle and its associated positive influence on clinical outcomes.

The databases I used to discover the evidence in the literature were National Guideline Clearinghouse, MEDLINE, Cumulative Index of Nursing & Allied Health, PubMed, and Joanna Briggs Institute Database. The search engines accessed were Google and Bing. Search terms were *chronic obstructive pulmonary disease, COPD, bundles, care bundles, discharge bundles, evidence-based bundles, interventions, and discharge interventions as well as evidence-base guidelines for COPD*. Combination search terms were *chronic obstructive pulmonary disease and bundles, chronic obstructive pulmonary disease and care bundles, chronic obstructive pulmonary disease and discharge bundles, chronic obstructive pulmonary disease and evidence-based bundles, chronic obstructive pulmonary disease and discharge interventions, chronic obstructive pulmonary disease and systematic review and interventions, COPD and bundle, COPD and discharge bundle*, and lastly, *COPD and care bundle*. The scope of review, regarding years searched, was over a 10 year period from 2006 to 2016. Despite the limit of 10 years, only literature from 2008 to 2016 was applicable. I determined that

a comprehensive search was completed when similar publications and authors were repeatedly recognized following the application of the abovementioned search terms and their respective combinations.

Local Background and Context

Effective October 2014, financial penalties for COPD all-cause readmissions within 30 days was enacted by the CMS through the HRRP, a program initiated by the Affordable Care Act (CMS, 2016). Penalties are calculated based on a readmission adjustment factor, and effective fiscal year 2015 hospitals could see reductions in reimbursement up to 3% (CMS, 2016; Krishnan et al., 2015). The average readmission rate for the diagnosis of COPD nationally is 20% (Krishnan et al., 2015) and this acute care project site has a nationally reported rate of 21.2% per Hospital Compare (CMS, n.d.). The value available on the government website lags behind by a year and a half; therefore, this facility's hospital system utilizes its own internal benchmark which is a monthly aim for 30-day readmission rate not to exceed 20%. The 2015 year-to-date (YTD) total readmission rates for a diagnosis of COPD was 19.48% for Medicare recipients, age 65 and older, and 19.51% for all payers which includes all payment methods plus Medicare. The hospital administration in collaboration with the outcomes department established a goal to decrease the 2016 YTD rates by 10% which would create an aim of 17.53% and 17.55% for Medicare only and all payers respectively. In January and February of 2016, the readmission rates for a COPD diagnosis was greater than 20% for Medicare recipients, age 65 and older, (33.33% and 22.73%) and all payers (29.03% and 20.51%). It was also higher when compared to the January and February of

2015 rates for Medicare only (25.00% and 13.65%) and all payers (27.27% and 18.18%). The hospital was concerned that reducing the 30-day readmission rates by 10% for 2016 would not be achievable if these percentages continue on this trend.

Another internal benchmark compares this acute care facility to others within the hospital system. Out of the 5 facilities which are included in these Medicare and all payer reports, this hospital was ranked 4 out of the 5 facilities per the 2015 YTD totals and continued this trend into 2016. On average the data for re-hospitalizations fluctuates month to month nonetheless this organization was challenged to improve its overall performance; therefore, the COPD discharge bundle was developed and implemented.

This acute care project site is a 281-bed facility that serves approximately 12 retirement communities within its township. The average range in the percentage of the population over 65 years and older is between17.5% to 28% in the county where this hospital resides (Zip Atlas, 2016). The prevalence of chronic disease increases as the population ages attributing to the rise in health care costs (Nash, Fabius, Skoufalos, Clarke, & Horowitz, 2016). Although financial incentives appear to be driving this practice change, it is not the only factor. With a mission statement that supports improving the health and well-being of the residents it serves, this hospital strives for more efficient and effective methods to provide patient care as it will impact the surrounding community.

Defining the COPD Discharge Bundle

The COPD discharge bundle is a set of defined interventions that contribute to a standard approach for transitioning a patient from hospital to home. One of the

interventions is a group of educational materials covering topics on COPD overview, smoking cessation (programs and support groups), maintenance and rescue inhalers, pulmonary rehabilitation program, pursed lip breathing, and the Better Breathers support group. The patient education is tailored according to individual learning needs. For example, if the patient is a former smoker, the smoking cessation material is not provided. Another intervention associated with the bundle is patient demonstration of proper technique with use of inhalers prior to discharge. A third requirement of the bundle is that the unit-based pharmacist performs a medication reconciliation on all patients actively being discharged or within 48 hours of discharge from the acute care setting. A fourth action is that all patients discharged home, with or without homecare services, will receive a phone call from the unit-based pharmacist to ensure they have the appropriate medications and to answer any questions regarding pharmacological therapies within 48 hours of transitioning to home. The last intervention is to offer enrollment into the chronic disease management program. This program contacts patients via an automated phone call system daily for 30 days with the first call made by a chronic disease staff member. During the phone call, the patient is assessed for signs and symptoms of respiratory decline by asking a series of questions. If worsening symptoms are identified, the patient receives a call from the chronic disease staff and is offered to speak to a nurse and/or follow-up with their physician.

Role of the DNP Student

The professional context that I have related to this doctoral project was in the role of a DNP student. In the capacity of a student, I had participated on a task force

committee established by the institution that developed the COPD discharge bundle. As part of my practicum experience, I engaged with committee activities such as literature review of evidence-based guidelines and discussions regarding the identification of essential bundle components. Furthermore, I was involved with interdisciplinary staff education and training to support this initiative prior to implementation.

The most significant motivation which attributed to my interest in this doctoral project is my passion for advocating on behalf of the COPD patient population. Within the past five years, my practicum facility hired advanced practice nurses to monitor the clinical progress and provide education to patients with diagnoses of heart failure, acute coronary syndrome, and stroke. However, there is currently not a designated advanced practice nurse or certified respiratory therapist to facilitate specific educational needs of the patient with a diagnosis of COPD. Addressing this identified gap in patient care was the impetus for my support with this initiative. Walden University has provided me the opportunity to explore chronic diseases and related population health issues particularly in COPD through course assignments and classroom discussions. My enhanced knowledge about the COPD patient population became a positive attribute that as a DNP student I continue to share with the project site task force.

Familiarity with the project site institution, because it is my place of employment, was a potential bias that initially concerned me about evaluating the implementation of this COPD discharge bundle. I did not want my present position in the organization to affect my objectivity when evaluating the bundle implementation. However, I ensured that I delineated my role as a DNP student from my current position as the nurse educator

to the team. Also, standardizing criterion for evaluating the project before its implementation helped to keep my focus objective.

Summary

Application of an evidence-based COPD discharge bundle may provide an effective change in practice to prepare a patient for discharge from the hospital efficiently. Utilizing the model for improvement facilitated a framework to test for the modification. Preexisting data on COPD hospital readmissions within 30 days of discharge was a source of evidence used to evaluate a change in practice. Preparing a patient for discharge from the hospital is a complex process and requires an effective approach. The literature provides inconclusive results regarding the most significant disease-specific interventions for the COPD patients to adjunct the discharge process from hospital to home. Other strategies on structured discharge processes such as Project RED and BOOST may have successfully reduced readmission rates, but did not meet the needs of patients with COPD diagnosis. The bundle provided an efficient method to address the appropriate disease-specific interventions based on the evidence-based recommendations. A COPD discharge bundle has the potential for not only costs savings for this identified acute care hospital but also fulfilling its mission to improve the health and well-being of its community residents.

The following section provides an overview regarding the sources of evidence used in evaluating the COPD discharge bundle. It discusses the procedures for gaining access to the data and ensuring ethical protection through Institutional Review Board

(IRB) processes. Also, in section 3 is a description of the data analysis method including statistical test selection.

Section 3: Collection and Analysis of Evidence

Introduction

An increase in readmission rates within 30 days of discharge for patients with COPD was the identified problem and foundation for this scholarly project. Re-hospitalizations within this time frame for chronic conditions including COPD are incurring reimbursement penalties from Medicare, per HRRP (CMS, 2016). Despite maintaining readmissions within 30 days at approximately 0.5% below the national benchmark of 20% in 2015 for Medicare only and all payers groups, this acute care facility set its internal benchmark for 2016 at 10% less than the 2015 YTD total. In January and February of 2016, the data began trending upward for COPD 30-day readmission percentages compared to the same period in the previous year. The administration and the outcomes department were concerned that the 2016 goal would not be achievable. To be proactive, ideas to improve readmission rates were evaluated and a COPD discharge bundle was chosen to be developed and implemented as part of the action plan. In addition to financial concerns of 30-day readmissions are the health outcomes of the COPD patient population. Acute exacerbations of COPD have been associated with worsening lung function that enhances disease progression (Criner et al., 2015; Guerrero et al., 2016). The COPD discharge bundle provided the ability to address both 30-day readmissions and COPD patient population health outcomes. The purpose of this doctoral project was to evaluate the implementation of an evidence-based COPD discharge bundle in a 281-bed, acute care hospital.

Practice-Focused Question

The practice-focused question was: Have 30-day readmission rates changed after implementation of a COPD discharge bundle? Hospital readmissions within 30 days of discharge for patients with a diagnosis of COPD are a problem for this acute care project site. Internal benchmark data ranked this hospital as number 4 out of 5 according to year-end 2015 totals when compared to the other benchmarked acute care facilities in the system. To improve its ranking, and ultimately, patient care, the discharge preparation process for this patient population became the target. Patient education is an interdisciplinary team responsibility, and various methods regarding informational content and approach were in practice at this hospital. Because there was a lack of standardization in the delivery of educational content, key topics regarding COPD self-management knowledge and skills were frequently omitted. The COPD discharge bundle offered the capacity to align the discharge education process with national and international guideline recommendations and ensure consistency in patient preparation for discharge. Providing a standard and collaborative approach to discharge planning through the use of a bundle supports adherence to evidence-based practice (Kirshnan et al., 2015). The evidence-based COPD discharge bundle has the potential to close this identified gap in practice.

For the purposes of this project, a COPD discharge bundle is a set of evidence-based interventions that is provided to all patients admitted with a primary diagnosis of COPD before transitioning the patient from hospital to home. To achieve the best clinical outcomes, all components of the bundle must be completed (Turner et al., 2015).

Elements of education included in the COPD discharge bundle are an overview of COPD, smoking cessation, inhaler types and technique for administration, pulmonary rehabilitation, pursed lip breathing skills, and the Better Breathers support group. Additionally, a unit-based pharmacist conducts medication reconciliation and phone calls within 48 hours of discharge. Lastly a daily automated call program coordinated by the chronic disease management staff is an option offered for patients to enroll in for 30 days post-discharge.

Sources of Evidence

Existing aggregate data on readmissions within 30 days, collected by the hospital system for this acute care facility, was one source of evidence. All diagnoses impacted by the HRRP program under Medicare, including COPD, are available in the form of internal reports and generated on a monthly basis for hospital leaders. Raw de-identified data on the number of readmissions and discharges for COPD diagnoses were obtained from these reports to compare pre-bundle implementation values to post. This comparison included two types of payers defined as Medicare (65 years and older) and all payers which comprise all payment methods in addition to Medicare. In order to assess if a change in 30-day readmission rates occurred following implementation of a discharge bundle in one or both of these groups, I obtained baseline data as part of my evaluation from two separate periods of time for readmitted patients with a primary diagnosis of COPD. One period was the 3 months directly prior to initiating the bundle, and the other was for the same 3-month period from 1 year prior to account for potential seasonal differences. These pre-implementation values were compared to readmission rates post-

implementation for both the Medicare and all payer groups. Although 30-day readmissions are monitored by the project site, the selection of a different set of timeframes than the institution provided a more comprehensive exploration of the impact of the COPD discharge bundle on readmissions.

An additional source of evidence from preexisting, non-identifiable data that pertains to the specific information on the COPD discharge bundle implementation was accessible through the project site's outcomes management department. Utilizing these data, readmissions within 30 days post-bundle implementation was assessed for patients identified as receiving the predetermined components of the COPD discharge bundle and those who did not. Furthermore, readmissions were also evaluated on one particular element of the bundle, which was the unit-based pharmacists' call back within 48 hours of discharge. Among those patients who received the bundle, 30-day readmission rates were compared between individuals who spoke to a pharmacist within 48 hours of discharge opposed to those who did not.

Archival and Operational Data

At the organizational level of this hospital system, the outcomes measurement analyst generates 30-day readmission rate reports for all diagnoses that are affected by Medicare reimbursement as outlined in HRRP at the end of every month (see CMS, 2016). Among the list of conditions that are subject to financial penalties for patients readmitted within 30 days is the diagnosis of COPD (CMS, 2016). Each hospital in the system is responsible for confirming, via billable codes, if these identified visits constitute a 30-day readmission from the monthly reports received. Once confirmed as a

readmission within 30 days, those patients with a principal diagnosis of COPD are selected by the outcomes measurement analyst and pulled into a report. Percentages of readmissions are ascertained using the raw de-identified data from this report. The display of this aggregate data is in two separate reports labeled as Medicare (age 65 and older) only and all payers which include all patients with and without Medicare. These reports are updated monthly and communicated via e-mail in an Excel document to all department leaders accountable for monitoring and sharing this information.

Confirmation of a 30-day readmission requires time and was one limitation inherent in the data. For example, when a patient discharge is at the end of June, the coding team must wait until the end of July to assess if a readmission has occurred within 30 days. If re-hospitalizations within this timeframe are acknowledged, an additional 2 to 4 weeks is allotted for a retrospective chart review to confirm. The data on readmission rates for June is not available until the end of August and subsequently reported by the first of September, which yields about a 2-month lag in obtaining the information. However, the advantage to acquiring these numbers internally within the organization is that they reflect the most current data available opposed to referencing Medicare on the Hospital Compare website because their figures are a year behind (CMS, n.d.).

Other limitations regarding this report are that it does not capture patients who have left against medical advice, those who transferred to another acute care facility not in the hospital system, and individuals readmitted within 30 days to an acute care setting outside of the hospital system. Furthermore, 30-day re-hospitalizations for acute care facilities in this hospital system share one data bank. Therefore, a patient can be

discharged from one hospital in the healthcare system but readmitted at another facility within the system, and it is the hospital receiving the readmission that will be financially accountable, not the hospital that discharged the patient. Lastly, long-term care and subacute patients are captured in this readmission report as well.

The 30-day readmission rate reports are shared via e-mail to all areas responsible for monitoring the data. I requested permission to gain access to these 30-day readmission reports via email from my practicum site preceptor for approval by the outcomes measurement analyst. Once approved, I was granted access to the monthly readmission reports and archived retrospective data as required.

The outcomes management department at the project site collected and maintained information specific to the COPD discharge bundle. This internal data was de-identified and provided the information necessary to evaluate 30-day readmission rates for all patients who qualified for the bundle and received all its predetermined elements. Also, the data from outcomes management recorded patients who were excluded from the bundle or did not obtain all of its required components. In addition to numbers on readmissions, these data points served to group individuals as compliant with the bundle or not. Compliance was confirmed when patients received all the predetermined elements of the COPD discharge bundle per the outcomes management department definition. Lastly, feedback from the unit-based pharmacist regarding the number of 48-hour call backs, if they spoke to the patient, and the clinical issues identified per case were prospectively tracked in these records.

Although readmissions within 30-days were being documented, they were not confirmed via billable codes like the hospital system data, which was a limitation of this data. Approval for access to the COPD discharge bundle post-implementation records was requested by my practicum site preceptor from the department of outcomes management.

Evidence Generated for the Doctoral Project

In order to conduct this project study, I submitted a proposal to the IRB at Walden University and the acute care facility implementing the bundle to obtain ethical approval (see Terry, 2015; Walden University, 2015). All doctoral students are required to complete a Walden IRB application. No data were collected or reviewed until I was granted approval. Approval is based on demonstrating that the scholarly project benefits outweigh the risks to the participants (Terry, 2015; Walden University, 2015). This scholarly project was submitted to the Walden University IRB and approved by the full committee (see Appendix A).

Retrospective patient record reviews or secondary data analysis requires ethical protection of the participants' personal information (Terry, 2015; Groves, Burns, & Gray, 2013; Walden University, 2015). Outcomes management ensured confidentiality of patient data through de-identification and use of a separate coding sheet from the original list of patient information prior to sharing specific data about the bundle. Managing the storage of the chart review monitoring data was secured according to this project site's IRB policies and recommendations (see Groves, Burns, & Gray, 2013).

Analysis and Synthesis

I analyzed existing data for COPD 30-day readmission rates over a 3-month period to assess the effect of change following the implementation of the COPD discharge bundle. The evaluation of readmission rates included the following: all patients with a diagnosis of COPD, all patients compliant in the bundle compared to those who were not, and all patients on the bundle who spoke to a unit-based pharmacist within 48 hours of discharge versus those who did not. The statistical test I identified to measure whether there was a difference in frequency of 30-day readmissions before the implementation of the COPD discharge bundle with those after implementation was the chi-square test of independence. Chi-square is a nonparametric test that utilizes variables described as percentages and measures them on a nominal scale (Grove et al., 2013; Polit, 2010). Assumptions are made that the observations are random and sampled independently (Polit, 2010). Utilizing a contingency table, the dependent variable was represented by readmissions within 30 days or no readmissions within that time. The independent variables were the following groups: pre or post-bundle implementation, compliant with the bundle or noncompliant, and spoke to a pharmacist within 48 hours of discharge or did not speak with a pharmacist. By contrasting the observed frequencies obtained by the existing data to the expected frequencies calculated based on the null hypothesis being true, a chi-square statistic can be completed and statistical significance determined (Polit, 2010).

The COPD discharge bundle implementation was on October 1, 2016; therefore, the post-bundle timeframe was November 2016 through January 2017 recognizing 1

month was required for assimilating the adoption. The baseline data pre-bundle used for comparison included two separate periods. One segment was the 3 months directly prior to implementation (July, August, and September 2016) and a second comparison was made with the same 3-month timeframe as the post-bundle from the previous year (November and December 2015 and January 2016). The readmission rates for both Medicare only and all payers were assessed individually using the time periods mentioned above. The post-bundle implementation timeframe for evaluating 30-day readmissions for patients who were bundle compliant verses those who were not remained the same period of time, November 2016 through January 2017. The impact of pharmacists call backs within 48 hours on re-hospitalizations utilized this 3 month timeframe as well.

Summary

Readmission rates within 30 days for patients with a diagnosis of COPD are a practice problem for one acute care facility. Lack of a standardized approach to address the knowledge and skills necessary for COPD self-management by the interdisciplinary team was an issue. An improvement in the discharge preparation process through the implementation of bundle was a viable solution. Aligning the discharge education process with national and international guideline recommendations in a bundle can provide consistency in patient preparation for discharge. Sources of evidence included existing hospital data to assess the change in readmission rates. The collection of current data regarding 30-day readmission rates at the hospital system and the project site level were discussed as well as their limitations. An overview was provided of the measures

that were taken to ensure ethical protection of patient data through obtaining Walden IRB approval. Regarding analysis and synthesis, the chi-square test of independence was the measurement selected to evaluate if there was a difference in frequency of 30-day readmissions prior to the adoption of the COPD discharge bundle compared with after its implementation. In the next section, statistical analysis results are presented with a discussion of findings and recommendations.

Section 4: Findings and Recommendations

Introduction

With this scholarly project, I addressed the problem of 30-day readmission rates for patients with a diagnosis of COPD at a 281-bed acute care community hospital. Rates for readmissions within 30 days were identified to be higher than the predetermined internal benchmarks at the project site facility. A COPD evidence-based discharge bundle was developed and implemented as a strategy to improve the process of preparing patients to transition from hospital to home. Discharging patients from the hospital is a complex process that requires collaboration among the interdisciplinary team. The lack of a standardized approach for discharge preparation can attribute to inconsistencies in the discharge procedure between healthcare providers, whereby patient interventions reflecting best practice guidelines are not regularly provided. Implementation of an evidence-based COPD discharge bundle facilitates closing this identified gap by promoting collaboration and standardization in the care provided by all disciplines involved.

The objective of this scholarly project was to evaluate if there was a change in 30-day readmission rates following the implementation of a COPD bundle before discharge from the hospital to home. I assessed readmission rates within 30-days pre and post-bundle for two types of payment systems, Medicare only and all payers. Furthermore, 30-day readmissions were also evaluated post-bundle implementation to review the impact of specific interventions on these re-hospitalization rates. The practice-focused question for this project was: Have 30-day readmission rates changed following the

implementation of a COPD discharge bundle prior to transitioning from hospital to home?

I obtained evidence for this DNP project from existing de-identified aggregate data on 30-day readmissions from the hospital system and the project site levels. A chi-square test of independence, or Pearson's chi-square, was selected to measure differences between observed and expected frequencies of readmissions within 30-days before and after implementation of the discharge bundle. Furthermore, a comparison of differences in readmissions post-bundle included data for discharge bundle compliance versus noncompliance and the intervention of whether the patient spoke with a pharmacist within 48 hours of discharge or did not speak with a pharmacist. I conducted data analysis using IBM SPSS Statistics, Version 23 to perform the chi-square tests and used an alpha of .05 as the established level of significance ($p < .05$).

Descriptive Statistics

Initially, I used the aggregate data to evaluate the impact of the COPD discharge bundle on 30-day readmissions pre and post-implementation. These data were individually assessed for two types of insurance payers; I will present the results for the Medicare-only group first. Pre-bundle data for Medicare-only were evaluated for two timeframes: Medicare-Pre2 and Medicare-Pre1. The Medicare-Pre2 group represented the 3-month period directly prior to the bundle implementation (July, August, and September 2016). A total of 50 patients were admitted with COPD during this timeframe. Eleven readmissions had occurred within 30-days which yielded a readmit rate of 22.0% (see Figure 1). These values were compared to the post-bundle

implementation period (November and December 2016 and January 2017), whereby there were a total of 109 admissions and 20 readmits inside 30-days which calculated a rate of 18.3% for readmissions (see Figure 1).

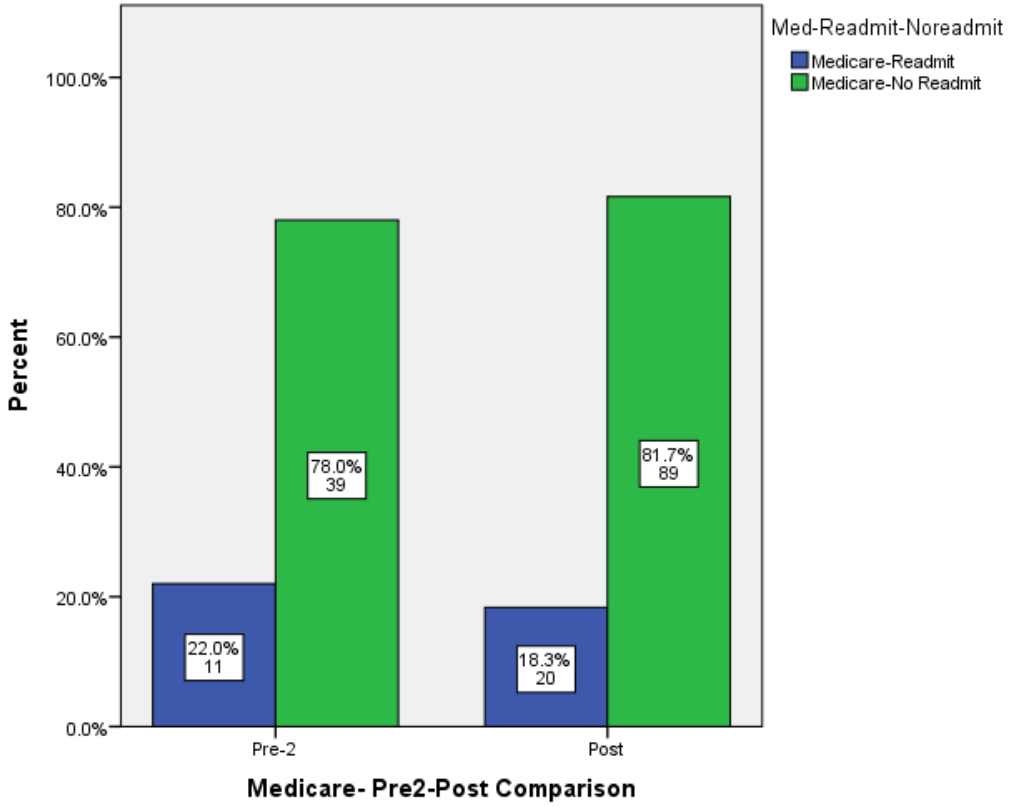

Figure 1. Percentage of readmissions for Medicare-Pre2 and post-bundle periods.

I conducted a chi-square test of independence between the Medicare-Pre2 and the post-bundle intervention groups for 30-day readmissions and no readmissions (see Table 1). Expected cell counts were greater than five, and this difference was not found to be statistically significant ($X^2 = 0.291$, $df = 1$, $p = .589$). Despite the lack of statistical significance between readmissions and the pre and post-bundle implementation population, examination of the 30-day readmissions regarding percentages indicate that there was a decrease of 3.7% in the rate.

Table 1

Chi-Square Test Results for Difference of 30-day Readmissions between Pre and Post-Bundle Implementation for Medicare-Pre2

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.291[a]	1	.589
N of Valid Cases	159		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.75

b. Computed only for a 2x2 table

I labeled the second pre-bundle timeframeMedicare-Pre1 (July, August, and September 2015). This timeframe used the same 3-month period as Medicare-Pre2 but reflected data from the year prior to account for seasonal differences. A comparison of 30-day readmission rates was made to the same post-bundle implementation period previously discussed (November and December 2016 and January 2017). The Medicare-Pre1 period had a total of 51 COPD patient admissions, which was nearly equivalent to the 50 from Medicare-Pre2. Readmissions within 30-days were equal to 10, again similar to the Medicare-Pre2 value of 11. However, the readmission rate for Medicare-Pre1was 19.6%, which was lower than the timeframe for the following year represented in the Medicare-Pre2 group at 22%. The post-bundle group data remained as stated earlier, 109 total admissions and 20 readmits with an 18.3% readmission rate (see Figure 2).

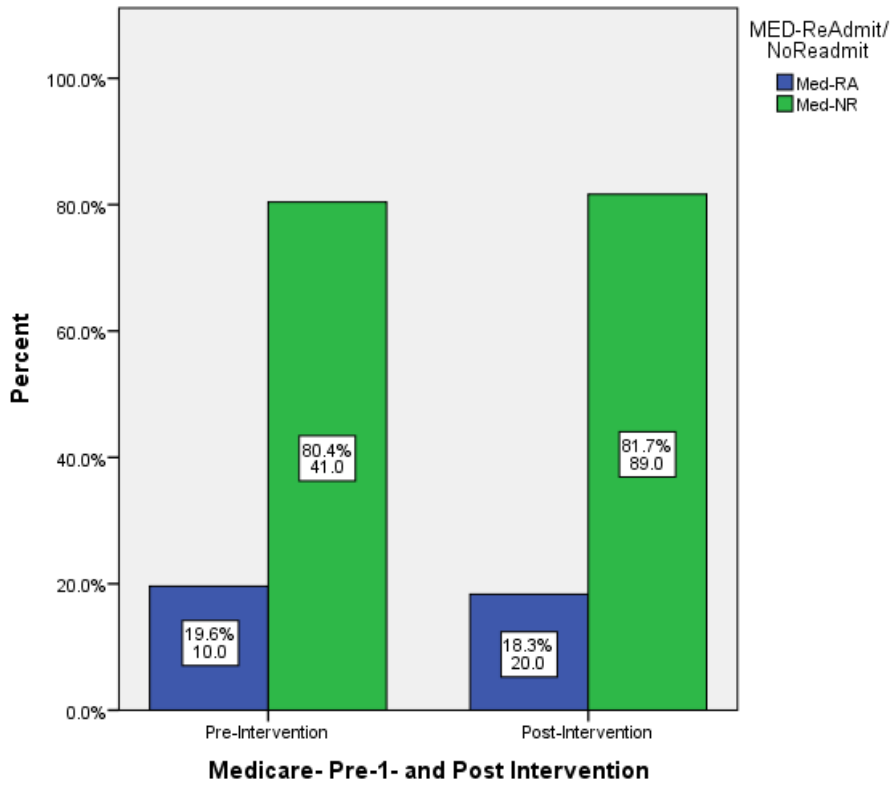

Figure 2. Percentage of readmissions for Medicare-Pre1 and post-bundle periods.

I completed a chi-square test of independence between 30-day readmissions and no readmissions for Medicare-Pre1 and the post-bundle intervention dataset (See Table 2).

Table 2

Chi-Square Test Results for Difference of 30-day Readmissions between Pre and Post-Bundle Implementation for Medicare-Pre1

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.036[a]	1	.849
N of Valid Cases	160		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.56.

b. Computed only for a 2x2 table

Expected cell counts were larger than five, and this difference was found not to be statistically significant ($X^2 = 0.036$, $df = 1$, $p = .849$). However, readmission rates were lower in the post-intervention group by 1.3%.

Next, I assessed the data for the all payers insurance group. Like the Medicare-only groups, pre-bundle implementation data for all-payers was evaluated for two timeframes: all-payer-Pre2 and all-payer-Pre1. The all-payer-Pre2 group represented the 3-month time period prior to the bundle implementation (July, August, and September 2016). A total of 75 patients were admitted with a COPD diagnosis in this timeframe with 18 readmissions inside 30-days equaling a rate of 24% (see Figure 3). These numbers were compared to the post-bundle implementation period (November and December 2016 and January 2017) which had a total of 187 admissions and 39 readmits and yielded a 30-day readmission rate of 20.9% (see Figure 3).

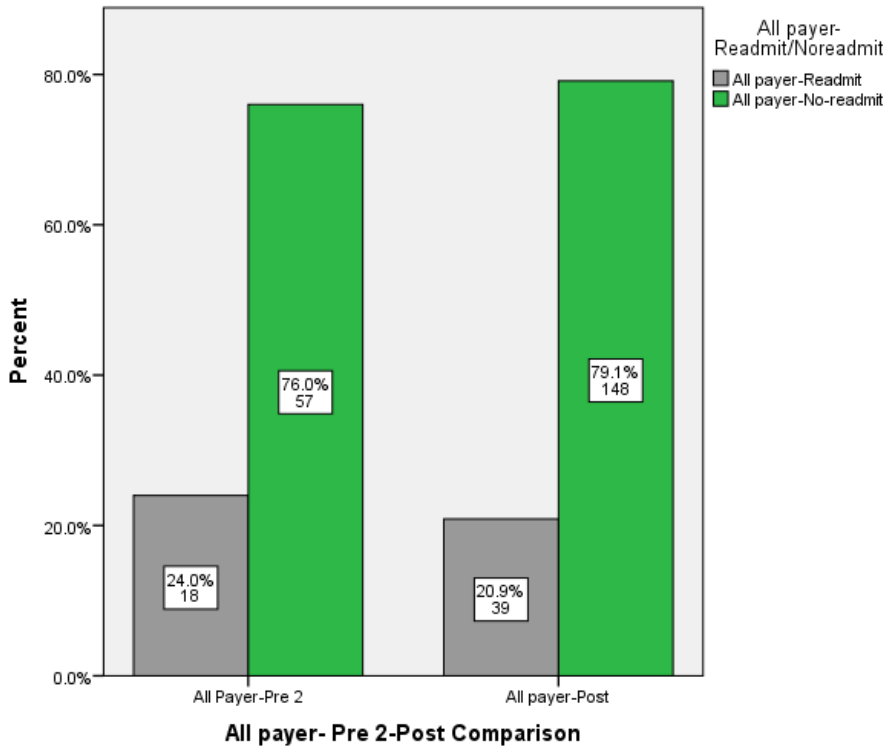

Figure 3. Percentage of readmissions for all-payer-Pre2 and post-bundle periods.

I performed a chi-square test of independence between all payer-Pre2 and the post-bundle group for 30-day readmissions versus no readmissions (see Table 3). The expected cell counts exceeded a frequency of five, and the difference was not found to be statistically significant ($X^2 = 0.311$, $df = 1$, $p = .577$). Nonetheless, 30-day readmission rates did decrease by 3.1% following the COPD discharge bundle implementation which is deemed to be clinically noteworthy.

Table 3

Chi-Square Test Results for Difference of 30-day Readmissions between Pre and Post-Bundle Implementation for All-payer-Pre2

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.311[a]	1	.577
N of Valid Cases	262		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 19.34
b. Computed only for a 2x2 table

The second pre-bundle period for this group of insurance payers was all-payer-Pre-1 (July, August, and September 2015). It reflected the same 3-month period as all-payer-Pre2 but utilized data from the year prior. I compared readmission rates to the same post-bundle implementation period discussed beforehand under all-payer-Pre2 (November and December 2016 and January 2017). A total of 96 patient admissions were identified for all-payer-Pre1 period. Readmissions within 30-days were equivalent to 18 producing a readmission rate of 18.8% (see Figure 4). The data for the post-bundle group remained as stated formerly, 187 total admissions and 39 readmits with a 20.9% 30-day readmission rate (see Figure 4). In this comparison, the readmission rates increased in the all payer post-intervention group by 2.1% when compared to the all payer-Pre1 dataset. Although the number of 30-day readmits was equivalent to 18 for both the all-payer-Pre2 and the all-payer-Pre1 groups, the number of admissions for all-payer-Pre1 was greater than all-payer-Pre2 yielding a larger denominator, and therefore, a lower rate.

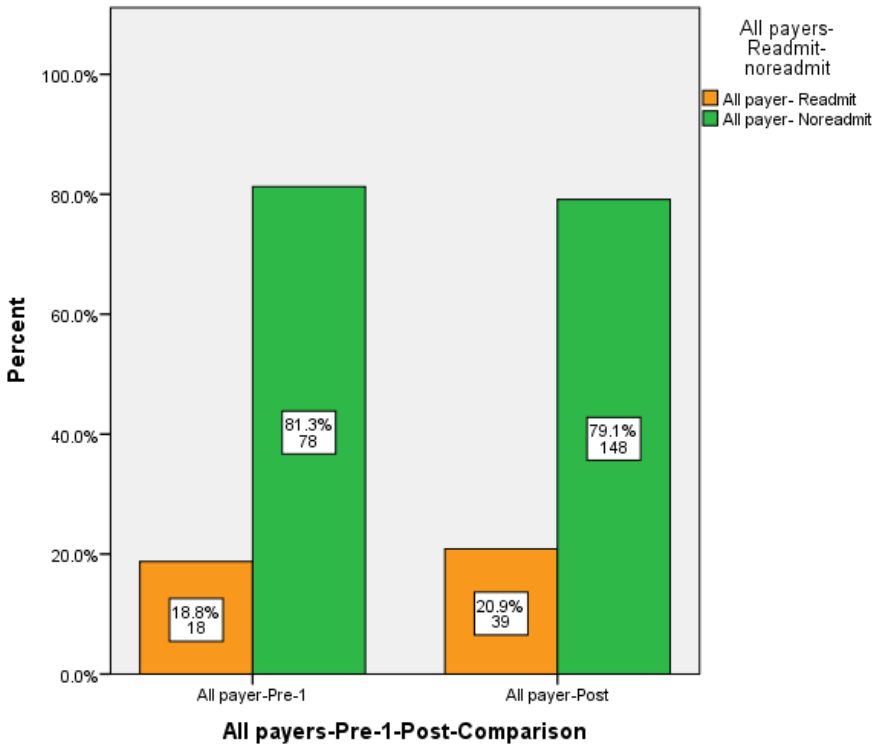

Figure 4. Percentage of readmissions for all-payer-Pre1 and post-bundle periods.

I completed a chi-square test of independence between 30-day readmissions and no readmissions for all payer-Pre1 and the post-bundle intervention group (see Table 4). All expected cell counts were greater than five. There was no statistical significant difference identified ($X^2 = 0.175$ $df = 1$, $p = .676$).

Table 4

Chi-Square Test Results for Difference of 30-day Readmissions between Pre and Post-Bundle Implementation for All-payer-Pre-1

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.175[a]	1	.676
N of Valid Cases	283		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.36
b. Computed only for a 2x2 table

In addition to evaluating the difference in 30-day readmission rates for pre and post-implementation of the COPD discharge bundle, I also reviewed the variances in hospital readmissions post-implementation for patients who were bundle compliant versus not and for those who spoke to a pharmacist post discharge compared to those who did not. These aggregate data were reviewed for the post-implementation period between November and December 2016 and January 2017. Unlike the previously discussed data on 30-day readmissions which included all COPD patient discharges and captured a variety of settings such as long-term care and subacute, these figures reflect only patients who were being discharged from the hospital to home and eligible for the bundle. A total of 116 COPD patients were admitted with a diagnosis of COPD. Among the compliant group of 75 patients, there were 12 readmissions within 30-days yielding a readmission rate of 16.0%. The number of readmissions was 13 for the noncompliant group out of 41 which equated to a 31.7 % readmission rate. The readmissions were twice as high for the bundle noncompliant group (see Figure 5). Within Figure 5, note that RA represents the number of readmissions and NoRA the count of no readmissions.

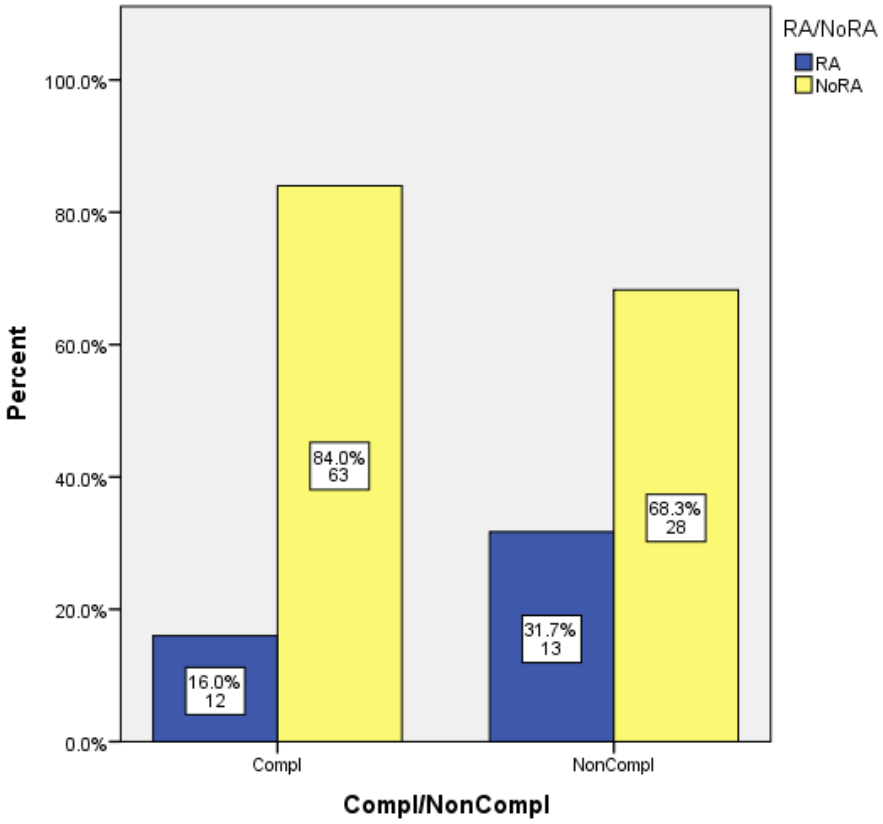

Figure 5. Percentage of readmissions for compliant and noncompliant groups.

I conducted a chi-square test of independence between the bundle compliant and the bundle noncompliant groups and 30-day readmissions versus no readmissions (see Table 5). Expected cell counts were greater than five. This difference was statistically significant ($X^2 = 3.868$, $df = 1$, $p = .049$).

Table 5

Chi-Square Test Results for Difference of 30-day Readmissions between Bundle Compliant and Non-compliant Post-Bundle Implementation

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.868[a]	1	.049
N of Valid Cases	116		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.84.

b. Computed only for a 2x2 table

The final comparison of readmission rates within 30-days post-bundle implementation represents COPD patients who spoke to pharmacist within 48 hours of discharge from hospital to home opposed to those who did not. The post-implementation timeframe was the same as the previous bundle compliant versus noncompliant analysis (November and December 2016 and January 2017). Out of a total of 116 patients who were admitted with a diagnosis of COPD, 104 received a phone call from a pharmacist within 48 hours of discharge. There were a total of 86 COPD patients that spoke to a pharmacist and among this group were 16 readmissions producing a readmission rate of 18.6% (see Figure 6). Eighteen patients received a call, and a message left by the pharmacist but the patient did not speak directly to the pharmacist. Ten of the 18 patients were readmitted within 30-days which resulted in a re-hospitalization rate of 55.6% (see Figure 6). There was a 37% higher difference in the rate of readmissions when patients did not speak to a pharmacist. In Figure 6, note that RA represents the number of readmissions and NoRA the count of no readmissions.

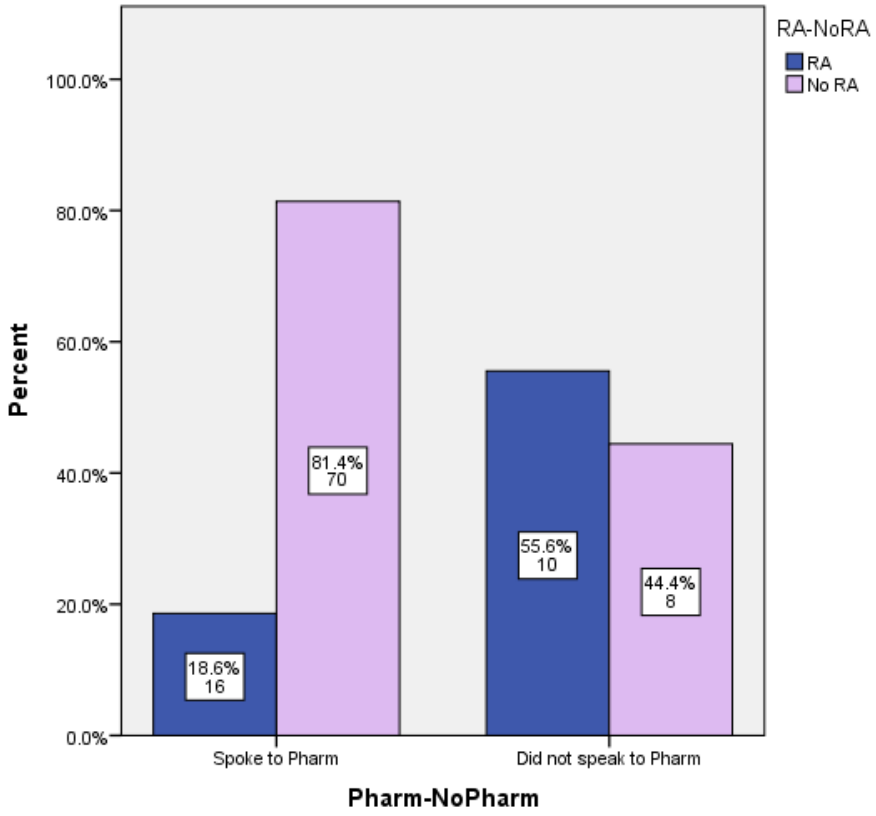

Figure 6. Percentages of readmissions for spoke to a pharmacist and did not speak to a pharmacist groups.

I performed a chi-square test of independence between those who spoke to the pharmacist and those who did not compared to those who were readmitted within 30-days and those who were not, the test results found this difference to be statistical significance as displayed in Table 6 ($X^2 = 10.868$, $df = 1$, $p = .001$). However, one expected cell count was less than five, therefore, the Fisher's Exact Test was also included in the results which supported significance as the p-value was $< .05$ ($p = .002$).

Table 6

Chi-Square Test Results for Difference of 30-day Readmissions between Spoke to a Pharmacist and did not Speak to a Pharmacist Post-Bundle Implementation

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.839[a]	1	.001		
Fisher's Exact Test				.002	.002
N of Valid Cases	104				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.50.

b. Computed only for a 2x2 table

Discussion

In the review of the data analysis, I noted that the readmission rates decreased post-bundle implementation by 3.7% and 1.3% when compared to the pre-bundle Medicare-Pre2 and Pre1 groups respectively. Although the findings did not prove to be statistically significant, a clinically significant change was assessed in 30-day readmission rates. In addition to the positive impact on patient healthcare outcomes, reduced 30-day readmissions have encouraging financial implications for this acute care institution and this group of a payment system, in particular, Medicare. As I discussed earlier in this DNP capstone, reimbursements are directly associated with all-cause 30-day readmissions for Medicare patients (see CMS, 2016). The readmission rates for the post-bundle period Medicare-Pre2 was 18.3% and for the Medicare-Pre1 was 18.4%. Maintaining readmissions rates below 20% contributes to avoiding financial penalties and therefore an increase in Medicare reimbursements for this project site facility.

All-payer-Pre2 findings yielded a decline by 3.1% in 30-day readmissions when likened to post-bundle implementation rates, but I did not identify statistical significance. All-payer-Pre2 yielded a similar change in readmission rates when equated to Medicare-Pre2. However, all-payer-Pre1 showed an increase in readmissions by 2.1% when compared to the post-implementation group. As its name indicates, the all-payer group consists of all COPD patients admitted regardless of payment system which also includes the Medicare payers in these numbers. Examination of the baseline data had shown higher 30-day readmission rates in the Medicare-Pre1 group (19.6%) than for the all-payer-Pre1 group (18.8%). Therefore, the lower readmission rates for the all-payer-Pre1 group could be attributed to those patients who utilized a health care payment method other than Medicare. Further exploration beyond the scope of this project may provide insight into additional possible reasons for the difference in this proportion of readmissions.

With regard to the evaluation of data post-bundle on readmissions within 30-days I found a change in readmission rates to be statistically significant for patients compliant with the bundle versus noncompliant and those who spoke to a pharmacist within 48 hours of discharge opposed to those who did not. Being bundle compliant and speaking with a pharmacist following discharge did show lower readmissions within 30-days. A phi coefficient was calculated for each chi-square result to determine the impact of these independent variables on readmission rates. For the bundle compliant group, the phi coefficient value was -.18 which yielded a small or weak relationship according to Cohen's guidelines to identify the magnitude of effect size (U.S. Geology Survey 2017).

In other words, the bundle compliant patients accounted for 18% of the readmission variance. Next, a phi coefficient was performed on the data for patients who spoke to a pharmacist within 48 hours of discharge, a value of -.323 was calculated. Unlike the bundle compliant group, this result produced a moderate relationship between speaking to a pharmacist and readmission rates. Speaking to a pharmacist accounted for 32% of the readmission variance. Based on this further analysis, it would suggest that speaking to a pharmacist after discharge was identified to be more impactful on the number of 30-day readmissions than the compliance of the COPD discharge bundle.

The role of the pharmacists in preparing a patient with COPD to transition from hospital to home is not only beneficial while one is in the acute care setting but also once an individual is discharged. Patients with a chronic medical condition are prescribed more medications than those without a chronic disease. Half of the medications errors occur at times of transitions in care from hospital to home or elsewhere (Kelly, 2011). By speaking directly to the patient, the pharmacist was able to intervene within 48 hours of discharge and rectify any issues with prescribed medications once the patient was home. Communication with a healthcare provider following discharge, in this case, a pharmacist, allows for continuity of care and is a critical component of discharge (Wong et al., 2011). Speaking with a pharmacist ensures adequate information regarding medications is discussed with the patient while at home to promote self-management. Individual patient and family educational needs were able to be met through questions that patients may have had about the effects or prescribed times of their medications. Understanding the importance of adherence to medications has been associated with

improved health outcomes and decreased hospitalizations in patients with COPD (Bryant et al., 2015). The intervention of speaking with a pharmacist within 48 hours of discharge from hospital to home was one way to ensure an emphasis on medication adherence.

Bundle compliance included patient education about pharmacological and non-pharmacological clinical management interventions, completion of a reconciliation of medication at discharge and a call from a pharmacist within 48 hours of transitioning to home after leaving the hospital. Although all patients identified as bundle compliant received a call from the pharmacist, it was only those individuals who spoke to a pharmacist that resulted in reduced readmissions. Frequent readmissions for COPD patients are associated with increased mortality as disease progression is expedited with reoccurring hospitalizations (Criner et al., 2015; Guerrero et al., 2016). Improving health outcomes of individuals through fewer readmissions is the overall perceived benefit of the bundle, in particular speaking to a pharmacist within 48 hours of discharge.

In conclusion, the implications of these findings benefit both the acute care institution and the individual patient as I previously discussed. The potential influence of a positive social change can be facilitated through the dissemination of these findings to other acute care facilities within the hospital system. Communicating best practices can further influence the health care outcomes of COPD patients in the community beyond this project site if other organizations decide to pilot the COPD discharge bundle. Overall, the implications of these bundle element results indicate that a discharge bundle

is adventitious for the health and well-being of the individual being discharged with a diagnosis of COPD.

Strengths and Limitations of the Project

A strength identified in this project was that it required the use of aggregate data. This healthcare organization maintains an abundance of data and specific to this project was 30-day readmission rates. In general, these data equate to quantitative figures that that are applicable to a statistical analysis, such as chi-square, and utilized in evaluating the COPD discharge bundle implementation for this project. Chi-square analysis provided an alternative method to interpret performance improvement data. The review of raw numbers by the outcomes management department did not yield the same type of results as did the application of inferential statistics. The role of the pharmacist calling and speaking to patients within 48 hours of discharge was not shown to influence readmission rates according to outcomes management findings unlike the results obtained by the chi-square analysis via this DNP capstone project. Another strong point of this project is the ability to replicate the implementation of a COPD discharge bundle at other acute care facilities with similar interdisciplinary resources and patient population issues.

On the other hand, a limitation of this DNP project was the delineation of selected 3-month timeframes to evaluate the implementation of the COPD discharge bundle. I identified the use of the model for improvement (see IHI, 2016; HRSA, 2011) as a good fit for this DNP capstone and the project site employed this model as well. The rapid, cyclic nature of the PDSA portion of this model may not have provided adequate time for evaluating this project and for the clinical staff to fully adopt the practice change.

Achieving 100% compliance with bundles involves extensive staff education and time for adaption (Lennox et al., 2014). There were no unanticipated limitations identified.

Recommendations

Based on the above discussion of findings, this project site facility should continue to support the role of the unit-based pharmacist calling the patient at home within 48 hours of discharge who have a diagnosis of COPD. In addition, the positive results with bundle compliance supported sustaining the bundle's use in practice. The discharge bundle encourages the interdisciplinary team to collaborate in preparing the patient for discharge from hospital to home. Maintaining the implementation of the COPD discharge bundle facilitates closure of the identified practice gap associated with this acute care facility which was a lack in a standardized approach for discharging COPD patients.

I only utilized de-identified aggregate data to evaluate a change in 30-day readmissions following the implementation of this COPD discharge bundle. Access to qualitative data such as patient demographics to determine mean age, sex or identify specific traits of those readmitted could add to the further scientific investigation on predicting which patient characteristics attribute to being compliant with health self-management versus not. Also, determining the reason for the readmission such as COPD exacerbation versus another diagnosis would lead to further evaluation of the bundle's influence or lack of influence on each corresponding readmission. As I presented in the discussion section, insight into the reasons for why the all-payer Pre-1 group had higher readmission rates when likened to the post-bundle group could be investigated. A final

recommendation is to expand the implementation of this COPD discharge bundle program to another similar acute care facility within the hospital system. Implementing the bundle at another hospital, would not only support replication of this project, but also impact positive social change by improving the health and management of the COPD population beyond this project site organization.

Section 5: Dissemination Plan

One of the most important and final steps of any scholarly project is dissemination. It is through the transfer and integration of research, evidence-based studies or quality improvement findings into practice that facilitates the clinical scholarship development of the DNP (American Association of Colleges of Nursing [AACN], 2006; Tymkow, 2011). As leaders, DNP-prepared nurses have the responsibility to communicate discoveries that can improve the quality of patient care and individual health outcomes (AACN, 2006).

My plans for dissemination regarding this evaluation of a COPD discharge bundle will be internal and external to the DNP project site facility. First, I will conduct internal communication with the COPD task force committee. Led by the outcomes department, this task force consists of the interdisciplinary team who developed and implemented the COPD discharge bundle as a performance improvement initiative. It is the unit-based pharmacists on this committee who will be most interested in the findings. The results from the data analysis on readmissions within 30 days are part of the *study* phase associated with the PDSA cycle which was my focus in this doctoral project. Further recommendations for the next cycle of PDSA can be considered following the sharing of this information.

In addition to the COPD task force, the Quality and Safety Council is another venue that I plan to communicate the project results via a presentation. This council is a forum where all performance improvement initiatives are reported to interdisciplinary team leaders. An additional opportunity to discuss the evaluation outcomes of the COPD

discharge bundle is the Hospital Readmissions Committee. This group is directed by an administrative physician leader and consists of members in positions that involve the monitoring and prevention of re-hospitalizations at the project site facility. One more group to share these results is the Quality Improvement and Outcomes forum. It is a hospital administrative committee at the project site that reviews patient safety and quality issues as well as improvement initiatives. Currently, my plans to present at Quality Improvement and Outcomes forum will be based on the feedback and guidance I receive from the Hospital Readmissions Committee. Lastly, I will arrange scheduled time to disseminate at the Transitions of Care Council, which is a hospital system meeting of inter and intra-professionals whereby initiatives to improve transitions in care are addressed.

The prospect for external dissemination for the results of this DNP capstone occurred in November 2017. Following the submission of an abstract for a poster presentation at the annual nursing research and evidence-based conference sponsored by the project site's hospital system, I was accepted to display my poster (see Appendix B). I will continue to seek future opportunities to present at nursing conferences. Broadening the perspectives of external dissemination, I am considering publication in an interdisciplinary journal. Dissemination is ongoing and may not be limited to the processes I have described in this subsection.

Analysis of Self

This journey began with a goal to achieve the highest level of leadership within nursing practice, the terminal degree of a DNP. For many years, I have been the clinical

educator and expert in critical care nursing and in this position, I am not frequently exposed to the preparation processes of discharging patients from hospital to home. However, through the coursework and practicum experience provided by the DNP program at Walden University, I was able to reconnect with my passion for patient education and chronic disease management. I explored issues associated with chronic disease and related evidence-based interventions to improve individual and population health outcomes throughout my class discussions.

Eventually, I directed my DNP studies to the chronic condition of COPD. With each course, I increased my knowledge about COPD as a diagnosis and via my practicum experience I enhanced my engagement with this patient population. I learned how as a DNP-prepared nurse I could make a direct impact on the health and well-being of the COPD patient population. Also, I augmented my understanding of transitions in care and the hospital discharge process. As part of my practicum experience, I participated in the interdisciplinary COPD task force which led to my capstone project of evaluating the implementation of a COPD discharge bundle. Through the task force, I collaborated with other disciplines in achieving a common goal which was to improve the health outcomes of patients admitted with COPD, and I was acknowledged by the interdisciplinary team as the clinical nurse expert. Additionally, I became involved with the Better Breathers support group and obtained my certification as a facilitator. The practicum experience also steered me towards becoming an active participate as a stakeholder in the 2016 Strategic Action Plan to Address COPD in New Jersey. My long term goal, beyond this scholarly project, is to maintain my role as an advocate for the COPD patient population

at this project site hospital as well as at the local and state level and to continue to apply all that I have learned towards improving the health outcomes for individuals with COPD.

Overall, this project helped me to grow as a DNP leader in nursing practice and in the delivery of healthcare by emphasizing the importance of staying focused and achieving the ultimate goal of completion. There is no doubt that full-time employment and addressing the demands of the DNP courses did provide a challenge in work-life balance, especially with my family. However, my most significant challenge along this journey was learning the application of inferential statistics. In the end, all the hard work and perseverance proved to be the most rewarding aspect of this capstone project. Without statistical analysis, I would not have discovered the value of the pharmacist speaking to the COPD patient at home within 48 hours of discharge. Upon completion of this DNP capstone project and fortified with the core competencies of the *Essentials for Doctoral Education for Advanced Nursing Practice*, I am empowered to seek out future improvement opportunities that will make a positive difference in how healthcare is provided for individuals with COPD and other chronic conditions.

Summary

In this DNP project, I evaluated the change in readmission rates within 30-days following the implementation of a COPD discharge bundle for patients being transitioned from the hospital to home at one acute care facility. The 30-day readmission rates were assessed pre- and post-bundle implementation for two payment methods, Medicare and all-payer. The initial baseline data reflected Medicare and all-payer groups in the 3-

month period directly prior to the bundle implementation and revealed a decrease in 30-day readmissions when compared to the post-implementation dataset. The second pre-bundle data were from the same 3-month period but from 1 year prior. The Medicare group showed a decrease in readmissions, while the all-payer group had an increase when likened to the post-bundle data. Following the data analysis, I found these changes were not statistically significant for the pre and post-bundle readmission comparisons.

I also evaluated readmission rates within 30 days post-implementation for the bundle compliant versus noncompliant and the spoke to a pharmacist within 48 hours of discharge versus those that did not speak to a pharmacist groups. Both interventions revealed lowered 30-day readmission rates, and these differences were found to be statistically significant. However, speaking to a pharmacist had a greater impact on re-hospitalization then did bundle compliance. Based on these findings, this acute care facility should continue to support using the discharge bundle for COPD, specifically the component of the pharmacist calling and speaking with patients following discharge. Additionally, I recommend the replication of the COPD discharge bundle at other acute care facilities with similar resources to promote better health outcomes for this patient population through fewer hospital readmissions.

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Appendix A: Walden IRB Approval Number

Walden IRB approval number is 07-03-17-0461650.

Appendix B: Poster Presentation for Dissemination