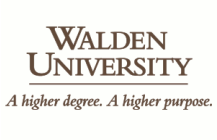

2019

Medication Reconciliation, Competency, Timely and Effective Care, and Hospital Readmissions

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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2019

Abstract

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by

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MBA, Strayer University, 2008

BA, University of California, Los Angeles, 1978

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

June 2019

Abstract

Hospital readmissions within 30 days of discharge result in significant multimillion-dollar penalties to thousands of Medicare-eligible hospitals throughout the United States and are indicators of suboptimal patient healthcare leading to less than ideal health outcomes for previously hospitalized patients. The purpose of this correlation study was to examine the relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. The sample of 269 hospitals came from the population of Medicare-eligible hospitals throughout the United States. Complexity theory and the general model of readmission were theoretical frameworks grounding this study. Secondary data were from publicly available governmental databases. The reporting of the *F* statistic resulted in rejection of the null hypothesis in this study, based on evidence of the existence of a significant correlation between the variables. Findings shows a statistically significant relationship between nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. Medication reconciliation, as measured in this study, was not a significant predictor of 30-day readmission rates. Implications of this study for positive social change include an understanding of factors related to hospital 30-day readmission rates to help leaders take action to enhance patient care, reduce inpatient care expenses, and decrease Medicare-imposed hospital penalties.

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Dedication

This work I dedicate to all of my family. Those who are not here, those who are here, and those who will be around in the future. I dedicate this work to my father and mother (Joe and Annie Nichols). They pushed education to all the children in the family, and to any child they came into contact with. I dedicate my work to my grandparents, Mitchell and Daisy Martin and Ann and Louis Harsaw. My brother (Joe M. Nichols) and his wife, who recently passed (Maxine Lilly Nichols), and my nephew (Kevin Nichols). Also to my sisters (Edith Nichols Odom, as well as Beverly Nichols Parker, who passed). My brother-in-law, Dr. Leroy Odom, and my nieces, Taryn, Jadah, and Leeah Odom, have supported me all of our lives. My aunts, Emma Lovett, Charlotte Scott, Edith Williams, and my cousin, Jerry Williams, who were my lifeline when I moved to the west. They have been major supporters for me since my childhood and undergraduate years. In addition, my Aunt Edith and Cousin Jerry assisted wonderful friends of mine in the interim days and did a lot more. This work I dedicate to the wonderful woman in my life, Consuella Gibson, who has encouraged me, pushed me, and not allowed me to think about not completing the DBA process. I have an unending commitment to those named in my dedication, and to those unnamed in it as well. There is a continuous Love for everyone who has supported me. In addition, there are those not named in the dedication, who have supported me as well. What a journey this has been, and life goes on. "Wow."

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I give a special thanks to Dr. Craig Martin for his continuing and purposeful guidance while assisting me in making this undertaking become a reality. I recognize the professors and staff at Walden University and my classmates for assisting in making this endeavor more palatable. I am grateful to those who challenged, critiqued, and encouraged me along the way throughout the doctoral program.

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Section 1: Foundation of the Study

Due to suboptimal healthcare outcomes and financial penalties that Medicare imposes on hospitals with relatively high readmission rates, hospital 30-day readmission has become an important performance measure for American hospitals (Gilman et al., 2014). A 30-day readmission to a hospital occurs when a hospital admits a patient to receive inpatient care during the 30 days following the patient's discharge from the same or a different hospital (Gu et al., 2014). In 2014, fines assessed for readmission penalties to more than 2,600 hospitals totaled approximately $428 million (Barnett, Hsu, & McWilliams, 2015). Preventable hospital readmissions account for $17 billion of total annual Medicare spending, with thousands of hospitals subjected to Medicare penalties totaling another $1 billion between 2012 and 2016 (Desai et al., 2016). Hospital readmission is a costly indicator of performance problems within the American healthcare system (Mitchell et al., 2016). Hospital leaders, clinicians, administrators, and policymakers can use effective strategic intervention plans, based on knowledge derived from relevant research about factors related to readmissions, to reduce 30-day readmission rates (Goodwin, Rice, Simpson, & Ford, 2015). Using previously-published, publicly available secondary data, the focus of this study was on the examination of the relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates.

Background of the Problem

American hospitals generate trillions of dollars in revenue. For example, there were approximately $1.1 trillion in inpatient hospital charges to patients in 2012

(Hamavid et al., 2016). As much as 41% of this revenue comes from Medicare and Medicaid, with the federal government disbursing more than $11 billion annually to states for assistance with taxpayer-funded public health care coverage (Neuhausen et al., 2014). Medicare reimbursements decrease because of penalties to hospitals that have greater than expected numbers of 30-day readmissions (Barnett et al., 2015). These costs may exacerbate associated problems with patient care quality. This exacerbation may be due to issues of medical reconciliation and timely and effective care associated with nursing workforce competency (Hume & Tomsik, 2014).

Reducing hospital 30-day readmission rates remains a challenge for hospital leaders, partly because of a lack of understanding about the problem (Goodwin et al., 2015; Mitchell et al., 2016). Hospital predictive models have shown poor performance in reducing 30-day readmission rates (Desai et al., 2016). However, previous studies revealed that poor quality of healthcare during the first hospitalization may be a significant driver of hospital 30-day readmission (Tsai, Orav, & Joynt, 2014). Medication reconciliation (as a practical tool to reduce the risk of medication errors), together with the enhancement of nursing workforce competency (based on the assessments of nursing skills), are significant drivers of healthcare quality at hospitals (Ramjaun, Sudarshan, Patakfalvi, Tamblyn, & Mequerditchian, 2015). Accordingly, indicators of higher care quality (specifically, metrics related to medication reconciliation, nursing workforce competency, and timely and effective care) were implicated in reductions of 30-day hospital readmissions for hospitals in the United States. Few studies exist on the relationship between medication reconciliation, nursing workforce competency, timely

and effective care, and Medicare-eligible hospital 30-day readmission. This study represented an opportunity to help fill the gap in the literature and contribute to business practice improvement.

Problem Statement

Hospital readmissions occur at a rate of 17% to 20% within 30 days of discharge (Gonzalez, Shih, Dimick, & Ghaferi, 2014); poor quality healthcare during hospitalization is a significant driver of hospital 30-day readmission, which may be associated with medical reconciliation, timely and effective care, and nursing workforce competency (Hume & Tomsik, 2014; Tsai, Orav, & Joynt, 2014). Fines assessed for readmission penalties at more than 2,600 hospitals totaled approximately $428 million in 2014 (Barnett et al., 2015). The general business problem addressed in this study is that hospital readmissions are costing hospitals billions of dollars in fines each year. The specific business problem addressed in this study is that some leaders of Medicare-eligible hospitals lack information on the relationship between medication reconciliation, nursing workforce competency, timely and effective care, and 30-day readmission rates.

Purpose Statement

The purpose of this quantitative correlation study was to examine the relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. The predictor variables were medication reconciliation, nursing workforce competency, and timely and effective care. The criterion variable was Medicare hospital 30-day readmission rates. Information on the factors related to 30-day readmission can help hospitals reduce the costs of

readmission penalties. The population for this study was Medicare-eligible hospitals throughout the United States, the majority of which published publicly available performance data that included readmission rates. Implications for positive social change based on a better understanding of factors related to hospital 30-day readmission rates include enhanced patient care with fewer medical errors, higher patient satisfaction and well-being, and potential reduction in billions of dollars of inpatient care expenses and Medicare-imposed hospital penalties. Information on the relationship between the aforementioned factors helps hospitals ameliorate financial costs associated with readmission penalties.

Nature of the Study

A quantitative methodology was suitable for this study. The three research methods are quantitative, qualitative, and mixed method (Roberts & Povee, 2014). In a quantitative study, the researcher relies upon data to describe concepts in numerical terms, examine relationships between variables, or compare groups or situations (Guetterman, Fetters, & Creswell, 2015). The quantitative method involves statistical means to test hypotheses, leading to findings that are typically objective and impartial (McCusker & Gunaydin, 2015). Because I intended to examine relationships between the variables through statistical means, thereby applying an analytical approach to the numerical secondary data collected for this study, the purpose did not align with a qualitative approach. According to Owen (2014), the qualitative method involves data collection techniques such as interviews, documents, artifacts, and observations to study phenomena, perspectives, cultures, theories, or beliefs of individuals. Qualitative studies

also entail collecting and analyzing data that are not numerical (Russell et al., 2016). The collection and analysis of quantitative data supported the questions asked in this study, which could not be answered through the collection and analysis of qualitative data. For a mixed method approach, data are collected and analyzed through the use of both qualitative and quantitative methods (Roberts & Povee, 2014). A mixed methods approach was not applicable to this study because the addition of a qualitative method was unnecessary to uncover an answer to the main research question.

The study design for this quantitative research was correlation, which Aarts, Dolan, Verhage, and Van der Sluis (2015) claimed is appropriate when the purpose of a study is to examine the relationship between variables with the purpose of testing hypotheses and drawing inferential conclusions. This study did not involve experimentation, which, according to Paliy and Shankar (2016), involves assigning, testing, and comparing groups through the statistical analysis of measurements before and after experimental treatments or the manipulation of independent variables. A quasi-experimental design is useful to examine the effectiveness of interventions in real-world settings across different populations and points in time (Bor, Geldsetzer, Venkataramani, & Bärnighausen, 2015). A quasi-experimental design was not appropriate for this study, because I did not intend to generate causal evidence or examine the effectiveness of interventions in real-world settings across different populations. The correlational design was the most appropriate, because it allowed for the examination of associations between the variables of interest.

Research Question

The research question was as follows: What is the relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates?

Hypotheses

$H_0$1: There is no statistically significant relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates.

H_a1: There is a statistically significant relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates.

Theoretical Framework

Stemming from systems theory, complexity theory holds that the components of some systems interact unpredictably (Therrien, Normandin, & Denis, 2017). Complexity theory enabled an understanding of the complicated interactions between the components of the complex organizational systems studied in this research. Complexity theory has been helpful to researchers aiming to solve business problems, such as those occurring in healthcare and hospital research settings (Adams, Jones, Lefmann, & Sheppard, 2014; Drack & Pouvreau, 2015). Hospital settings involve extraordinary and unpredictable situations that hospital staff must address without interfering with service to existing patients (Therrien et al., 2017). Three salient factors in the hospital system that may be related to readmissions are medication reconciliation, nursing workforce competency,

and timely and effective care (Shaw, 2014). Adams et al. (2014) claimed that the provision of healthcare services involves complex interdependent components that can contribute to or compromise the efficiency, value, and quality of patient care. Medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission were appropriate to examine for the relationship between elements through the application of complexity theory.

Operational Definitions

30-day readmission: Hospital 30-day readmission refers to an admission to a hospital within 30 days of discharge from the same or another hospital (Centers for Medicare & Medicaid Services [CMS], 2014).

Hospital: The word *hospital* in this study encompasses Medicare-eligible acute care healthcare settings in the United States, operated as free-standing facilities specializing in the treatment of patients with acute or chronic critical illness (Kahn et al., 2015).

Medication reconciliation: Medication reconciliation is the process of comparing a patient's current medication to the patient's previous medications (Almanasreh, Moles, & Chen, 2016).

Nursing workforce competency: Nursing workforce competency is an assessment of nursing skills required to use critical thinking and apply problem-solving skills; nursing workforce safe practices comprise a competency concept measured to reflect adequate staffing of hospitals with skilled nurses who are trained to provide safe care (American Association of Colleges of Nursing, 2019).

Secondary data: Existing data collected in primary research studies and stored in database systems available for use by researchers not involved in the original research (Cheng & Phillips, 2014).

Timely and effective care: Timely and effective care involves how quickly and how well a hospital treats and provides preventive services to patients with certain types of medical emergencies (Medicare, 2017).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions in this study were aspects of the study deemed true or necessary for valid outcomes. Identifying underlying assumptions can enhance the transparency and validity of a study (Ernst & Albers, 2017; Wu, Thompson, Aroian, McQuaid, & Deatrick, 2016). For this research, I assumed that the secondary data used in the study were accurate, credible, and complete. The data were from the National Quality Forum (NQF) and CMS, both reputable, credible, government-affiliated databases. The data-accuracy assumption was necessary because inaccuracy of secondary data may stem from errors in data entry, falsification of reports, or other bias in the original data collection procedure (Cheng & Phillips, 2014).

Limitations

Limitations are elements of a research study that are beyond the researcher's control (Ward, 2014). The primary limitation of this study was that I was not able to control the accuracy and completeness of the secondary data. Although I was not able to confirm the accuracy and completeness of the data, the sources of the data were

government-affiliated databases that likely contained accurate data on most, if not all, of the Medicare-eligible hospitals operating in the United States. A secondary limitation was the generalizability of findings to hospital settings that are not Medicare eligible, and the results of the study may not apply to hospitals outside the United States.

Delimitations

The delimitations of a study are the choices that the researcher makes to narrow and define the scope of the study (Knafl, Leeman, Havill, Crandell, & Sandelowski, 2015). The scope of this study included Medicare-eligible hospitals located throughout all regions of the United States that reported performance data to government-affiliated databases. The study included secondary data from the NQF and the CMS, both reputable government-affiliated databases. The purpose of this study was not to include other factors, such as the patient demographics, healthcare behaviors, or other unique characteristics, that may have also been sources of hospital readmissions. The purpose of this quantitative correlational research was to determine if a relationship existed among variables selected for the focus of this study. Examining every possible variable implicated in Medicare-eligible hospital readmissions was beyond the scope of this study. The selection of variables in this study stemmed from a comprehensive review of the literature leading to the identification of a gap in the related body of knowledge and the identification of variables recommended by prior researchers for future study to help fill the gap in knowledge.

Significance of the Study

Hospital 30-day readmissions represent a significant performance indicator of hospitals in the United States (Zhou, Della, Roberts, Goh, & Dhaliwal, 2016). One of the most important topics of concern to hospital leaders is the 30-day readmission rate, representing enormous costs to hospitals in the United States (Mortensen et al., 2014). Consequently, ongoing study of hospital 30-day readmission contributes knowledge that can lead to business practice improvements to reduce fines associated with hospital readmissions, as well as positive social change and improved patient care. The following subsections include the contributions of this research to industry and the implications for social change.

Contribution to Business Practice

The results of this study contribute to business practice by providing hospital leaders with information about operational factors that may relate to hospital 30-day readmissions. The results of this study illuminate how the medication reconciliation, nursing workforce competency, and timely and effective healthcare measures of a hospital relate to the overall incidence of hospital 30-day readmission. Hospital 30-day readmission is becoming a significant determinant of hospital financial performance in the United States (Fischer et al., 2014). Despite the growing problem and expenses associated with it, hospital leaders lack a full understanding of the reasons for 30-day readmissions rates (Mitchell et al., 2016). Understanding the variables implicated in the problem and their relationship with 30-day readmission may help hospital leaders develop strategies to reduce the number of readmissions and related financial costs to

patients and payers (Rennke & Ranji, 2015). Implementing strategies based on rigorous research may also help prevent reductions in government-payer reimbursement penalties for higher than expected readmissions, thereby enhancing business practices by preventing lost revenues for inpatient care (Barnett et al., 2015).

Implications for Social Change

Given that hospital 30-day readmission is a significant driver of healthcare cost and could stem from and exacerbate problems with the quality of hospital care, there were implications of this for positive social change. The results represent new knowledge that healthcare leaders can use to generate and implement strategies for healthcare improvements. Providing knowledge of ways to lower healthcare costs and improve the quality of care can benefit all members of society who rely upon healthcare services (Mortensen et al., 2014). A successful healthcare system is one that has obtainable healthcare outcomes and low costs (Davis, Schoen, Stremikis, & Squire, 2014; Mortensen et al., 2014). The average U.S. citizen does not always receive the best healthcare, despite escalating healthcare costs (Davis et al., 2014). This suboptimal healthcare outcome is partly due to avoidable hospital 30-day readmissions that absorb limited healthcare resources (Desai et al., 2016). Consequently, reducing 30-day readmission is likely to improve healthcare access and quality of care for the healthcare-seeking members of society within the United States.

A Review of the Professional and Academic Literature

The purpose of this quantitative correlation study was to examine the relationship between medication reconciliation, nursing workforce competency, timely and effective

care, and Medicare-eligible hospital 30-day readmission rates. The null hypothesis was that there is no statistically significant relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. The alternative hypothesis was that there is a statistically significant relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. The research process led to an answer to the guiding research question through hypothesis testing and correlation examination between the three predictor variables and the criterion variable (30-day readmission rates). Hospital readmission has been the subject of various empirical studies (Bernatz, Tueting, Hetzel, & Anderson, 2016; Flint, Allen, Pham, & Heidenreich, 2014; Raval et al., 2015). The amount and complexity of rigorous research efforts with a focus on hospital 30-day readmission grew from the need to address the problem from multiple perspectives (Bernatz, Tueting, & Anderson, 2015; Tung, Chang, Chang, & Yu, 2017). The purpose of this literature review was to synthesize literature on Medicare-eligible hospital 30-day readmission and possible related factors. This literature review included identification and reporting of peer-reviewed studies pertinent to hospital 30-day readmission in the United States.

Walden University's online library and the University of North Carolina, Greensboro Library were sources for this literature review. I also used the Centers for Medicare and Medicaid Services (CMS) and hospital safety websites for statistics and additional research involving the topics under study. Within the Walden University online library, I used the following databases to conduct the literature search: Business

Source Premier, Education Source Complete, ProQuest Central, and SAGE full-text. The keywords used in the online searches included combinations of the following words: *30-day readmission*; *hospital readmissions*; *healthcare administration and leadership strategies*; *Medicare and Medicaid hospital services, reimbursement, and expenses*; *medication errors and reconciliation*; *hospital staff, physician, nurse, and nursing workforce competency*; *healthcare and inpatient costs*; and *efficient, timely, and effective quality patient care*.

During the literature search, I ensured that most articles included in this synthesis met the criteria for peer-reviewed references published within 5 years prior to my graduation date of 2018, to align with the requirements of the Walden DBA program. As displayed in Table 1, the review included 204 sources, 191 of which were peer-reviewed articles published between 2014 and 2018. I used Ulrich's periodicals directory from the Walden University Library website to verify whether an article was peer reviewed. Additional books outside the current peer-reviewed criteria were germinal sources pertaining to the theory and historical context of the topics of this study.

Table 1

Summary of Sources in the Literature Review

Reference type	Total	2014-2018	< 2014
Peer-reviewed journals	199 (95%)	190	9
Books	2	1	1
Websites	3	0	3
Total	204	191 (93%)	13

Complexity Theory

Complexity theory grew out of systems theory in the 1960s and has been used by researchers to examine and understand the relationships between interrelated components in complex, dynamic systems such as healthcare delivery systems (Peters, 2014). Therrien et al. (2017) noted extraordinary hospital situations that require hospital staff members to manage circumstances without interfering with their service to patients. No universal definition of complexity theory exists; however, as Thompson et al. (2016) emphasized, a lack of universal definition does not equate to the absence of validity; accordingly, the definition of complexity depends on the perspectives reflecting a phenomenon of interest. Thompson et al. explained complexity theory as a coalescence of perspectives conceptualized based on the relationships of components within systems and the foundation of the properties involved with system change.

The structure of the U.S. health care industry is complex and this complexity is partly responsible for calls for better applications of theory in health services research (Thompson et al., 2016). An emphasis on the increase of the use of theory in the design

and interpretation of healthcare research led to the analysis of the attributes of complexity theory that have become useful in healthcare-related studies (Provost, Lanham, Leykum, McDaniel, & Pugh, 2015). Complexity theory applies to the study of a multitude of phenomena, with increasing promise in healthcare research (Pitkäaho, Partanen, Miettinen, & Vehviläinen-Julkunen, 2015). For example, Karemere, Ribesse, Kahindo, and Macq (2015) called hospitals complex adaptive systems in their study of hospital programs and dynamics. Glenn, Stocker-Schnieder, McCune, McClelland, and King (2014) framed their study of nursing practices with perspectives on complexity as it pertained to safety. Cucolo and Perroca (2017) and Eika, Dale, Espnes, and Hvalvik (2015) similarly applied complexity theory to the study of nursing practices in healthcare delivery settings. Anderson, Toles, Corazzini, McDaniel, and Colon-Emeric (2014) used complexity theory to frame the study of interaction strategies and the capacity for improved healthcare settings.

Complexity theory emerged alongside the acceptance that organizations are systems (Drack & Pouvreau, 2015; von Bertalanffy, 1950). The appropriateness of complexity theory in studying hospital systems stems from researchers' abilities to conceptualize hospitals as systems (Thompson et al., 2016). A system is a group of interdependent or interacting objects (Ashby, 1958; von Bertalanffy, 1950). Thompson et al. (2016) suggested that hospitals are complex adaptive systems comprised of interconnected and interdependent parts bound by a common purpose. According to Thompson et al., the parts of a hospital system combine in predictable ways, and it is possible to isolate individual parts of the system to gain an understanding of the overall

system and its interrelated parts. However, Thompson et al. also warned that hospitals are especially complicated or complex, requiring theories to help in understanding the interrelationships of complex systems.

Sturmberg and Martin (2013) and Sturmberg, Martin, and Katerndahl (2014) examined complexity theory as applied in health settings research. Sturmberg and Martin described complexity as a characteristic of a system and argued that complexity theory represents a perspective with which to study complex systems in ways that do not reduce systems to their individual components. A complexity-theory perspective encompasses consideration of the interactions between individual components that are important in the study of systems (Thompson et al., 2016). Sturmberg et al. noted that the interactions among components in a system are responsible for the results of the system; accordingly, complexity theory helps to account for the interactions within a system that produce behaviors leading to results.

Thompson et al. (2016) described complexity theory as including the idea of self-organization (interactions among agents) and emergence (system-level changes). Thompson et al. explained that agent interactions are not under a central control and instead are under limited decentralized control through simple rules and various responses to environmental changes. Consistent with this concept is the idea that new system behaviors may be unpredictable and difficult to attribute to a specific cause (Sturmberg & Martin, 2013). Additional aspects of complexity theory pertain to the idea that a system is open to its surroundings, as well as the idea that interactions and

exchanges of information and individuals are mutually influential (Sturmberg et al., 2014).

Applications of complexity theory appear throughout the literature involving organizational mathematics and organizational and management sciences (Pollack, Adler, & Sankaran, 2014). Pollack et al. (2014) studied the uses of complexity theory and reported that scholars of organizational research were later adopters of complexity theory than scholars in the field of mathematics. Pollack et al. recommended additional applications of complexity theory to management problems. Sturmberg et al. (2014) used complexity theory in health care research, with a focus on general practice applications. Sturmberg et al. also concluded that more scholars are framing research with complexity theory than in the past.

Thompson et al. (2016) found in a review of 44 healthcare-related peer-reviewed studies revolving around complexity theory that there had been increasing incorporation of complexity theory into healthcare services research. Most of the studies reviewed by Thompson et al. were qualitative studies, with the majority being case studies at healthcare facilities. The authors reported that the most common attributes of complexity theory in healthcare research included relationships and self-organization, as well as diversity, with a central theme of how diverse relationships and interactions among individuals in systems bring about change (Thompson et al., 2016).

Complexity theory holds that small changes to any part of a system, as well as the interactions and relationships within the system, may lead to tremendous changes in the system and outcomes (Drack & Pouvreau, 2015; Thompson et al., 2016). For example,

with a complexity theory perspective, medication reconciliation, nursing workforce competency, timely and effective care, and hospital 30-day readmission are all interrelated elements of a dynamic, interrelated hospital system. The purpose of this study aligned with the principles of complexity theory because the expectation in this study was that small changes in related factors (medication reconciliation, nursing workforce competency, and timely and effective care) corresponded with noticeable changes in hospital 30-day readmission rates.

General Model of Readmission

To approach the issue of hospital readmissions and to help guide future researchers, Greenblatt et al. (2012) developed a general model of readmission that builds upon the theoretical framework advanced by Kangovi and Grande (2011). Kangovi and Grande claimed that the strategy of attributing hospital readmissions to poor discharge processes for medically high-risk individuals yielded disappointing results because of the omission of attention to important factors contributing to hospital readmissions. In the conceptual development of their broad theoretical framework for hospital readmissions, Kangovi and Grande proposed additional consideration for identifying alternative strategies to reduce readmissions, many of which pertain to complexity theory and involve constructs such as timely and effective care, hospital staff competency, and effective treatment strategies, including proper disease management and appropriate medication management.

According to Greenblatt et al. (2012), three major tenets pertain to this theoretical framework of hospital readmissions, originally entitled the *general model of readmission*.

The first tenet of the theoretical framework established by Greenblatt et al. for hospital readmission studies is that an inadequately treated or untreated complication may develop or exist during an original hospitalization, which can lead to readmission. For example, a patient suffering from pneumonia may receive inappropriate antibiotics, which in this study would fall under the category of a lack of effective care, incompetence, or poor medication reconciliation. Greenblatt et al. noted that about 38% of readmitted patients in their study returned to the hospital for readmission, suggesting that inadequate treatments, lack of timely and effective care, or lack of competence in treatment or care could contribute to the problem.

A second tenet of the theoretical framework for hospital readmission established by Greenblatt et al. (2012) is that an unrecognized or untreated complication develops during the original hospitalization that leads to readmission, as in the case of a heart-failure patient sent home without proper medications to address fluid retention. In this situation, complications involve a lack of timely or effective care or incompetence of staff in recognizing and treating a disease or complication. The Greenblatt et al. findings revealed that 60% of the reasons for readmissions involved a condition remaining undiagnosed during the original hospitalization or the development of a complication or disease following the patient's original hospital discharge. Undiagnosed conditions and complications involve the third tenet of the general model of readmission by Greenblatt et al., which is that a new disease or a complication stemming from the original disease or treatment could develop after hospital discharge, resulting in a new hospital readmission.

An example relevant to this study might be an adverse drug reaction resulting from poor medication reconciliation.

Medication Reconciliation

Medication reconciliation score was one of the independent variables in this study, as one of the eight metrics of NQF Safe Practices measures of hospital safety scores (Shwartz, Restuccia, & Rosen, 2015). The purpose of NQF Safe Practices is to gauge the progress of a hospital in implementing processes and protocols that promote safe care for patients (Medicare, 2017). The hospital safety score based on NQF criteria reflects a measure whereby hospitals can earn points for their medication reconciliation score (Shwartz et al., 2015). Medication reconciliation is also a process that hospitals put into place in which national data reflect whether a hospital fully meets standards, is making substantial or some progress toward standards, or is not making progress toward standards (Leapfrog, 2018).

Medication reconciliation refers to the process of identifying and documenting information on all of the medications that a patient is taking, by comparing records from various sources such as lists obtained from patients, hospital records, and files obtained from other providers (Mekonnen, Abebe, McLachlan, & Brien, 2016). Medication reconciliation reduces the chances of medication-related errors such as omission, duplication, and drug interaction (Thomas et al., 2015). Effective medication reconciliation is also likely to improve patient safety and reduce the chance of unplanned readmission (Mekonnen et al., 2016). Many scholars believe that medication

reconciliation is likely to contribute to efforts to reduce hospital 30-day readmission rates (Hume & Tomsik, 2014).

Patients usually receive new medication or face changes in their medication on various occasions including hospital admissions, changes in care, transfers within hospital units or from one hospital to another, discharges, and changes in medical conditions (Mekonnen et al., 2016). This process represents a source of many medical errors (Kennelty et al., 2015). Medication-related errors contribute to the morbidity and mortality rate every day in the United States (Abdel-Latif, 2016). Although there are various reasons for these medical errors, medication-related errors are among the most frequent (Thomas, Coralic, Ruegger, & Thompson-Moore, 2015). Medication-related errors occur in different stages of the care process, from admission to discharge (Conklin, Togami, Burnett, Dodd, & Ray, 2014). Many factors are likely to lead to medication-related errors, with a common cause being the lack of effective medication reconciliation (Thomas et al., 2015). Adopting an effective medication reconciliation process is likely to reduce medication-related errors in hospitals (Mekonnen et al., 2016).

In 2005, the National Patient Safety Goals by the Joint Commission (TJC) introduced the term *medication reconciliation* to emphasize the process of accurately, comprehensively, and systematically reconciling medications across the continuum of health care (Almanasreh et al., 2016). Because hospitals faced challenges implementing medication reconciliation in systematic ways, in 2009 the TJC lightened the role of medication reconciliation in accreditation decisions, but later reintroduced requirements in 2011 because of significance of medication reconciliation to patient safety (TJC,

2012). Acknowledged globally by entities such as the World Health Organization as an essential step in drug safety, medication reconciliation involves comparing lists of patients' medications to physicians' discharge orders to ensure correct medications at discharge through a formal process occurring at the transitions of care (Kennelty et al., 2015). Despite the simplicity of the concept, the implementation of medication reconciliation may be inconsistent, complex, and challenging (Almanasreh, Moles, & Chen, 2016).

To reduce medication discrepancies and improve patient safety during health care transitions, such as discharge from hospitals, medication reconciliation occurs as part of the protocols for medication management and facilitation (Ramjaun et al., 2015). Almanasreh et al. (2016) reported that approximately 50% of hospital medication errors and 20% of adverse drug events result from miscommunications at the interfaces of health care or health care transitions. Kennelty et al. (2015) attributed many adverse drug events and medication discrepancies that jeopardize patient health to poor or nonexistent medication reconciliation at hospital discharges or transitions of care, when patients often receive new or different medication orders. Problems may stem from errors in recording original orders or changes to orders, poor communications between health care professionals, or misunderstandings of the patients (Almanasreh et al., 2016).

Block, Morgan-Gouveia, Levine, and Cayea (2014) studied the aspects of a safe hospital discharge. Like Ramjaun et al. (2015), the authors noted that a critical step in the reduction of the risks of preventable adverse drug reactions and drug events following discharge is an effective medication reconciliation process. Almost 25% of hospital

admissions involve some type of adverse drug events, which can also prolong hospitalizations and lead to unnecessary complications, including deaths, estimated to be at least 7000 per year in the United States (Block et al., 2014). Accordingly, medication reconciliation processes are critical steps in the reduction of medication discrepancies and adverse drug events, which may reduce hospital readmissions. Prior research included a focus on factors involved with medication reconciliation and medication discrepancies, interventions and best practices, and significant barriers to effective reconciliation, but the methodological inconsistencies among studies made it difficult to interpret the body of knowledge in a clear and consistent manner (Almanasreh et al., 2016). However, Thomas et al. (2015) found drug-related problems in the majority of hospital readmissions.

Marinović, Marušić, Mucalo, Mesarić, and Vrca (2016) claimed clinical pharmacist-led programs on medication reconciliation within the context of implementation at hospitals is of worldwide concern and improving medication reconciliation processes can help prevent unintentional medication discrepancies for patients who require hospital care. Hospital leaders recognized the value of medication reconciliation; however, implementing such process has been a challenge (Lee, Varma, Boro, & Korman, 2014). This process includes interviewing patients and using other information records such as those of pharmacies, physicians' offices, and nursing facilities (Sen, Siemianowski, Murphy, & McAllister, 2014). The process of maintaining an accurate list of medications constitutes a challenging task (Stewart & Lynch, 2014).

Medication reconciliation has become suspect in hospital readmission rates. According to Murphy, Rosenman, McPherson, and Friesner (2014), medical discrepancies such as incomplete, inaccurate, or illegible discharge medication instructions and unintentional omission of discharge medications frequently occur during hospital discharge. Given 70% of hospital readmissions occur within a 30-day period, most may be due to adverse drug effects (Murphy et al., 2014). The effectiveness of medical reconciliation is critical in reducing numerous avoidable risks. Most patients are assigned to medical trainees such as medical students and residents for admission, transfer, and discharge. It is important to emphasize skills for quality care of medical staff during their education (Ramjaun et al., 2015).

Nursing Workforce Competency

Nursing workforce competency is one of the variables in this study. Nursing workforce competency is also one of the eight metrics of the NQF Safe Practices measures of hospital safety score (Shwartz et al., 2015) and is part of the steps to avoid harm in the inpatient care management measures of the Leapfrog annual safety score survey . The purpose of NQF Safe Practices is to measure the progress of a hospital in implementing processes and protocols that promote safe care for the patient (Mears & Kates, 2015). Hospitals can earn points for their nursing workforce competency, and as a part of the steps to avoid harm score, reflects whether a hospital fully meets standards or is making substantial progress, some progress, or no progress toward competency standards established as part of the inpatient care management assessments (Leapfrog, 2018).

The role of nurses has become critical in ensuring patient safety and the overall healthcare quality (Liu, Curtis, & Crookes, 2014.). Nurses are champions for patient safety in all healthcare facilities (Avgar, 2015). Despite the critical role of nurses, the shortage of nursing professionals remains a global problem (Kraft, Kästel, Eriksson, & Hedman, 2017). The majority of countries who are members of the World Health Organization report there are issues such as shortages, misdistribution, and misusage of nursing workforce competency (Shidhaye, Lund, & Chisholm, 2015). This shortage might be a result of the growing and aging world population.

The nursing workforce is diverse, and the competency of hospital staff may also improve job satisfaction and reduce disparities in patient experiences with care (Sharghi et al., 2015). The workforce is composed of nurses and leaders from different generations, educational levels, races, genders, beliefs, work habits, and expectations (Avgar, 2015). Managing this diverse workforce is essential for the hospital to be and remain competitive in the healthcare industry. A well-structured, maintained, and educated nursing workforce is a significant driver of care quality and hospital performance (Yakusheva, Lindrooth, & Weiss, 2014). Nursing workforce skill has an influence on various hospital metrics, such as outcomes, mortality rates, and medication errors (Bing-Jonnson, Hofoss, Kirkevold, Bjørk, & Foss, 2016). Researchers have found an association between the quality of nursing workforce competency and the quality of healthcare and performance of hospitals (Aiken, 2014; Yakusheva et al., 2014).

Although the nursing literature includes various uses and definitions of nursing competence, Bing-Jonnson et al. (2016) highlighted the usual reference of the term

competence to mean the capable, professional execution of knowledge and skills to accomplish tasks and duties, often pertaining to a collective activity. Zhang, Ye, and Fan (2015) claimed nursing competence is a difficult concept to define and assess, but that there nevertheless should be greater efforts to study the concept, because nursing competence is one of the most significant prerequisites for high-quality nursing interventions leading to optimal patient outcomes.

Incompetence among the nursing workforce can be dangerous and lead to patient dissatisfaction (Sharghi et al., 2015). Zhang et al. (2015) highlighted the underdevelopment of literature regarding nursing competence, in terms of settings and individual variables, although nursing competency remains an issue at the forefront of nursing and healthcare research conducted in a variety of settings. For example, Bing-Jonnson et al. (2016) studied the sufficiency of nursing staff competence in the geriatric setting, with the purpose of testing a competence measurement instrument developed for registered nurses and certified nursing assistants. Applying multiple regression, Bing-Jonnson et al. reported a relationship between better quality of registered nursing care and improved patient outcomes with fewer adverse events. Bing-Jonnson et al. reported that, in their study of nursing competency, RNs had higher overall collective competency ratings than lesser credentialed nurses or nursing assistants.

Bing-Jonnson et al. (2016) also discussed how the concept of competence in a nursing context can be a collective activity, such that the goals within a healthcare setting, like a hospital, should include a workplace collective competence that exceeds the sum of individual competencies, made possible by the reciprocal strengthening of

each other's competences. Despite these goals, Bing-Jonnson et al. reported the nursing staff they studied demonstrated insufficient nursing competence, lacking in areas such as observation skills, systematic assessments, implementation of nursing measures, performance of advanced procedures, documentation of work processes, and cooperation with colleagues when necessary. However, Bing-Jonnson et al. cautioned readers that minimum acceptable scores of nursing competence measures may be elusive and future research can help practitioners establish the lower ends of clinically acceptable scores for the nursing workforce as a whole and separately for different categories of nurses working in various settings. Continuously assessing nursing competence may help prevent adverse events and provide safer care in healthcare settings.

Nursing competence assessment tools applied throughout the world in diverse healthcare settings included such variables as knowledge, skills, attitudes, ethics, education and professional development, critical thinking, leadership, relationships, and scholarship (Attard, Baldacchino, & Camilleri, 2014; Bing-Jonnson et al., 2015; While & Clark, 2014; Zhang et al., 2016). For example, Sharghi, Alami, Khosravan, Mansoorian, and Ekrami (2015) claimed that high quality nursing care depends on nursing competence, which involves cognitive and psycho-physical clinical skills, critical thinking and decision-making abilities, and learning academic knowledge that leads to adherence to standards that result in safe care. Sharghi et al. also identified technical skills, nursing education and professional development, personal characteristics and experiences, as well as motivation and job satisfaction as contributors to nursing competency. Sulosaari et al. (2015) evaluated the competence of nursing professionals,

through a descriptive study, in terms of their theoretical, practical, and decision-making competence. Theoretical competence pertained to knowledge, while practical competence was the application of that knowledge and decision-making to situations involving patients. Sulosaari et al. (2015) highlighted the role of education, self-regulation, and motivation as significant factors in the development of theoretical, practical, and decision-making nursing competence.

The regression model reported by Bing-Jonnson et al. (2015) reflected that professional group affiliations, work places, and ages of nurses explained only 30% of the variance in nursing competence, although the authors expected education and training to contribute more to the model. With respect to age, there was a negative association with competence, meaning that the older respondents scored lower than younger respondents, which authors attributed to the possible lack of more current education and training. Zhang et al. (2015) also noted an inconsistent contribution of age to nursing competence in the study, but did acknowledge the knowledge and experiences, skills and abilities, as well as characteristics and traits as important elements of overall nursing competence measures. Authors, such as Bing-Jonnson et al. and Zhang et al., concluded that knowledge about nursing competence is necessary to evaluate health care in settings serving patients with acute and complex health care needs.

Timely and Effective Care

Hospitals are in the process of continuous reforms, including financial restructurings, mergers, closures, and performance improvement initiatives as responses to demands to improve efficiency and effectiveness (Giancotti, Guglielmo, & Mauro,

2017). Hospital leaders are under constant pressures to reduce costs while elevating the quality of their health care services; unfortunately, the reduction of hospital costs to avoid closures, especially in more impoverished areas, may also coincide with a lower quality of care, or less timely and inefficient care (Dong, 2015). Hospital staff remain challenged to make optimal use of available expertise, infrastructure, and equipment to benefit patients in the most effective and timely ways (Giancotti et al., 2017). Kristofferson et al. (2015) noted the importance of hospital staff commitment to the process of relevant actions most ideal to reduce morbidity and mortality. Performance measurements, such as timely and effective care measures, represent information on the achievement of quality improvement targets and facilitate the identification of opportunities for improvements (Medicare, 2017).

According to the official United States government site for Medicare (2017), the measure for timely and effective care includes the percentage of adult hospital patients who received medical and surgical treatments associated with the best results, based on scientific evidence, for particular conditions and procedures. The measure also includes how quickly patients received treatments, and how well hospitals provided preventive types of services. Most timely and effective care measurements are from data submissions that Medicare and government officials audit and edit, thereby validating submitted data (Medicare, 2017).

Timely and effective care score is one of the independent variables of this study as the CMS metric used to compare hospitals in the United States; the CMS metric is one of many ways the CMS compels service delivery improvements (Gerhardt et al., 2014).

Data on timely and effective care is available to the public on the Medicare Hospital Compare website. Timely and effective care data includes measures for conditions, such as acute myocardial infarction, heart failure, pneumonia, pregnancy and delivery care measures, surgical care improvement project, preventive care, blood clot prevention and treatment, emergency department, children's asthma care, and stroke care (Medicare, 2014).

Timely and effective care refers to how quickly and how well a hospital treats and provides preventive services to a patient with certain types of medical emergencies (Medicare, 2014). Timely and effective care evolved to become one of the most important performance indicators of hospitals in the United States. This metric is one of the several metrics Medicare CMS uses to compare American hospitals (Gerhardt et al., 2014). Patients may use this type of information to choose hospitals that recommend treatments as a part of their overall care (Frank, Hsu, Landrum, & Chernew, 2015).

Timeliness is paramount in healthcare. How quickly a hospital staff addresses a patient's concerns is a crucial factor in healthcare quality, patient choice, and hospital performance (Frank et al., 2015). Providers should strive to be efficient in every aspect of their operations, including patient care (Fisher & Dickinson, 2014; Guerin-Calvert, 2014). Providing timely and effective care is likely to maximize public benefit, improve health outcomes, and boost hospital performance (Haley & Kreek, 2015).

Timely, effective, and quality care of hospitals is an intrinsic target of health care systems throughout the world (Aryankhesal, Sheldon, Mannion, 2014; Azevedo & Mateus, 2014). Efficiency and productivity are also closely related to effectiveness and

timeliness of care in hospital settings in a quest to improve outcomes for patients (Cheng & Zervopoulos, 2014; De Nicola, Gitto, Mancuso, & Valdmanis, 2014; Li, Dong, & Liu, 2014). Hospital leaders and government policymakers focus on measures of performance, such as the timeliness and effectiveness of hospital care, to improve quality in health care (Hashjin, Kringos, Manoochehri, Aryankhesal, & Klazinga, 2014; Tsai & Jha, 2014). Public access to performance and quality measures of healthcare organizations, such as hospitals, has become crucial to facilitate informed decision making and quality improvements in health care facilities (Hashjin et al., 2014).

According to Hasjin et al. (2014), hospital data pertaining to timely and effective care revolves around the achievement of specific functional, clinical, and administrative objectives to reflect hospitals' commitments to quality, adhering to standards, and meeting expectations. Given the important role of timely and effective health care, especially in hospitals and other acute care settings in which seriously ill patients seek help, health care systems around the world and their associated governments increased investment in performance measurements and reporting systems for hospital performance data (Hashjin et al., 2014). Hasjin et al. noted the U.S. government's nationally-applied bonus and penalty system for hospitals is based on measures of performance and quality of care provided to patients, including the timely and effective care of patients.

Hospital 30-Day Readmission

Hospital 30-day readmission was the criterion variable in this study. The CMS (2014) provides data about hospital 30-day readmission, and it is one of the most tracked performance metrics for hospitals in the United States. Data on 30-day readmission is

available to the public on the Medicare Hospital Compare website and includes different breakdowns, such as 30-day readmission for post-surgical conditions and diseases, including heart failure, heart attack and stroke, chronic pulmonary conditions, as well as and pneumonia (Medicare, 2017).

Hospital dependency on Medicare and Medicaid-eligible populations poses increased revenue challenges for those experiencing high 30-day readmission rates (Barnett et al., 2015). Medicare expenditures for hospital readmissions represent billions of dollars in potentially preventable spending (Gerhardt et al., 2014). Preventable hospital readmission are the subject of concern for scholars and practitioners (Alerno et al., 2017; Gue et al., 2014). Hospital readmission may stem from poor quality care, inadequate transitional care, or care stemming from systematic discharges. High postoperative bed use and the need for hospital bed space are other factors that are a part of these elements (Galloway et al., 2016; Mitchell et al., 2016; Picket et al., 2015; Sanford et al., 2014). The nonexistence of outpatient follow-up care, misunderstanding discharge instructions, multiple medication issues, and insufficient assistance to patients transitioning from the hospital to home are considered being systematic discharge complications implicated in 30-day readmission (Picker et al., 2015). According to O'Brien et al. (2015), special consideration may be appropriate for hospital readmission of Medicare and Medicaid patients, in comparison to other patients served in various types of hospital systems.

Policymakers are continuously seeking ways to improve the quality and reduce the cost of healthcare. Reducing cost and improving healthcare quality is the primary goal of any health system (Mortensen et al., 2014). The United States has seen a tremendous

increase in healthcare costs in the past few decades (Wu et al., 2014). As revealed in this section, although financial performance may relate to quality care, there are other factors related to financial results and quality care that may impact readmission rates. Identifying suboptimal care and its associated outcomes is a needed step to designing and informing quality improvement projects in hospital settings (Kristofferson et al., 2015).

The U.S. Congress, acknowledging the readmission rate as a part of suboptimal healthcare outcomes, passed the HRRP, which involves financial penalties to hospitals with relatively high readmission rates (Salerno et al., 2017). As a result, hospital leaders increased their interests in implementing programs to reduce readmission rates (Zuckerman, Sheingold, Orav, Ruhter, & Epstein, 2016). Joynt, Sarma, Epstein, Jha, and Weissman (2014) studied the challenges leadership encountered in attempting to reduce readmissions in minority-serving hospitals. The authors claimed that hospital leaders had only a general awareness of its performance on readmissions metrics; however, those leaders felt that reducing hospital readmissions was among their highest priorities, partly because of the federal readmissions policy and the financial impact the policies had on hospitals serving Medicare patients.

Barnett et al. (2015) studied patient characteristics and readmission rates, concluding that penalties to hospitals for relatively high readmission rates may stem from patient characteristics. Hospitals that serve overall healthier, more socio-economically advantaged individuals may be able to devote fewer resources to maintain penalty-free readmission rates, whereas hospitals that serve sicker, more socio-economically disadvantaged people may require considerably more resource investments to avoid

penalties (Barnett et al., 2015). Salerno et al. (2017) also studied the readmission rates of hospitals that served different patient groups, such as comparing those hospitals that serve a higher and lower percentage of socio-economically disadvantaged patients. Salerno et al. reported that discharged patients from hospitals that serve a larger percentage of socio-economically disadvantaged patients were more likely readmitted within 30 days of their discharges, compared to patients discharged from hospitals serving fewer socio-economically disadvantaged patients. Gilman et al. (2014) reported similar findings and that hospitals serving higher proportions of socio-economically disadvantaged patients were more frequently penalized financially by government regulation programs, such as the HRRP.

Herrin, Kenward, Joshi, Audet, and Hines (2016) similarly studied hospital 30-day readmission rates in a national sample of 4,073 hospitals, using county data in a hierarchal linear model. The authors reported that county data explained 58% percent of the national variation in 30-day hospital readmission rates, with the strongest association with the measure of care access (Herrin et al., 2016). As a result of similar findings, Gu et al. (2014) suggested that hospital readmission reduction policies stem from concerted efforts to balance the needs for reduced readmissions with the continued access to quality care of particularly vulnerable patient populations. Sheingold et al. (2014) conducted additional analysis of readmission rates and patient populations, but suggested that, although socioeconomics are explanations for some of the difference in readmission rates, there are unmeasured factors, such as those pertaining to hospital performance, that

likely contribute to the problem; understanding those factors could help with the overall objectives for hospital-based healthcare delivery systems transformations.

Although hospital-based strategies for reducing 30-day readmissions included improving discharge processes, customizing transitional care, and focusing on community support and resources, salient barriers to reducing readmission rates continue to challenge hospital leaders (Joynt et al., 2014). Barriers to reducing 30-day readmissions included a lack of clear understanding about contributors to the problem, scarce resources, the diversity of patients and their needs, limited abilities to influence care and support resources in communities, and a misalignment of priorities with respect to financial incentives and patient outcomes (Joynt et al., 2016). Jeno et al. (2016) conducted a large scale quasi-experimental study, revealing a fairly consistent and sustained readmission reduction rates based on interventions that included personalized transitional care, education, medication reconciliation, follow-up patient contacts, and community resource support. The authors concluded that because of barriers, including limited resources, substantial reductions in readmissions for all patients may be prohibitive from a resource-intensive view and that the government's goals of 20% readmission reduction may be overambitious (Jeno et al., 2016).

Zuckerman et al. (2016) reported a concern that with the government readmissions penalties, hospitals may keep patients in observation or not readmit them when necessary and appropriate, as a way to reduce reported readmissions. In response to the concern, Zuckerman et al. studied 3387 hospitals whose readmission rates declined between 2007 and 2015 and concluded that they could not report the finding of evidence

that the decline in readmissions was due to longer or more frequent observation-unit stays. While issues of fairness, how hospitals reduced readmission rates, and how to overcome barriers remain unresolved and incompletely understood, HRRP incentives led to an overall reduction of readmission rates on a national scale (Carey & Lin, 2016).

Hospital 30-Day Readmission Methodologies

Thirty-day readmission measures reflect hospital performance and most of the methodologies used to study the dependent variable, reported in the peer-reviewed literature, were quantitative studies, using rates reported by the National Quality Forum (Minges, Herrin, Fiorilli, & Curtis, 2017). Readmission rate measures stem from data derived from Medicare claims data, validated through medical records data (McIlvennan, Eapen, & Allen, 2015). Claims-based models are useful for calculating hospital risk-standardized 30-day all-cause readmission rates (Spivack, Bernheim, Forman, Drye, & Krumholz, 2014).

Risk-adjusted 30-day readmission rate measures stem from a hierarchical logistic regression model, derived from Medicare claims data, validated through medical records data (McIlvennan et al., 2015). Hierarchical logistic regression model calculations lead to adjustments in the actual numbers of readmissions, estimating probabilities of readmissions at specific hospitals (Gu et al., 2014). Other measure include excess readmission ratios, typically used to assess hospital penalties, adjusted for variations in a hospital's volume and cases, accounting for patient risk factors, such as age, gender, and particular morbidities (McIlvennan et al., 2015).

Summary

In summary, the literature includes various studies on the value of measuring and tracking hospital 30-day readmission, medication reconciliation, nursing workforce competency, and timely and effective care. Hospital 30-day readmission is a significant driver of hospitals' financial performances in the United States, underlying one of the primary objectives needed to be addressed to improve financial performance and remain competitive (Mortensen et al., 2014). Schoonover et al. (2014) demonstrated through research that the annual savings realized from mitigation of the Medicare 30-day resubmissions can add up to $12 billion. Hospital 30-day readmission has become a fundamental threat to the financial performance of hospitals in the United States (Mortensen et al., 2014). Consequently, research on reducing this risk is likely to benefit every stakeholder of the United States hospital system.

Medication reconciliation, nursing workforce competency, and timely and effective care may relate with measures of patient safety, healthcare quality, and overall health outcome (Haley & Kreek, 2015). Additionally, high healthcare quality is likely to reduce 30-day readmission (Herrin et al., 2016). A lack of empirical evidence appeared to exist about how medication reconciliation, nursing workforce competency, and timely and effective care related to 30-day readmission rates. This study investigating the relationship between these three independent variables and the hospital 30-day readmission led to additional information to fill a persistent gap in the research. Adding to the body of knowledge are findings that leaders can use to improve business practices and enhance the experiences of staff and patients in the healthcare industry.

A comprehensive review of the literature indicated that the possibility of significant correlations of variables selected for examination in this study. According to Fisher, Graham, Krishnan, and Ottenbacher (2016), researchers are actively attempting to identify predictors of 30-day hospital readmissions because the identification of potentially important predictors and correlates of hospital readmission can lead to strategies to reduce readmission rates. The growing interest in readmission rate research stems largely from leadership goals to prevent a significant proportion of hospital readmissions, with quantitative predictive, correlative, and linear models the most commonly applied approaches to the study of implicated variables (Gohil et al., 2015). Fisher et al. recommended additional research using a quantitative methodology and a regression design to study important hospital-level variables and outcomes. Although there is a distinction between risk at the hospital level and risk prediction at the patient level, the quantitative study of readmission risk and rates in this study aligned with the research recommendations of the CMS, based on the assumption that the risk of readmission is modifiable by the quality and type of care that hospitals provide.

Transition

Section 1 included the foundation of the study. Topics covered in this section were the background of the study, problem addressed in this research, the purpose and nature of the study, the research question which aligned with the hypothesis, the theoretical framework, definition of relevant terms, assumptions, limitations and delimitations, significance of the study, and a review of related literature. The literature reviewed led to additional insight about factors hospital leaders may learn about to reduce

30-day readmission rates. The literature review revealed a gap in knowledge about a possible relationship between 30-day readmission and other factors, such as medication reconciliation, nursing workforce competency, and timely and effective care. This study led to contributions to help leaders improve business practices, with implications for positive social change, while filling the gap in the literature. Two additional sections follow. The next section, Section 2, includes the steps involved in the research method and design, such as collecting, validating, and analyzing data. Section 3 includes the presentation and analysis of the results, with recommendations for action and future research that lead to the final reflections and conclusions drawn from this study.

Section 2: The Project

Section 2 includes details about the methodology of this study. A restatement of the purpose of the study and an explanation of my role as the researcher lead to details about the participants, followed by justifications for the selection of a quantitative methodology with a correlational design. In this section, I identify the population and sampling procedures, address ethical considerations surrounding the research, describe the data collection procedures and related instrumentation, and offer details about the use of multiple linear regression as the data analysis technique selected for the study. The chapter concludes with a discussion of threats to validity and reliability.

Purpose Statement

The purpose of this quantitative correlation study was to examine the relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. The predictor variables were medication reconciliation, nursing workforce competency, and timely and effective care. The criterion variable was Medicare hospital 30-day readmission rates. Information on the factors related to 30-day readmission can help hospitals reduce the costs of readmission penalties. The population for this study was Medicare-eligible hospitals throughout the United States, the majority of which published publicly available performance data that included readmission rates. Implications for positive social change based on a better understanding of factors related to hospital 30-day readmission rates include enhanced patient care with fewer medical errors, higher patient satisfaction and well-being, and potential reduction in billions of dollars of inpatient care expenses and

Medicare-imposed hospital penalties. Information on the relationship between the aforementioned factors may help hospitals ameliorate financial costs associated with readmission penalties.

Role of the Researcher

My role in this research was to propose a research question that addressed a gap in the peer-reviewed literature and justify the significance and methodology of the study, demonstrating the value of the research to society. As a part of my role as a researcher, I collected and analyzed the data ethically and disseminated the information promptly, which are responsibilities that Chiumento, Rahman, Frith, Snider, and Tol (2017) described for researchers. I collected data published by government-affiliated databases maintaining annually updated information about Medicare-eligible hospitals, including 30-day hospital readmission rates, medical reconciliation, nursing workforce competence, and timely and effective care (T&E) scores. All data were secondary and available to the public; therefore, I did not need permission from the data owners before collecting the data.

My role as the researcher was to collect and analyze the data while adhering to all ethical and legal guidelines required by the Institutional Review Board (IRB) of Walden University. While secondary data collection methods are flexible approaches that can be applied in several ways, they also involve procedural and evaluative steps, just as when researchers are collecting and analyzing primary data (Doolan & Forelicher, 2009). I obtained approval from the IRB of Walden University before collecting data. The only connection I had with the topic or industry was as a consumer of the healthcare industry.

Reliance on secondary data using random sampling and complete reporting of findings from the sample can reduce bias related to one's own experiences and other potential sources of bias in a study (Jefferson et al., 2014; Reid et al., 2015). As a general outsider to the topic and industry who was collecting secondary data and using systematic random sampling and statistical analysis procedures, I reduced the likelihood of the influence of personal bias on the study findings.

Researchers face legal and ethical challenges in every stage of their studies (Check, Wolf, Dame, & Beskow, 2014). I considered the potential ethical and legal challenges at each step of research planning. Complying with applicable codes of conduct, legal requirements, certificates of confidentiality, and social responsibilities is likely to reduce ethical and legal challenges (Beskow, Check, & Ammarell, 2014). I complied with the ethical standards of the IRB, legally accessed data, adhered to confidentiality principles, and acted with social responsibility. Ethical standards described in the Belmont Report apply to human beings as research subjects (U.S. Department of Health, 2014). I did not include human subjects because I collected data from publicly available secondary data sources. However, I respectfully followed guidelines for conduct that apply to rigorous ethical research, including applying objectivity, integrity, confidentiality, and responsibility.

Participants

Although there were no active participants in this study, the unit of interest corresponded to Medicare-eligible hospitals in the United States. The list of Medicare-eligible hospitals and the performance measures were available online through publicly

accessible websites (Medicare, 2017). Scholarly leaders, such as Dunn, Arslanian-Engoren, DeKoekkoek, Jadack, and Scott (2015) and Burton, Banner, Elliot, Knoppers, and Banks (2017), described the use of secondary data as an efficient and effective approach to collect and statistically analyze data in the healthcare field. Secondary data are often appropriate to use when there is a valid and reliable set of secondary data appropriate for research efforts (Cheng & Phillips, 2014; Doolan & Froelicher, 2009). The most time-consuming steps of typical research projects, such as instrument development and primary data collection, were eliminated from this study; however, the effort to access multiple databases and compile data on the hospitals in the sample was labor intensive and followed a systematic random sampling process.

The random sampling process, described by West (2016) and Shi (2015) as a commonly desirable technique for sampling, gives the same selection chances to each unit of interest. The eligibility requirements encompassed Medicare-eligible hospitals included in publicly available reports of performance data compiled by the CMS and NQF, which is where I accessed the participants' data for the random sample from the population. Medicare-eligible hospitals are hospitals that are eligible for Medicare reimbursement, and most if not all are represented in the publicly available data on government-funded hospital performance (McHugh et al., 2015). Medicare-eligible hospitals operate under the same or similar regulations and stakeholder pressures and are all subject to 30-readmission penalties (Desai et al., 2016).

Access to secondary data contained in databases allows researchers to compile and analyze primary data collected and reported by others (Singh et al., 2016). In this

study, the secondary data represented the primary data collected and reported by the CMS and NQF, obtained from hospitals and maintained in their annually updated databases. According to Johnston (2014) and Cheng and Phillips (2014), accessing participant information by obtaining secondary data involves the application of the same basic research principles as those applied to research using primary data obtained directly from participants.

Research Method and Design

The following subsections include the justifications for the selection of a quantitative method. In addition, there are explanations that support the use of the correlational design applied in this research. The reasons for not selecting alternative research methods and designs are also part of the rationales for the methodology and design choices made in this study.

Research Method

The method for this study was a quantitative research method. In the process of identifying the most appropriate research method for this study, I considered quantitative, qualitative, and mixed methods research approaches. The objective of this study included the desire to examine the correlation between variables (medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rate). In a quantitative study, the researcher uses quantitative or measurable data to perform statistical tests that may include examination of the correlation between variables (Kühberger, Fritz, & Scherndl, 2014). All of the variables in the study were measurable and represented by quantitative data, which aligned with the

concept of quantitative research. Quantitative methodology involves numbers and categories analyzed by the application of statistical methods, whereas qualitative methodology involves descriptions with textual or nonnumerical data (Carayon et al., 2015). Szucs and Ioannidis (2017) explained how null hypothesis significance testing occurs through a quantitative method. I intended to use numerical and not textual data and planned to apply statistical tests to arrive at an answer to the research question by hypothesis testing, which supported the choice of a quantitative methodology.

The qualitative research method was not appropriate because qualitative studies typically involve the collection of prolific, often narrative data reflecting the perspectives, experiences, and beliefs of individuals or groups of individuals pertaining to identifiable phenomena (Owen, 2014). Qualitative studies also involve collecting and analyzing nonmeasurable data from relatively small samples and may involve multiple data sources (Wu et al., 2016). Van Bogaert et al. (2017) described the types of thematic findings that could stem from qualitative studies. The collection of narrative data, reliance upon small samples, and a focus on personal experiences and perspectives organized around themes were not relevant to the goals in this study. Instead, the overarching research question pertained to known variables represented by measurable data, and the results derived from larger samples could be appropriately generalizable through a quantitative method.

Mixed methods studies, although common in healthcare and social science research (Van Bogaert et al., 2017), are very complex and time consuming, because they involve collecting and analyzing both qualitative and quantitative data (Hughes, 2016). The mixed method, including a qualitative component combined with quantitative data

collection and analysis, was not the most suitable method for this study because of the complexity and time associated with mixed methods studies. A mixed method, which, according to Roberts and Povee (2014), adds a more in-depth qualitative research methodology component to a quantitative study, was unnecessary to arrive at an answer to the overarching research question.

Research Design

The design for this study was a correlational design involving the use of multiple regression to examine relationships between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. Quantitative researchers can choose between different research designs, including experimental, nonexperimental, and correlational designs (Roberts & Povee, 2014). A quantitative study is correlational when the focus is examining the relationships between variables, while experimental research revolves around the examination of potential causal relationships (Kühberger et al., 2014). Correlational research is an umbrella concept that encompasses the use of correlation and regression analyses and is appropriate when the objective is to examine the relationships between predictor variables and a criterion variable (Cheung & Jak, 2016; Leedy & Ormrod, 2010). In this study, the goal was to examine the relationships between predictor variables and a criterion variable, which aligned appropriately with the nature and design of correlation research.

Other designs were not appropriate choices for this study, including experimental and quasi-experimental designs. Aarts et al. (2015) noted how experimental designs may

involve multiple measurements following different experimental conditions or manipulations. I was not seeking to establish causal evidence, manipulate variables, or record multiple measurements over time; instead, I intended to examine potential relationships, which aligned with a correlation design rather than an experimental design. A quasi-experimental design is similar to an experimental design without random assignment (Kelly, 2015). While I did intend to use random sampling, I did not intend to assign participants to groups. The experimental and quasi-experimental research designs were not suitable for this study because I did not intend to study different groups and had no interest in evaluating causal relationships. To answer the overarching research question of this study, there was no need to generate causal evidence by manipulating variables, assigning groups, or comparing outcomes from changing or different interventions. Rather, the goal of this study was to examine the degree and the nature of the relationships between the variables, which aligned with a correlation design.

This study revolved around the use of multiple linear regression to examine the relationships between predictor variables and an interval-level criterion variable. Applying statistics to data through a correlation design involves calculating, describing, and summarizing data followed by the subsequent testing of a hypothesis to answer a research question involving relationships among variables (Vetter, 2017). The hypothesis for the research pertained to a significant relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates, which aligned with a correlation design.

Population and Sampling

The general population of this study consisted of 3,359 Medicare-eligible hospitals in the United States. Research populations are individuals, groups, or entities that share defined social, demographic, environmental, or geographic attributes (Moonesinghe, Bouye, & Penman-Aguilar, 2014). Hospitals within the Medicare-eligible population have approximately the same size and face the same regulations and same stakeholder pressures; these hospitals are all subject to 30-day readmission penalties (Desai et al., 2016).

For the purposes of data collection, I used a systematic random sampling technique. Random and stratified sampling are two common probability sampling techniques applied in quantitative research when generalization and a representative sample are desired (Etikan & Bala, 2017; Martínez-Mesa et al., 2016; Shi, 2015). Systematic random sampling results from selections using an ordered sampling frame with an equal probability method (Raina, 2015). Using this equal probability method, I progressed through the list of hospitals in the data file downloaded from the Medicare.gov website, starting with the first hospital on the list and then selecting every 10th hospital, continuing with sampling that selected every 10th hospital in the database, until 269 hospitals were in the sample.

Probability random sampling was appropriate for this study because, as described by Etikan and Bala (2017), probability random sampling is one of the most common, unbiased, convenient, cost-effective, and easy techniques for sampling in rigorous research studies. The random sampling process provided equal probability of selection to

each Medicare-eligible hospital in this study. Nonprobability sampling, such as convenience sampling, is more appropriate for smaller samples, such as in qualitative studies. In addition, these nonprobability sampling methods limit generalization and introduce greater sources of bias when selecting research participants (Martínez-Mesa, González-Chica, Duquia, Bonamigo, & Bastos, 2016).

When using statistical tests for inferences in a study with a minimum of two predictor variables and a criterion variable, a major step is determining an appropriate minimum sample size that can lead to unbiased, correct, and complete results (Pye, Taylor, Clay-Williams, & Braithwaite, 2016; Vatcheva, Lee, McCormick, & Rahbar, 2016). Predetermination of the appropriate technique and sample size is possible in quantitative studies (West, 2016). Higher complexity, required accuracy, and larger populations correspond with larger sample sizes (Shi, 2015). A priori power analysis for a multiple regression was run using G*Power 3.1.7, based on three predictor variables: medication reconciliation, nursing workforce competency, and timely and effective care. A priori values and assumed parameters used for sample size calculations are commonly applied means of predetermining sample size (Das, Mitra, & Mandal, 2016; Tavernier & Giraudeau, 2015). I calculated that a sample of 266 would provide a generalized scale at the 95% confidence level. After indicating a medium effect size (0.15), a desired statistical power of 0.95, and a probability level of 0.05, I determined that a sample size of 269 Medicare-eligible hospitals would meet the minimum statistical requirements for a multiple linear regression, based on the nature of the variables, as explained by Faul,

Erdfelder, Buchner, and Lang (2014). The data from the study were from 269 Medicare-eligible hospitals.

Ethical Research

Studies involving human participants are subject to the ethical guidelines detailed in the Belmont Report, maintained by the Department of Health (2014) for researchers to review and apply. The ethical guidelines include protecting human subjects' rights, being beneficent, and fair, which often involves the use of an informed consent form so participants can understand their rights, responsibilities, and risks of participation (Check et al., 2014; Tam et al., 2015). Etikan and Bala (2017) also discussed how researchers typically seek the consent of those with the knowledge required to inform the study. In this study, there were no human participants and therefore no consent process; by the nature of publicly available information, there was also no need to obtain permission or consent for use of the data. Secondary data collection does not require informed consent because the researcher does not interact with participants (Cheng & Phillips, 2014).

This study included collecting and analyzing secondary data whereby I did not have any contact with participants. Because of the nature of the secondary data, there were no withdrawal processes and no incentives. Furthermore, data for this study were publicly available; therefore, I did not need permission from the data publisher before collecting the data. Although the data for each of the variables and for each Medicare-eligible hospital were available to the public, I did not include the names of hospitals in the sample in this study. The data entry process involved replacement of the names of hospitals by simple numerical codes (for example, H1 through H269). Additionally, I

obtained IRB approval before collecting data, to ensure that the study aligned with acceptable ethical research standards.

Data Collection Instruments

The variables in this study were 30-day hospital readmission rates, medication reconciliation, nursing workforce competency, and timely and effective care, as described in detail below. Data for all four variables were available to the public; previous researchers collected data and entered data into a publicly available databases. Therefore, I did not need any instrument, such as a survey, to collect the data. Instead, I downloaded data recorded from the selected Medicare-eligible hospitals into an Excel spreadsheet. Data accessed for this study were most applicable to address the measurement of a relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. However, as a way to strengthen the study and evaluate the quality of data, Cheng and Phillips (2014), Dunn et al. (2015), and Thomas (2015) recommended investigating the origins of data and explaining the instruments used for the collection of data and generation of the measures. Discussions of the instruments used to collect the original data are in the subsections below.

Medicare-eligible hospital 30-day readmission was the criterion variable in this study. Hospital 30-day readmission is one of the most tracked performance measures for hospitals in the United States (Hoyer et al., 2017). Gu et al. (2014) explained hospital readmission as when a patient returns to the hospital, which admits them for at least one overnight stay during a specified timeframe following a previous discharge. Data on 30-

day readmission is a performance measure reported by CMS, available to the public on the Medicare Hospital Compare Website, which indicates the percentage of patients who returned for a hospital stay within 30 days of their prior discharge (release) from a hospital (Medicare, 2017). The data for the 30-day readmission rates do not stem from the use of any survey or instrument. The source of data is real-life Medicare administrative claims and enrollment information for hospitalized patients. The CMS tracks 30-day readmission involving post-surgical care, chronic pulmonary diseases, and other common hospitalizing conditions, including heart failure, heart attack and stroke, and pneumonia. For the purposes of this study, the composite score was the measure for the criterion variable, which Medicare.gov titled the 30-Day Hospital-Wide All Cause Unplanned Readmission Rate. The composite score for all 30-day readmissions is a percentage of patients and is a continuous variable that ranges from 0 to 100. Demonstrated c-statistic results ranging from 0.5 to 1.0 which indicated perfect discrimination and good constructive validity, Fischer et al. (2014) concluded that the readmission rates reported to CMS accurately reflected the numbers of patients readmitted to hospitals within 30-days of their prior hospital discharges.

Timely and effective care (also reported as a T&E care score) was one of the predictor variables of this study and one of the measures CMS uses to compare hospitals in the United States (Medicare, 2017). The composite score reported by CMS for the timely and effective care construct stems from the measures of three hospital activities: (a) the percentage of adult hospital patients who received medical and surgical treatments deemed the best approaches, based on scientific evidence; (b) how quickly patients

received treatments; and (c) how well hospitals provided preventive types of services. The scores for timely and effective care measurements are from hospital data submissions, including patients' electronic hospital records and medical histories, that Medicare and government officials audit and edit, thereby validating submitted data (Medicare, 2017). Timely and effective care data includes Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) reports of measures for the following conditions: acute myocardial infarction, heart failure, pneumonia, pregnancy and delivery care measures, surgical care improvement project, preventive care, blood clot prevention and treatment, emergency department, children's asthma care, and stroke care (Toomey et al., 2015). I used the HCAHPS 2015 composite score (summated scores for all conditions) reported. The summated T&E care score is a continuous variable with possible scores ranging from 0 to 1192 (Elliott et al., 2015). The HCAHPS survey purpose is to serve as a standardized data collection instrument for the measure of how patients perceive care received at a hospital (Toomey et al., 2015). According to Tang, Cui, and Babenko (2014), although new ways to assess internal consistency and reliability are emerging, the prior applications of internal consistency tests remain relevant to the research community. The internal consistency, which reflects reliability important to quantitative researchers, was the focus of prior studies involving the T&E measure. To evaluate the reliability of T&E, CMS (2003) conducted a pilot study with a sample of 16,619 patients from 85 different hospitals. The pilot study resulted in an internal consistency of .69 and a median hospital-level reliability of .74.

Medication reconciliation, another predictor variable in the study, is a term created by The Joint Commission (2015) as part of the hospital accreditation program, pertaining to the formal process of comparing each patient's medications to their physician's discharge orders, to ensure correct medications at the time of a patient's hospital discharge (Kennelty et al., 2015). The medication reconciliation score is a measure reported as one of the eight metrics of the NQF Safe Practices hospital safety score (Hyder et al., 2015). The Leapfrog medication reconciliation hospital survey is a 4-item instrument that assesses hospitals on their awareness, accountability, ability, and communication actions for accurate information on patients' medication. The Leapfrog evaluation tools remain widely promoted as a means of monitoring medication entries and rates of preventable and potential adverse drug events (Shwartz et al., 2015). Independent researchers assessed and confirmed the validity and reliability of the hospital survey (Diana, Kazley, & Menachemi, 2011; Kazley, Diana, & Menachemi, 2011).

Nursing workforce competency, the third predictor variable in this study, is one of the eight metrics of NQF Safe Practices measures of hospital safety score. The purpose of NQF Safe Practices is to measure the progress of a hospital in implementing processes and protocols that promote safe care for the patient (Hospital Safety Score, 2012). Nursing workforce competency data stems from yearly collections of information from the Leapfrog (2018) hospital survey and are available to the public on the hospital safety score website. The nursing workforce competence section of the Leapfrog hospital survey is a 4-item instrument that assesses hospitals on their awareness, accountability, ability, and action in proving enough qualified nurses. The nursing workforce measure is a part

of the steps to avoid harm, which also includes handwashing, listed as inpatient care management practices on the Leapfrog hospital survey results. Dissemination of the Hospital Safety Score is a key component of Leapfrog strategy, in addition to independent researcher assessments confirming the validity and reliability of the Leapfrog hospital survey (Gonzalez & Ghaferi, 2014). Table 2 presents the variables of interest and the types of measurement.

Table 2

Variables of Interest and Type of Measurement

Variables	IV/DV	Data type
Medicare-eligible hospital 30-day readmission rates	DV	Interval
Timely and effective care	IV	Interval
Medicare reconciliation	IV	Interval
Nursing workforce competency	IV	Interval

Data Collection Technique

This study involved collecting and analyzing publicly-available secondary data, with the data representing four continuous variables which can be further categorized as interval variables: the criterion variable (Medicare-eligible hospital 30-day readmission rates) and three predictor variables (medication reconciliation, nursing workforce competence, and T & E scores). The data collection did not include administering any survey, interview, site visit, or types of interactions with the study participants, described by research experts, such as Mindell et al. (2015), as common in research involving healthcare. Johnston (2014), Dunn et al. (2015), and Burton et al. (2017) described secondary data collection and analysis as also appropriate in healthcare studies, as the volumes of data in credible databases continue to grow.

The use of secondary data has several benefits including timeliness of data collection, accessibility of data, and feasibility of quantitative studies (Burton et al., 2017). However, Mitchell (2015) and Cheng and Phillips (2014) also highlighted disadvantages of secondary data, including no control of the quality of the data or incomplete and outdated data. Through the use of secondary data, I did not have communication with the units of interest. To overcome the disadvantages, I did not include hospitals with incomplete data.

Johnston (2014) and Cheng and Phillips (2014) also suggested aligning the secondary data with the constructs of interest in a study. The data collection process in this study included the collection of secondary data by downloading composite scores for the 30-day readmission rates and T & E care data from the CMS website. I compiled the data from the scores for medication reconciliation and nursing workforce competency measures reported to and maintained as data in the Hospital Safety Score website. During this process, I verified alignment of the constructs, variables, and measures, subsequently reporting on the entities that collected and reported the primary data and the timeframe in which data collection occurred.

Data Analysis

Compilation of data occurred using Excel as an organizational tool, which then uploaded into SPSS version 25.0 for Windows. SPSS is a statistical tool of choice for quantitative data analysis in the academic field (Bruland & Dugas, 2017). The data analysis process of this study included two steps, which were generating the descriptive statistics (including measures of central tendency such as the mean, median, mode, and

standard deviations) and the hypothesis testing using multiple regression. Cheung and Jak (2016) discussed how, when analyzing large data sets in quantitative studies, such as those involving multiple regression, it is appropriate to report descriptive statistics before testing the hypothesis. The aim of the descriptive statistics includes observing and describing data and the distribution of the data set (Vetter, 2017). The hypothesis testing involves a decision regarding the appropriateness of rejecting the null hypothesis and allows answering the research questions, following appropriate statistical models and tests (Perrone & Müller, 2016).

All the variables in this study were on observable scales, collected from existing databases. Kulkarni and Bakal (2014) noted that databases may contain various types of errors, such as spelling mistakes, inconsistent conventions, inadequate information about data sources, and missing fields. Data maintained by the Medicare-affiliated websites stemmed from significant time and manpower investments into data cleaning (detecting and correcting errors) and auditing of hospital reported measures (Medicare, 2017). Greenwood-Nimmo and Shields (2017) discussed common data cleaning tasks, such as frequency conversions, data scaling, and addressing sampling uncertainties, structural breaks, and outliers. Like Greenwood-Nimmo and Shields, Kulkarni and Bakal emphasized that data cleaning beyond that performed during primary data collection involves informed judgements, requiring transparency via detailed documentation of data cleaning procedures. I did not encounter situations that appeared to require data cleaning efforts that impacted the data derived from the random sample. The data analysis process in this study did not include any other types of transformation or recoding processes

because the data for all the variables were pre-existing, well-organized, and there were unique identifiers for each of the variables. I excluded hospitals from the sample that had missing data, so there was no need to code or address missing data entry for variables in SPSS. I assumed a normal distribution with my sample size, because of the guarantee of the central limit theorem of a normal distribution with sufficiently large sample sizes (Cundill & Alexander, 2015).

This study involved the use of multiple regression to accomplish the objective to examine the relationships between predictor variables (medication reconciliation score, nursing workforce competency, and timely and effective care) and a criterion variable (Medicare-eligible hospital 30-day readmission rates). The process of examining these relationships included collecting and analyzing quantitative data to answer a research question about the extent to which a significant correlation existed between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates.

The research question aligned with the null and alternate hypotheses. Testing the hypothesis through multiple regression allowed for answering the study's research question. Applying statistics to data through specific methods involves calculating, describing, and summarizing collected research data in logical, meaningful, and efficient ways, so that the subsequent testing of a hypothesis can lead to an answer to the research question (Vetter, 2017). The null hypothesis was that there is no significant correlation between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. The alternative was that

there is a significant relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. Cheung and Jak (2016) and Yuan and MacKinnon (2014) recommended that researchers conduct hypothesis testing in valid and efficient ways, such as through the use of multiple regression.

Although the central limit theorem guarantees a normal distribution with sufficiently large samples, the descriptive statistics in this data analysis included computing normal Q-Q plots of variables to examine visually the normality of distribution. Normal distributions are a condition for multiple regression and observing scatterplots is a way of visually demonstrating normal distribution (Ernst & Albers, 2017). Observing the scatterplots from the descriptive analysis allows for demonstrating visually that there is a normal distribution (Shanks, 2017). Variable selection is critical in multiple regression and with multiple predictor variables, there is a need to test for collinearity among the predictor variables (Liu & Li, 2017). Ernst and Albers (2017) explained how collinearity increases the difficulty of interpreting statistical tests. I tested for collinearity among the three predictor variables. Collinearity indicates relationships between the predictor variables, leading to inflation of the standard error and a determination of statistical insignificance when findings are statistically significant, increasing a standard error of b, leading to a less powerful test of significance (Loeys, Moerkerke, & Vansteelandt, 2014).

After addressing the assumptions of the regression, the multiple linear regression followed to examine the predictive relationship between medication reconciliation score,

nursing workforce competency, and timely and effective care on Medicare-eligible hospital 30-day readmission rates. A multiple linear regression is appropriate when assessing the predictive relationship between a group of independent variables and a continuous criterion variable (Tabachnick & Fidell, 2013). The *F* test was useful to generate an overall interpretation about whether there was a collectively predictive relationship between the predictors and Medicare-eligible hospital 30-day readmission rates. Following the determination of significance of the *F* test, individual *t*-tests helped to further evaluate the predictive effect of each predictor variable. Based on statistical tests, I made a decision about whether to reject or fail to reject the null hypothesis at the generally accepted level for significance, $\alpha = .05$.

Study Validity

Validity and reliability are essential considerations in rigorous research studies (Csikszentmihalyi & Larson, 2014). According to Galloway et al. (2015), the reliability and validity of the measurements examined by CMS and independent scholars were adequate for use in prior research studies. In addition to the demonstration of acceptable psychometric properties of the instruments of the primary data collection from previous research studies that generated the secondary data representing the variables in this study, other considerations and ways to address validity and reliability concerns were as follows.

Validity pertains to the scientific acceptability of a study and how quantitative study findings stem from measures that accurately reflect reality and the intended construct (Shwartz et al., 2015). According to Csikszentmihalyi and Larson (2014), the

validity depends on consistency of measurements and other established steps of the research project. Threats to validity may lead to errors, whereby rejection of the null hypothesis or failure of null hypothesis rejection occurs inappropriately (Ciolinoi et al., 2015). Minimizing these threats involved use of reliable instruments, meeting data analysis assumptions, and using an appropriate minimum sample size.

Validity is an important element of research; therefore, researchers should address the internal and external validity of their studies (Roe & Just, 2014). Internal validity of a study often pertains to causal relationships between the variables of the study. This study did not include examining a causal relationship. Internal validity is the extent of which one is able to say that no other variables except the one you are studying caused the results. Due to the use of archival data, confounding variables can potentially alter the relationships between the variables of interest (Howell, 2013). I acknowledged the potential impact of confounding variables and covariates in the interpretation of the findings.

External validity pertains to appropriate inferences or generalizations of research results to other populations (Rooney et al., 2016). External validity addresses the ability of the study results to apply to a larger population (Roe & Just, 2014). A researcher's ability to choose a representative sample for the study is an effective way of improving external validity (Mindell et al., 2015). Optimal sampling strategies can enhance validity; for example, random sampling improves external validity (McBride, 2016). I used random sampling to establish a sample that could enhance the validity of the study. The expectation was that a minimum sample size of 266 would be sufficient, using SPSS to

determine minimum sample size required for this study, based on three predictor variables, a medium effect size (0.15), a desired statistical power of 0.95, and a probability level of 0.05. The a-priori values and assumed parameters used for sample size calculations are common means of predetermining sample size (Das et al., 2016; Shi, 2015; Tavernier & Giraudeau, 2015). The sample of the study consisted of 269 hospitals randomly selected from the population of 3,359 Medicare eligible hospitals in the United States, based on well-established means for determining minimum sample size. According to Palazón-Bru, Folgado-de la Rosa, Cortés-Castell, López-Cascales, and Gil-Guillén (2017), the use of software for sample size calculations is also appropriate for quantitative studies. Minimizing threats to external validity involved sampling that supported generalizations of the study results.

Other factors might affect the validity of the results of a study, including Type I error and the assumptions related to multiple regression (Mindell et al., 2015). Violations of assumption may result from the nature of the data set or the use of incorrect or inappropriate tests (Kühberger et al., 2014). I ensured data met the assumptions for the statistical tests performed in this study. I applied the statistical tests most appropriate for the nature of the data and implemented the most appropriate statistical procedures for meeting assumptions and for choosing tests suitable for the purpose of the study. For example, using Bonferroni's approach to control Type I error, I required a *p*-value of less than .005 for significance. Statistical conclusion validity occurs in models with violations of parametric assumptions and elimination of outliers reduces the skewness of the

distributions (Mindell et al., 2015). However, the data did not greatly deviate from normality, and the central limit theorem applied through the adequate sample size.

Reliability represents the idea that one can replicate the study independently; adequate emphasis should be on recording research decisions for reproducibility of research (Ioannidis et al., 2014). The purpose of this study aligned with the concepts of positivist worldview. The worldview of positivists supports the belief that under the same circumstances, various researchers investigating the same facts using correct statistical analysis and common research processes will have the same results (Russell et al., 2016). Although repeated studies are beyond the scope of this study, the databases planned for accessing the secondary data are data sources used by prior researchers in related research. Prior authors demonstrated that the data collection tools and measures used in this study are sufficiently reliable (CMS, 2003; Diana et al., 2011; Gonzalez & Ghaferi, 2014; Kazley et al., 2011).

Transition and Summary

Section 2 included details about the research steps involved in sampling, collecting secondary data, and analyzing the data compiled for this study. Topics covered in section 2 included the restatement of the purpose of the study followed by the role of the researcher, the study participants, a deeper discussion of the research method and design, the sampling method, the ethical considerations, the data collection and analysis processes, and the validity of the study. Section 3 contains the presentation, discussion, and implications of the study results.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this quantitative correlation study was to examine the relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. Findings from the analysis of data collected from publicly available data sources for the four variables for 269 randomly selected nationwide Medicare-eligible hospitals indicated that the multiple regression model provided a better fit than the model without the predictor variables. Specifically, 62% of the variance of 30-day hospital readmission rates of the hospitals in the sample is explained by the predictor variables in the model, with a strong direct relationship between the predicted and observed data. There appears to be an inverse correlation between nursing workforce competency and 30-day hospital readmission rates and between timely and effective care and 30-day hospital readmission rates. Medication reconciliation did not appear to be a significant predictor of 30-day hospital readmission rates, as considered in this study.

Presentation of Findings

Multiple regression was useful in this study to learn more about the relationship between the predictor variables and the criterion variable. Table 3 includes the results of the measures of central tendency of the variables in this study. The criterion variable in this study was 30-day hospital readmission rates (M = 15.39, SD = .83). One predictor variable was timely and effective care (M = 130.21, SD = 77.34). A second predictor

variable was nursing workforce competency (M = 4.34, SD = .87). A third predictor variable was medication reconciliation (M = 4.24, SD = .1.01).

Table 3

Descriptive Statistics

Variable	Mean	*SD*	Variance	Skewness
Medication reconciliation	4.24	1.01	1.03	-1.49
Nursing workforce	4.34	.87	.76	-1.45
Time and effective care	130.21	77.34	5982	1.39
30-day hospital readmission	15.39	.83	.69	.36

Normal distributions are a condition for multiple regression, and plots visually demonstrate normality (Shanks, 2017). The central limit theorem guarantees a normal distribution with sufficiently large samples, which in this case applied to the data in the sample of 269 hospitals. In addition, Figure 1 is an illustration of the QQ plot, a diagnostic probability plot and a graph of the residuals versus the expected order statistics of the standard normal distribution. The Q-Q plot is a plot of quantiles of the data compared to quantiles of a distribution, which in this case reflects data from a normal distribution.

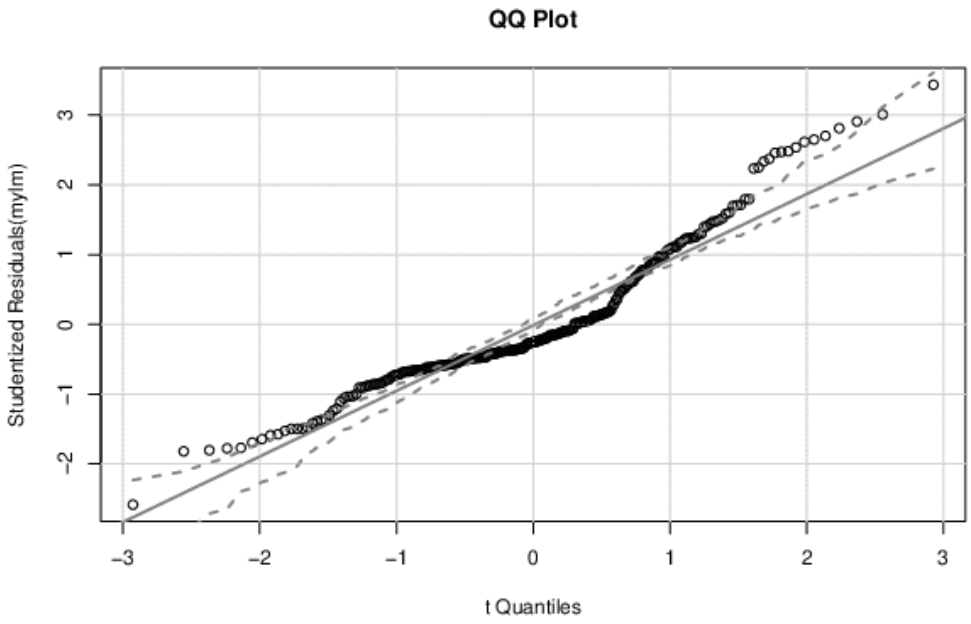

Figure 1. Q-Q plot of quantiles.

Correlations reflect relationships among variables. Table 4 is a matrix that includes the correlations generated between variables. The results indicate that there are inverse correlations between readmission rate and all three predictor variables in this study, with the largest negative correlation between readmission rate and timely and effective care (r = -.77) and the weakest correlation (r = -.14) between readmission rate and medication reconciliation. Readmission rate decreases as the values of timely and effective care, nursing workforce competence, and medication reconciliation increase. In addition, there are positive correlations between nursing workforce competence, medication reconciliation, and timely and effective care.

Table 4

Correlation Matrix

	Readmission rate	Nursing workforce	Medication reconciliation	Timely and effective care
Readmission rate	1.00	-0.27	-0.14	-0.77
Nursing workforce	-0.27	1.00	0.37	0.19
Medication reconciliation	-0.14	0.37	1.00	0.11
Timely and effective care	-0.77	0.19	0.12	1.00

Multiple regression procedures are widely used acceptable means for determining predictors and for testing hypotheses in scholarly research endeavors. As shown in Table 5, regression results in a right-tailed statistically significant outcome, $F(1,266) = 212.22$, $p < \alpha$ (0.05). The linear regression model provides a better fit than the model without the predictor variables.

Table 5

Regression Statistics

Source	*DF*	Sum of squares	Mean square	*F* statistic	*p*-value
Regression	2	113.30	56.65	212.21	0.000
Residual	266	71.01	0.26		
Total	268	184.31	0.68		

The linear regression model provides a better fit than the model without the independent variables. Specifically, there were statistically significant relationships between nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. The negative relationships indicate that 30-day readmission rates decrease with increasing nursing workforce competency and increased timely and effective care. The regression model is an expression of a plausible prediction of the criterion variable, given the predictor variables in this study.

Table 6 includes the coefficient iteration for the variables in the study. Timely and effective care as well as nursing workforce competence are variables that are significant as predictors for 30-day hospital readmission rates. The regression model generated provides a better fit than the model without the independent variables. However, medication reconciliation, as measured in this study, was not a statistically significant predictor of 30-day hospital readmission rates. The linear regression model without

medication reconciliation is as follows: Readmission rate = 16.9559 - 0.1223 Nursing workforce - 0.008028 Timely and effective care.

Table 6

Coefficient Iteration

	Coeff	SE	t-stat	Lower t0.025 (265)	Upper t0.975 (265)	Stand coeff	*p*-value
b	16.97	0.18	94.10	16.61	17.32	0.00	0.000
Nursing workforce	-0.11	0.04	-3.00	-0.19	-0.04	-0.12	0.00
Medication reconciliation	-0.01	0.03	-0.21	-0.07	0.06	-0.01	0.83
Timely and effective care	-0.01	0.00	-19.22	-0.01	-0.01	-0.74	0.00

R-square (R^2), also known as the coefficient of determination, is a commonly used statistic to evaluate model fit. In this study, R^2 = .62, which means that 62% of the variance of 30-day readmission rates can be explained by the variables in the study. Adjusted R^2 = 0.61, with multiple correlation (R = 0.78) means that there is a strong direct relationship between the predicted data and the observed data. The null hypothesis in this study was that there is no statistically significant relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. The alternative hypothesis was that there is a

statistically significant relationship between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. A decision to reject the null hypothesis is appropriate in this case. Because *p*-value < α (0.05), H_0 was rejected.

Findings from this study do confirm and extend knowledge of the relationships among variables. Specifically, this study demonstrated an inverse relationship between timely and effective care and 30-day hospital readmission rates, and between nursing workforce competence and 30-day hospital readmission rates among Medicare-eligible hospitals in this study. Comparing the findings with other peer-reviewed studies from the literature review ties findings to the existing literature on effective business practice, as follows.

Analysis and interpretation of the findings in the context of the theoretical framework are possible through consideration of the general model of readmission and complexity theory. A complexity theory perspective encompasses consideration of the interactions between individual components that is important in the study of systems (Thompson et al., 2016), which based on the results of this and prior studies of 30-day hospital readmission rates appears applicable to the effects of components of hospital systems on outcomes Sturmberg et al. (2014) noted that the interactions among components in a system are responsible for the results of the system; accordingly, complexity theory helps account for the interactions within a system, such as workforce competence and timely and effective care, that encompass behaviors leading to results, such as reduced 30-day hospital readmissions.

Results of this study are also consistent with the idea expressed by Greenblatt et al. (2012), who developed the general model of readmission based on the idea that important hospital-level factors can contribute to or prevent hospital readmissions, such as the level of timely and effective care. Results of this study indicated that although timely and effective care as well as nursing competency are part of the model of hospital readmissions, there are other factors that could help explain readmission. For example, Greenblatt et al. claimed that undiagnosed conditions and complications involve the third tenet of the general model of readmission, which is that a new disease or a complication stemming from the original disease or treatment could develop after hospital discharge, which results in a new hospital readmission.

Medication reconciliation reduces the chances of medication-related errors such as omission, duplications, and drug interactions (Thomas et al., 2015) which Mekonnen et al. (2016) claimed is likely to reduce the chance of unplanned readmission. Many scholars believe that medication reconciliation is likely to contribute to efforts to reduce hospital 30-day readmission (Hume & Tomsik, 2014). However, the process of correct medication reconciliation rests with hospital staff, as well as outpatient pharmacists and patients' own primary care or specialist physicians (Marinović et al., 2016). While there is no doubt that medication-related errors contribute to the U.S. morbidity and mortality rate (Abdel-Latif, 2016) throughout the care process from admission to discharge (Conklin et al., 2014), adopting an effective and measurable medication reconciliation process to help reduce readmissions from medication-related errors is still in a formative stage (Mekonnen et al., 2016). Consistent with findings in this study, the implementation

of medication reconciliation may be inconsistent, and hospitals confront the challenges of implementing medication reconciliation in systematic ways (Almanasreh et al., 2016; Lee, 2104). The results of this study support the idea that ongoing efforts at designing and evaluating valid measures for medication reconciliation are worthwhile steps that can help scholars and practitioners document the role of medication reconciliation in the healthcare process.

Nursing workforce competency is necessary to avoid harm in the inpatient care management measures that promote safe care for the patient (Mears & Kates, 2015), which in this study were inversely related to 30-day hospital readmission rates. As demonstrated in this study and documented in previous research, the role of nurses is critical in ensuring patient safety and the overall healthcare quality. Nursing workforce skill has an influence on various hospital metrics, such as outcomes, mortality rates, and medication errors (Bing-Jonnson et al., 2016); therefore, the inverse relationship of nursing workforce competence to 30-day readmission rates and its significance in the prediction model is consistent with expectations based on prior research results. For example, the results of the multiple regression performed in this study align with findings by Bing-Jonnson et al. (2016), who reported a relationship between better quality of registered nursing care and improved patient outcomes with fewer adverse events, with special attention of the authors to collective competence in a nursing context.

Most providers strive to be efficient across operations, including patient care (Fisher & Dickinson, 2014; Guerin-Calvert, 2014), and previous research has revealed that timely and effective care is likely to improve health outcomes and boost hospital

performance (Haley & Kreek, 2015). Timely and effective care evolved to become one of the most important performance indicators of hospitals in the United States, which was a significant predictor of 30-day hospital readmission rates in this study, evidenced by a negative correlation between T&E and readmission rates. As timely and effective care is shown to help prevent readmission, as in this study, hospitals will likely continue to incorporate related practices into health care systems throughout the world (Aryankhesal et al., 2014; Azevedo & Mateus, 2014). Hospital leaders and government policymakers focus on performance measures, such as the timeliness and effectiveness of hospital care, to improve quality in health care (Hashjin et al., 2014; Tsai & Jha, 2014), which are practices supported by the findings in this study. As Kristofferson et al. (2015) claimed, identifying suboptimal care and its associated outcomes is a needed step in designing and informing quality improvement projects in hospital settings, which could include 30-day hospital readmission reduction.

Preventable hospital readmissions are of concern to scholars and practitioners who claim that hospital readmission may stem from poor-quality care, inadequate transitional care, or care stemming from systematic discharges (Alerno et al., 2017; Gue et al., 2014). Findings from this study indicate that there may be other variables that contribute to the model that can account for 30-day hospital readmission rates. For example, Picker et al. (2015) suspected that the nonexistence of outpatient follow-up care, misunderstanding discharge instructions, other types of medication issues, and insufficient assistance to patients transitioning from the hospital to home may contribute to 30-day readmissions. The population for this study was Medicare-eligible hospitals,

which, according to O'Brien et al. (2015), may have different considerations, experiences, or rates than other types of hospital systems. For example, Joynt et al. (2014) studied the challenges of leaders in understanding and reducing readmissions in minority-serving hospitals, which are among their highest priorities. This study did not focus exclusively on minority-serving hospitals, although a portion of Medicare patients are minorities, nor did it include measures of care access. Herrin et al. (2016) similarly studied hospital 30-day readmission rates in a national sample of 4,073 hospitals and reported that county data explained 58% of the national variation in 30-day hospital readmission rates, with care access having the strongest association (Herrin et al., 2016). Pertinent to this discussion is that timely and effective care may help reduce hospital readmission, but only when patients have access to that care.

Applications to Professional Practice

The findings from this study are applicable to the improvements of professional practices in healthcare. Approaching the issue hospital readmissions from both a complexity theory and general model of readmission mindset, leaders can apply strategies to reduce readmissions. This study led to findings that support a rich academic argument for the relevance of timely and effective care and nursing workforce competence to the prevention of 30-day hospital readmission rates. Applicable to professional practice is the idea that, according to complexity theory, changes to any part of a system, as well as the interactions and relationships within the system, may lead to tremendous changes in the system and its outcomes (Drack & Pouvreau, 2015; Thompson et al., 2016). Based on the results of this study, such strategies can include attention to timely and effective care,

hospital staff competency, and effective treatment strategies, including proper disease management and appropriate medication management. Hospitals leaders can also consider the plethora of research that is beginning to capture the many different factors that contribute to readmission models.

Medication reconciliation is a process that hospitals are refining to fully meet expected standards; leaders can continue to make substantial progress toward standards to reduce the chances of medication-related errors such as omissions, duplications, and drug interactions. Although as considered in this study, there was not a statistically significant relationship between medication reconciliation and 30-day hospital readmission rates in the Medicare-eligible hospitals in the sample, effective medication reconciliation is likely to improve patient safety and reduce medication-related medical errors that contribute to the morbidity and mortality rate in the United States. Attention of leaders to the processes that can reduce medication-related errors should continue to include medication reconciliation processes that are team-based, consistent, documented, measurable, and reportable. It is also important to emphasize medication reconciliation processes and skills in healthcare education programs, to enhance knowledge of quality care tactics that medical staff learn during their training programs.

Findings from this study confirm that nursing competence is critical for ensuring patient safety and the overall healthcare quality. Results from this research indicated that nursing workforce competence and documented steps to avoid harm are predictors of reduced 30-day hospital readmission in Medicare-eligible hospitals. Nurses are champions for patient safety in all healthcare facilities, yet the ongoing nursing shortage

deserves further attention so that the nursing workforce is adequately staffed and competent. A well-structured, maintained, and educated nursing workforce is a significant driver of care quality and hospital performance, and according to the results of this study may significantly influence hospital metrics, such as outcomes, mortality rates, medication errors, and 30-day hospital readmission rates.

Leaders need to be able to capture adequate knowledge about how to optimize nursing competence necessary for quality care delivered in settings serving patients with acute and complex health care needs. Although nursing competence may be a difficult concept to define and assess, there nevertheless should be greater focus of leaders on the concept, because nursing competence is one of the most significant prerequisites for high-quality nursing interventions leading to optimal patient outcomes. Nursing competence stems from knowledge, skills, attitudes, ethics, education and professional development, critical thinking, leadership, relationships, and scholarship (Attard et al., 2014; Bing-Jonnson et al., 2015; While & Clark, 2014; Zhang et al., 2016). Continuous assessment of nursing competence may help prevent adverse events and provide safer care in healthcare settings.

Hospital leaders are under constant pressures to reduce costs while elevating the quality of their health care services and must make optimal use of available expertise, infrastructure, and equipment to benefit patients in the most effective and timely ways (Giancotti et al., 2017). The results of this study highlight the need for ongoing attention to progress toward improved performance measurements, such as timely and effective care. Timely and effective care, or how quickly and how well a hospital treats and

provides preventive services to patients, according to the results of this study, relate to reduced 30-day hospital readmission rates. Leaders can continue to focus on tactics to improve timely and efficient care, which some patients also consider when choosing hospitals for their care needs. Timeliness is not only a crucial factor in healthcare quality, patient satisfaction and choice, and hospital performance, but may also lead to improved treatment outcomes that may reduce unplanned readmissions.

Leaders' attention to changes in hospital systems that can improve timely and effective care is likely to maximize public benefit, improve health outcomes, boost hospital performance, and reduce hospital readmissions that can reduce healthcare costs and Medicare-related penalties. Timely and effective care requires staff focus on the achievement of specific functional, clinical, and administrative objectives to reflect hospitals' commitments to quality, adhering to standards, and meeting expectations. Hospital leaders and government policymakers can continue to focus on measures of performance, such as the timeliness and effectiveness of hospital care, to improve quality in health care.

Hospital leaders have had only a general awareness of its performance on readmissions metrics; although, more leaders are recognizing that reducing hospital readmissions has become a high priority. Hospital dependency on Medicare and Medicaid-eligible populations poses increased revenue challenges for those experiencing high 30-day readmission rates, but leaders can continue to focus on the results of rigorous research and research-driven recommendations that can help reduce unplanned readmissions. Preventable hospital readmission are the subject of concern for scholars

and practitioners and for policymakers seeking ways to improve the quality and reduce the cost of healthcare. Reducing cost and improving healthcare quality is the primary goal of any health system, which according to the results of this study, may be possible through attention to timeliness and effective care, nursing workforce competency, and medication reconciliation efforts. Although the predictor variables in this study help explain 30-day hospital readmission rates in Medicare-eligible hospitals, there are other factors that may impact readmission rates. Additional strategies for reducing 30-day readmissions revealed in the peer-reviewed literature included improving discharge processes, customizing transitional care, and focusing on community support, healthcare access, education, and resources (Joynt et al., 2014).

Implications for Social Change

There are implications for tangible improvements in healthcare that can help to prevent 30-day hospital readmission rates to Medicare-eligible hospitals in the United States. The implications pertain to patients who receive care, the communities that hospitals serve, the hospital leaders and policymakers who work to prevent readmissions and associated penalties, and the healthcare professionals who can act on recommendations from the results of this study to improve healthcare outcomes. Patients can benefit from better care and reduced healthcare costs. Communities can benefit from healthier citizens who access and receive treatment from hospitals that employ research-driven practices to improve the quality of care. Hospital leaders can reduce Medicare-imposed penalties and can divert resources away from unplanned readmissions to improve care, productivity and efficiency of staff, and support needed services.

Healthcare professionals can learn from the results of rigorous research to improve practices, shape educational programs, and deliver care in ways that have the most ideal impact on patients. Policymakers can use new knowledge to guide strategies for accountability toward optimal outcomes measures. Because unplanned hospital readmissions are significant drivers of healthcare costs, research that uncovers related factors has implications for positive social change. The new knowledge generated by this study is beneficial to healthcare leaders who can implement strategies for healthcare improvements pertaining to timely an effective care, nursing staff, and medications. Reducing unplanned hospital readmissions that lower healthcare costs and taking steps to enhance quality care practices can benefit all members of society who invest in and rely upon healthcare services (Mortensen et al., 2014).

Recommendations for Action

Several recommendations for leaders stem from the results of this study and dissemination of the results of this study may occur through the published literature, conferences, and inclusion in training resources. Leaders seek to apply strategies to reduce readmissions, which based on the results of this study, can include attention to timely and effective care, hospital staff competency, and appropriate medication management. Recommendations for leaders also include ongoing attention to the ongoing research that is revealing the many different factors that contribute to readmission models.

Recommendations include increased attention of leaders to the processes that can reduce medication-related errors. Processes should be consistent, documented,

measurable, and reportable. Team-based approaches should involve nursing staff, coordinated efforts by physicians, pharmacists, educators, social serve staff, and patients. Emphasis on medication reconciliation processes and skills necessary for optimal medication management in healthcare education programs will likely enhance knowledge of quality care tactics that may ultimately help improve quality care and reduce unplanned readmissions.

A competent nursing workforce is a significant driver of care quality, hospital performance, and may reduce 30-day hospital readmission rates. Therefore, recommendations for leaders include capturing adequate knowledge about how to optimize nursing competence through enhanced knowledge, skills, attitudes, ethics, education and professional development, critical thinking, leadership, relationships, and scholarship. Continuous assessment of nursing competence are recommendations for leaders to promote safer care in healthcare settings and address deficits as additional steps to avoid harm and reduced unplanned hospital readmission rates.

Ongoing leadership attention to timely and effective care can enhance patient satisfaction and choice, overall hospital performance, and improved treatment outcomes that are likely to reduce unplanned hospital readmissions. Recommendations include staff focus on specific functional, clinical, and administrative objectives geared toward timely and effective care, adhering to standards, and meeting established targets and leadership expectations. Higher standards for timely and effective care are recommendations for leaders that are likely to help reduce unplanned readmissions, which can reduce Medicare

penalties, healthcare costs, and utilize hospital staff in the most productive, efficient, and satisfying ways.

Recommendations for Further Research

There are several suggestions for future research that stem from the results of this and the limitations of this study. The major conceptual limitation of all regression techniques is that there is only an attempt to ascertain relationships, which cannot be generalized to establish underlying causal mechanisms. Accordingly, in correlation research, it is important to consider various alternative causal explanations and continue research that can further illuminate relationships and possible causal relationships. While causation is complex and 30-day readmission rate studies included many patient-level factors, ongoing research of ways hospital leaders can take actions that reduces the likelihood of readmissions continues to be worthwhile endeavors.

Although there was an ample number of hospitals represented in the sample, this was a nationwide study, which if repeated at local or regional levels, may have different results pertinent to particular or unique geographical considerations. There were also several hospitals represented in the Leapfrog database that were not in the Medicare database. A repeat of correlation research that includes hospitals not listed in the Medicare database might lead to different results and illuminate the nature of relationships among variables measured for non-Medicare hospitals.

Medication reconciliation is a relatively new construct. The reporting of medication reconciliation measures by hospitals, made available by the Leapfrog group, is a new addition to the publically available data. It is possible the way that medication

reconciliation was operationalized and measured in this study led to statistical results that did not fully reflect the nature of the practical relationship between medication reconciliation processes and 30-day hospital readmission rates. As the concept of medication reconciliation continues to remain a variable of interest to scholars and practitioners, and ways to measure and report medication reconciliation continue to evolve, further research can uncover the usefulness of the construct and its relationship to other quality care measures.

Data analyzed in this study were from publically-available databases, collected largely from self-reported information from hospitals, often in redundant measures. Including additional variables may lead to findings of other quality care measures related to readmission rates. Other measures of similar concepts, such as the competence of a nursing workforce, the ways hospitals reconcile medications, and the delivery of timely and effective care could lead to different results, based on the ways those concepts are operationalized and reported.

The readmission rates in this study were for 30-day hospital-wide all-cause readmissions. Hospitals report readmission rates into several distinct measures, including various and specific heart, pulmonary, and surgical categories. Examples of major categories include readmissions following treatments for stroke, congestive heart failure, major heart attacks, pneumonia, chronic obstructive pulmonary disease, and specific types of surgeries, such as hip replacements. The strongest predictor of readmission rates in this study was timely and effective care, which pertains largely to appropriate treatments for particular diseases. Therefore, it is possible that a closer look at specific

categories of diseases and treatments during initial hospitalizations could add more informative findings for each of those distinct categories with respect to predictors of 30-day readmissions.

Reflections

Reflections on the research experience within the doctoral study process includes consideration of personal biases or preconceived ideas and values confronted during the research process. There was no influence of the researcher on the participants or the situation, because of the reliance on secondary data collection and analysis using computerized statistical programs. Changes to the researcher's thinking after completing the study include a revised outlook about the idea that predictors of unplanned hospital readmissions would be simple or easy to pinpoint. The results of this study indicate that, although there are known factors that help explain 30-day hospital readmissions at Medicare-eligible hospitals, there is still much to learn about the complex systems of healthcare organizations and the populations they serve. The initial approach to this study stemmed from the assumption that hospitals report performance measures in standardized ways and that reporting those measures are a routine part of hospital leadership practices. Throughout the process of random sampling, it became apparent that not all hospitals reported the same measures in the same ways and not all databases had a record of the same hospitals or performance measures. The multiple databases and the thousands of hospitals across the US result in an enormous amount of data available for analysis in many different ways. The nature of different hospitals and the patients they serve also prevent wider generalizations, which makes ongoing research necessary for more

complete understanding of the complex systems that operate in the diverse communities they serve.

Conclusion

Hospital readmissions within 30 days of discharge are indicators of suboptimal patient healthcare outcomes for previously hospitalized patients and result in significant financial penalties to thousands of Medicare-eligible hospitals throughout the US. The study of 269 hospitals from the population of Medicare-eligible hospitals in the US with the purpose of examining the relationships between medication reconciliation, nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates led to findings that support the need for attention to these predictors as a means to reduce unplanned hospital readmissions. Results of this study, evaluated in light of complexity theory and the general model of readmission, based on secondary data from publicly available governmental databases, led to a rejection of the null hypothesis and demonstration of a significant correlation between the variables.

Although medication reconciliation, as measured in this study, negatively correlated to 30-day readmission rate in Medicare-eligible hospitals, it was not a significant predictor of 30-day readmission rates. There is a statistically significant relationship between nursing workforce competency, timely and effective care, and Medicare-eligible hospital 30-day readmission rates. Improved workforce competency and timely and effective related to reduced 30-day hospital readmission rates in Medicare-eligible hospitals. For the Medicare-eligible hospitals in the sample, 62% of the

variance of 30-day hospital readmission rates is explained by the predictor variables in the model, with a strong direct relationship between the predicted and observed data.

The findings from this study led to the identification of practical ways that the results can improve professional practices and recommendations for leaders. Suggestions for future research stemmed from considerations of the results and limitations of this study. The researcher's reflections included additional remarks on the process that unfolded and the insights gleaned from the research process. Implications for positive social change include a better understanding of factors related to hospital 30-day readmission rates to help leaders act on recommendations to enhance patient care, reduce inpatient care expenses, and decrease Medicare-imposed hospital penalties.

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