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Care Management and Readmission among Elderly African American Patients with Chronic Illnesses

Vivien Lyn Salmon
Walden University

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Walden University

College of Health Sciences

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Vivien Lyn Salmon

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Walden University
2020

Abstract

Care Management and Readmission among Elderly African American Patients with

Chronic Illnesses

by

Vivien Lyn Salmon

MHSA, Iona College, 1993

BS, Iona College, 1983

Proposal Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

College of Health Services

Walden University

May, 2020

Abstract

More than 70 million Americans aged 50 years and older suffer from at least 1 or more chronic condition and use the emergency department frequently. By 2025, chronic illness will affect an estimated 164 million Americans or nearly 49% of the population. The rapid rise in chronic illness is due to a combination of an aging population, longer life expectancies, and poor lifestyle choices. This quantitative study provided a statistical analysis on the impact of care management on readmissions among African Americans between the ages of 65 and 80, with diabetes, hypertension, asthma, or multiple chronic conditions. Logistic regression was used to address the gap in the literature on unplanned readmission for an elderly population living in an urban community. The chronic care model was used as the theoretical framework of a systematic approach to improve relationships between patients and the clinical team. Retrospective data analysis ($n = 577$) from the years 2016–2018 supported a predictive association between care management and lower rates of readmission for an at-risk population. Findings from the analysis showed care management had a significant impact and positive association for diabetes, hypertension, and multiple chronic conditions. The asthma cohort had minimal association with care management due to other outside therapeutic resources. Factors that affect poverty in neighborhoods, living alone, and aging can affect a patient's chance of being readmitted, however, the linkage of care management provides an alternative to improve social change by reducing psychological, physical, and financial stress for readmissions.

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Dedication

This dissertation is dedicated to my mother, the late Dorothy Clark Salmon, who gave me life, taught me to pursue my passion with the audacity to dream, and to never ever give up. With grace, style, and dignity, her quiet voice peacefully reminds me; faith is the substance of things hoped for, the evidence of things not seen.”Hebrew 11:1, KJV. Mom, I love you, and thank you for your unconditional love and years of sacrifice.

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Chapter 1: Introduction to the Study

The increased burden of chronic illness in the United States impacts African Americans and low-income population more than other ethnic communities. An estimated 16 million adults in the United States have one or more chronic illness and one third remains undiagnosed. Compared to non-Latino Caucasian adults, the rates of chronic conditions are 1.6 times greater in non-Latino African Americans and 1.9 times greater in the Hispanic population (Horowitz, Williams, & Bickell, 2003). In the United States, people of color suffer worse health outcomes than their Caucasian counterparts for virtually every health indicator (Horowitz et al., 2003). New York City's poorest neighborhoods, which have a high proportion of African American and Hispanic residents, death rates are related to chronic illness are 30% higher than those in more affluent neighborhoods. Although, health outcomes have improved in wealthier areas, African Americans continue to die at higher rates than Caucasians, regardless of living environment (The Institute for Family Health, 2019). Costly chronic conditions grow more prevalent as the U.S. population ages (Berwick, Nolan, & Whittington, 2008), and healthcare systems are increasingly faced with financial pressure as the industry shifts from traditional healthcare to population health management and preventive strategies. Care management has emerged as one of the leading practice-based strategies for managing chronic conditions. The literature identified three strategies that formulated the practice of care management: (a) identify an at-risk or moderate population; (b) align services to the needs of the population; and (c) identify, prepare, and integrate appropriate personnel to deliver the services (Farrell et al., 2015).

These strategies modestly address the effectiveness of care management as a solution to reduce usage of emergency room and hospital readmissions in an elderly African American population. In 2010, shortly after ACA was enacted, many healthcare facilities across a spectrum of cities and states began to study care management as a potential solution to help manage chronic illness. The purpose of this study was to statistically examine whether there is or not a predictive relationship between care management and readmissions within an elderly African American population who has one or more chronic illness. The findings will share an insight on the benefits of care management and its respective posture in the literature with an at-risk population.

In Chapter 1, I will discuss the background, problem, purpose, research questions, hypotheses, assumptions, scope, and limitations of the study.

Background

The high rate of hospital readmissions within 30 days after patients are discharged has drawn national, political, and policy attention due to the associated high cost. In response to this expense, the Centers for Medicare and Medicaid Services (CMS) developed a Hospital Readmission Reduction Program to help prevent avoidable readmissions. Starting in 2013, hospitals were penalized for selected conditions, such as excessive readmissions, at an initial rate of 1% of Medicare payments, increasing in increments to 3% over the next few years (Centers for Disease Control and Prevention, 2010). These financial penalties intensified hospitals to reduce excessive; unplanned readmissions. The greater a hospital rate of readmissions prior to 30 days of discharge, the higher the penalties. The national average of readmission rates are calculated across a

spectrum of health care entities. CMS factors in adjustments for certain demographic characteristics of: (a) admitted patients, (b) age, and (c) severity of illness in each hospital's patient population. After these adjustments, CMS calculates the rate of excess readmissions, which links directly to the hospital's readmission penalty (Boccuti & Casillas, 2017). The financial impact, based on CMS calculations, advocated for a more robust care management intervention to support transitional care for at-risk population with chronic diseases who are candidates for readmission. Population with one or more chronic conditions account for a disproportionate share of total health care costs (Friedman, Jiang, & Elixhauser, 2008). Daily the healthcare industry seeks (a) opportunities to manage the high cost, and (b) ways to contain expenses for an at-risk population with one or multiple chronic conditions.

In 2005, approximately 63 million Americans, or 21% of the population, had more than one chronic condition that increased with age. In 2019, there were approximately 81 million Americans, 40% of the population over age 65, with multiple chronic conditions (MCCs). With the aging U.S. population, the number of Americans over 65 with MCCs is projected to be 133 million by 2020 (Gerhardt et al., 2013). Comorbidities and the ability to manage significant barriers to lifestyle changes and regimens have a profound effect on the elderly African American population (Piette & Kerr, 2006).

Several socioeconomic factors affect this elderly population: (a) self-management of care, (b) financial burdens, (c) lack of housing, (d) unstable environments, (e) insurability, (f) substance dependence, and (g) lack of family support. These

complications often necessitate a visit to an emergency room or unplanned readmission to an inpatient setting (Jencks et al., 2009). For this population, everyday living concerns obscure the management of chronic disease and lead to self-diagnosis and self-medication without proper medical advice (Baumann & Dang, 2012). Some of these problems can be addressed with care management intervention, but some cannot be addressed immediately. Many African American patients between the ages 65 and 80 years are overwhelmed with MCCs and challenged with sustaining daily activities. This specific cohort relies on a primary care system that is fragmented with limited access to appointments, which can delay and interrupt continuity of care, resulting in an unhealthy patient experience. Other contributing factors include: (a) patients who resist change, (b) utilization of an emergency room as primary care access, (c) lack of early recognition of symptoms, (d) poor home support, (e) and lack of transportation to follow-up care (V. Salmon, personal communication, Feb 2018).

Comprehensive care management interventions are a set of activities intended to improve patient care and reduce the need for medical services through enhanced coordination of care and effectively manage health conditions across a spectrum of health institutions (CMS, 2019). With such coordinated activities, a successful approach can potentially improve quality care and control costs for patients with complex conditions (Goodell, Bodenheimer, & Millett-Berry, 2009).

Problem Statement

Chronic diseases are the most prevalent and costly health conditions in the United States. Nearly half of all Americans suffer from one or more chronic disease and the

number is growing. Globally, chronic disease affects the health and quality of life for many citizens and impacts the workforce. Additionally, chronic diseases contribute to 80% of the deaths in low-and middle-income communities in equal numbers among men and women (World Health Organization, 2017).

Contributing factors to the challenges of chronic illnesses in the elderly are competing priorities that are often based on monetary availability. Elderly patients with chronic disease often perform self-diagnosis based on body experience or feelings, which can lead to self-medicating without proper advice. In addition, low-income patients tend to hesitate in asking questions based on fear, lack of understanding, or embarrassment of chronic health conditions at all levels (Stone & Hoffman, 2010). In an era of declining federal and state funds, to remain viable, health care institutions are forced to develop a potential care transition model utilizing statistical analysis to better forecast the needs of the community population and the resources required for managing care.

In the last 5 years, there has been an increase interest on care management research, readmissions, and chronic disease, but not with a statistical focus and understanding about African American elderly patients in low-income areas. This study specifically focuses on the statistical relationship between care management and readmissions for elderly African American patients with high rates of asthma, diabetes, hypertension, and multiple chronic illnesses.

Purpose

The purpose of this quantitative research is to examine a predictive relationship between care management and readmissions among African Americans between the ages

of 65 and 80 years with one or more chronic conditions, and to share the statistical findings based on results.

Research Questions and Hypotheses

The following research questions and hypotheses were used as a framework to guide this study:

RQ1: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 years with diabetes?

*H*₀1: There is no predictive relationship between care management and readmission among African American patients aged 65–80 with diabetes.

*H*₁1: There is a predictive relationship between care management and readmission among African American patients aged 65–80 with diabetes.

RQ2: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 with hypertension?

*H*₀2: There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with hypertension.

*H*₁2: There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with hypertension.

RQ3: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 with asthma?

*H*₀3: There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with asthma.

*H*₁₃: There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with asthma.

RQ4: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 years with multiple chronic illnesses?

*H*₀₄: There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with multiple chronic illnesses.

*H*₁₄: There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with multiple chronic illnesses.

Theoretical Framework

The study was guided by a framework based on Wagner et al.'s (2001) chronic care model (CCM), which served as the theoretical framework for producing healthy communities through a multidimensional solution to a complex problem. CCM is an evidence-based guide used as a synthesis for quality improvement with the flexibility to change when new evidence emerges (Wagner et al., 2001). The model provided an evidence-based practice that integrated biological and psychosocial pathways to better understand the corrective measures needed in the management of chronic disease (Ben-Shlomo & Kuh, 2002). Wagner's CCM introduced six fundamental components: (a) self-management support, (b) delivery system design, (c) decision support, (d) clinical information systems, and (e) organization of health care and community—as the health

care trajectory for improvement in population health (Institute for Healthcare Improvement, 2017). Further description of the CCM is shared in Chapter 2.

Nature of the Study

A statistical design was used to address the nature of this study. Secondary data was de-identified from a public teaching facility in a major Metropolitan area of the North Eastern United States from 2016-2018. In the study, two different codes were used to identify the dependent and independent variables. The dependent variable: readmission was coded 0 for readmission and coded 1 for not readmitted, the independent variable, care management, was coded 0 for care managed and coded 1 for not care managed. The controlled variables (covariates) were age and gender. Each chronic illness i.e. diabetes, hypertension, asthma and multiple chronic. Logistic regression was the best option to examine and measure the predictive correlation between care management and readmissions. Data were electronically stored under a secured protocol and analyzed using SPSS statistical Version 24 for Windows 10.

Definitions

The study included the following terms and descriptive definitions related to the variables:

Care Management: A range of activities intended to improve patient care and reduce the need for medical services by enhancing coordination of care to guide patients and caregivers more effectively in the management of chronic care conditions (Bodenheimer & Berry-Millet, 2009).

Readmission: Episodes when a patient who was discharged from a hospital setting is readmitted within 30 days of discharge for the same diagnosis.

Chronic Disease: A permanent, nonreversible condition expected to require a long period of supervision, observation, or care and found to interfere with a person's physical, psychological, and social functioning (Stuifbergen, 1997).

Chronic Care Model (CCM): An organizational approach to manage a population faced with chronic disease by creating protocol and supportive, evidence-based interactions between an informed, active patient and a prepared practice team (Wagner et al., 2001).

Unplanned Readmission: Patients discharged from the hospital who return with an unplanned readmission within 30 days of the first admission (Bradley, 2013).

Hospital Readmission Reduction Program: A federal government program designed to monitor readmission rates for chronic conditions in hospitals that have higher than expected 30-day readmissions rates (McIlvennan, Eapen, & Allen, 2015).

Assumptions

Secondary data were retrieved from a secured data system that stored electronic healthcare records. The assumption that all data was error-free and entered in the system correctly.

Scope and Delimitations

The scope of this study focused on one public urban community healthcare institution located in a major Metropolitan Northeastern area of the United States. The age ranged from 65–80 years, limited to patients who had participated in a primary care

setting for over 2 years, visited the emergency department, and readmitted within 30 days. Secondary data was used to examine separate cohorts to determine if care management had an impact on readmission rates.

Limitations

Limitations in the study were identified, to include: (a) small data sample size, (b) archival secondary data extracted by others (c) potential data errors; and (d) study focused on one ethnicity.

Significance

As society ages, there will be a greater need to better manage chronic illness and a greater need to address unplanned readmissions. The findings of this study will significantly benefit the coordinated care for an at-risk population and provide clinical leaders an opportunity to create or modify policies, regulations, for supportive services or resources to improve care outcomes. Thus, minimizing stressful hospital readmissions.

Summary

Hospital readmission rates are important indicators of quality of care (Friedman & Basu, 2004; Miller, 2007). It demonstrates types of action taken or omitted during an initial hospital stay. A readmission may result from incomplete treatment or poor care of the underlying problem, or may reflect poor coordination of services at the time of discharge and afterwards, such as incomplete discharge planning and/or inadequate access to care (Halfon et al., 2006; Kripalani et al., 2007). Managing readmissions are important not only as quality screens, but because they are expensive, and consumes disproportionate share of expenditures for inpatient hospital care (Anderson and

Steinberg, 1984). This study will serve as an opportunity to examine the impact of care management, in addition, to serving as a reference to decrease unplanned readmission, measure sustainable outcomes, and potentially reduce expenditures. Chapter 2 will include published works related to the stated problem of chronic disease, care management, hospital readmissions, and examine the study's research questions and hypotheses.

Chapter 2: Literature Review

An important challenge in the healthcare system is the increased incidence of chronic disease. The traditional model for acute conditions of chronic disease showed patients responsible for taking a more active role in managing their own day-to-day decisions related to their illness. The new disease paradigm requires a working relationship between providers and patient that involves a collaborative treatment plan within an integrated system. CCM was used as a frame work because of its multifaceted, evidence-based framework for enhancing care delivery by identifying essential components of the health care system that can be modified to support high-quality, patient-centered chronic disease management that empowers patients to actively manage their own health through collaboration with health care providers. In Chapter 2, I reviewed studies relevant to this research for comparative knowledge and substantial findings on the phenomenon of chronic disease and the impact of care management to improve outcomes.

The literature showed patients who are more informed, involved, empowered, and interactive with their care plan are more effective in promoting healthier outcomes (Bodenheimer, 2002; Grover & Joshi, 2014). HealthyPeople (2020) noted, that growth in the number of older adults is unprecedented. In 2014, 14.5% (46.3 million) of the people in the United States were 65 years or older, and that group was projected to reach 23.5% of the population (98 million) by 2060. This older population often contributes to unspecified complications that require readmissions (Jencks et al., 2009). To address the gap of global chronic diseases that affect the health and quality of life of many citizens,

there are some key elements in the literature that support success using CCM: (a) identification of those at risk, (b) access to the right population data, (c) actionable insights about chronic care patients, and (d) coachable options toward healthier choices (Berwick et al., 2008). The literature showed that hospitals that continue to develop extensive and comprehensive models of care (a) improve disease outcomes, (b) increase clinical and financial benefits, and (c) develop a clear and immediate opportunity to evaluate care management as part of a healthier strategy for an aging society, became an exemplary model.

Literature Search Strategy

The strategy to determine and review the literature is a comprehensive approach to objectively analyze current narratives and knowledge on the topic. I used several literature searches to identify patterns, trends, and to determine gaps or inconsistencies in the body of knowledge to justify the research questions and hypotheses. The search consisted of *PubMed*, a public search engine used to identify journal articles and *Cochrane Review*, a systematic review of primary research in human healthcare and health policy, internationally recognized as the highest standard in evidence-based healthcare resources. Also, reports and data analysis from the U.S. Census Bureau, the Centers for Disease Control and Prevention, and the World Health Organization were used as references. Peer-review dissertations relevant to this study, located within the Walden University library, were reviewed for comparability to this literature search. The following key words were searched: *diabetes, hypertension, asthma, chronic care model,*

care management, care transition, care coordination, readmissions, African American elderly/frailty, and hospitalization.

The Burden of Chronic Disease

The literature indicated that chronic disease is a significant burden among many ethnicities. The widespread epidemic of chronic disease is the leading cause of death in the world. The World Health Organization projected 17 million people would die prematurely each year as a result of this global epidemic of chronic disease. With these alarming numbers, readmission rates related to heart disease; a contributing factor to hypertension and diabetes, imposed over \$2 billion in penalties on hospitals since the Hospital Readmission Reduction program began in 2012 (Health Leaders Media, 2019). These unprecedented unplanned readmissions remain challenging in an already stressed system with increased costs (Centers for Disease Control and Prevention, 2010). In the literature review, Jencks (2009) shared, the readmission rates within several articles, as a base analysis of readmission within 30 days of discharge. With this concern, an effort to reduce excess hospital readmission remains a priority for hospital executives to mitigate financial penalties linked to reimbursement. In June 2009, CMS began publicly reporting on its Hospital Compare website, the 30-day readmission rates for Medicare patients hospitalized and discharged with various conditions, including pneumonia, acute myocardial infarction, and heart failure (CMS, 2017). The reporting phenomenon on high readmission rates showed a problem of hospital care transitions, an uncomfortable level for hospital executives, with research showing one in five Medicaid/Medicare patients was readmitted within 30 days after hospital discharge (Jencks et al., 2009). The Patient

Program and Protection, Section 3025 of the Affordable Care Act and Section 1886(d) of the Social Security Act, established the basis for the Hospital Readmission Reduction program to examine opportunities to reduce excessive readmissions under CMS rules. Hospital readmissions were defined as a patient being admitted to a hospital within 30 days after being discharged from an initial hospitalization, not just where the patient was originally hospitalized. Planned readmissions were considered under certain circumstances, but will not be examined in this study. To reduce readmission rates, many hospitals began to focus on: (a) better coordination of care and communication between provider, patient, and their caregivers; (b) improved discharge planning, education, and follow up for discharged patients; and (c) utilization of electronic medical records as a means to share information and provide continuity of care faster (CMS, 2017). Recognizing that hospitals were at different stages in the process and not all readmissions were entirely preventable, hospital executives focused on national efforts and best practices to support change. Finding the right strategy to reduce readmissions influenced hospitals to study care management as an intervention to manage MCCs with the understanding that all care management models were not the same. Some care management programs included elderly wrap-around services, consisting of adult daycare services or assisted living services, for a more cohesive structure to mediate aging-in-place and nursing home care (Cutchin, 2003). These types of service are not discussed in this study, but they provide an example to the innovation of health care management.

Today, many vulnerable elderly patients with chronic diseases tend to use services such as emergency rooms more frequently than other services when seeking care;

however, the episodic mode of emergency care does not adequately respond to the complex care needed for elderly patients (Aminzadeh & Daiziel, 2002). The average emergency room is limited in resources, space, services, and long term care for chronic illness is usually not addressed. However, observational status, as precautionary measure is evidence-based and often used to manage hospital readmissions. For example, researchers noted, that the use of observational status in an emergency room is helpful to reduce readmissions by placing at-risk patients in an observer status without formal admission (Zuckerman, Sheingold, Orav, & Epstein, 2016). Although, the observational status will not be addressed in this study, it is an option. American Diabetes Association (2017) noted, that diabetes is one of the most serious health problems that the African American community faces today. Compared to the general population, African Americans are disproportionately affected by diabetes (American Diabetes Association, 2017) and preventing its onset is an important public health challenge (Samuel-Hodge, Johnson, Braxton, & Lackey, 2014). Diabetes places a heavy burden on the lives of many African Americans, in three categories: Type 1 juvenile diabetes attacks and destroys insulin-producing cells; Type 2 diabetes in adult's manifests as high blood sugar, insulin resistance, and lack of bodily insulin; and Type 3 diabetes manifests in adults as hypersensitivity to an overproduction of immunoglobulin, which affects various bodily tissues. Studies in which intensive diabetes treatments have been applied, such as the ACCORD (action to control cardiovascular risk in diabetes) study, showed using the same HbA1c as the treatment targeted for people from different ethnic backgrounds may

have created a higher risk of hypoglycemia among patients of Asian, African, or Hispanic origin (Wolffenbuttel et al., 2013).

Although, United States national health goals for the year 2010 called for a reduction in the health and economic burden caused by diabetes. The disease continued largely unabated in the United States, affecting more than 25 million people, or 8.3% of the population (U.S. Department of Health and Human Services, 2010). The burden worsened in the next few years as the numerical and demographic characteristics of the U.S. population led to dramatic increases in the number of Americans with diabetes (Boyle, Honeycutt, & Narayan, 2001). The treatment of chronic conditions was vitally important for persons of all ethnic backgrounds, but this was especially the case for African Americans, who tended to delay care and refer to a faith-based or self-care armor. The longer chronic conditions, such as, diabetes were untreated, the more costly the health complications, such as cardiovascular disease, kidney disease, blindness, nerve impairment, amputations, and death (CDC, 2008). A study entitled, *The Racial-Ethnic Disparities in the Association between Risk Factors and Diabetes: The Northern Manhattan Study* (Kulick et al., 2016), identified disparities in the development of diabetes, finding that minority populations, i.e., non-Hispanic African American and Hispanics, showed an increased risk of developing diabetes. The pattern that was seen with adult onset diabetes had been observed in other studies assessing the influence of racial-ethnic disparities in pre-diabetes and control of diabetes (Lee et al., 2014; Zhang, Ferguson, Simonsen, Chen, & Tseng, 2014; Osborn, deGroot, & Wagner, 2013).

Evidence related to risk factors further strengthen the association of adult onset diabetes with specific racial ethnic groups, with high BMI who indulged in smoking.

Existing studies on hypertension in the African American population showed, nearly 67 million adults in the U.S. (30.4%) had hypertension, and less than half (46.5%) have their hypertension controlled (CDC, 2010). The American Heart Association projected that the direct medical costs for hypertension will increase from \$69.9 billion in 2010 to \$200.3 billion in 2030 (Heidenreich, Trogon, & Khavjou, 2011). The prevalence of high blood pressure in African Americans is the highest in the world and one of the leading causes of death and hospitalization in urban communities, with heart disease specifically, in African American women (American Heart Association, 2016). Hypertension is the fastest growing rate in African American women compared to all other race/ethnic groups, along with high rates of diabetes in comparison to other ethnicities. In addition, older African Americans were more likely to rate their own health as fair or poor than older adults in other racial/ethnic groups (Gallant et al., 2010). According to the American Heart Association, cardiovascular disease kills nearly 50,000 African Americans annually; only a small percentage of African Americans were aware of the signs and symptoms of a heart attack and even smaller percentage of African American women knew that heart disease was their greatest health risk (AHA, 2016). The New York City Department of Health noted, that many deaths from heart disease were preventable or controllable through manageable factors, such as, reducing smoking and managing cholesterol, diabetes, and obesity through social regimens (New York State Department of Health, 2017).

Asthma, a common chronic condition characterized by airflow obstruction and inflammation (National Institutes of Health, 2017), showed the elderly population has been long overlooked for asthma management. The literature provided limited studies about the control and management of the asthmatic elderly population, but several studies noted patients over the age of 65 years had the highest asthma mortality rate of any age group, accounting for over 50% of all asthma deaths (Moorman, Akinbami, & Bailey, 2012). Older asthmatic patients were hospitalized at a greater rate than other age groups due in part to the greater frequency of cardiovascular comorbidities, a known risk factor for asthma death (NIH, 2017). Unfortunately, comprehensive asthma self-management intervention has not been tailored to individuals over the age of 65 years, as the barriers in this population were not well defined. According to the vital health statistics from the U.S. Department of Health and Human Services, African Americans, at 2.3%, had a higher asthma death rate compared to European Americans, at 1.3%, per 10,000 persons below 65 years of age with asthma between the years of 1980–1990, and African Americans had three times more emergency room visits compared to European Americans per 100 visits below age 65 years, showing a reduction in asthma death rates, however, not in the African American population ages 65 years and above. The population of African Americans over 65 years had a leading death rate of 5.8% per 10,000 population and hospitalization rates had substantially increased to 2.6% from 1.2%. The pattern of asthma hospitalization continued at a higher risk for African Americans than for other ethnicity patients (U.S. Department of Health and Human Services, 2010). As the population of the United States continues to age, there is an interest in evaluating,

monitoring, treating, and counseling older adults with asthma (Baptist, Deol, Reddy, Nelson, & Clark, 2010).

Care Management

The practice of care management in the literature showed modest statistical best practices. Ferlie (2001) noted, that the birth of care management came from the pressure of controlling costs related to hospital readmissions and it answered the consumer demand for support and advocacy to cope with chronic illness. In 2010, a significant change occurred through the Patient Protection and Affordable Care Act (ACA) with widespread mandates covering health benefits. Many recognized that in order to meet the cost of universal coverage, the most expensive, most complex care must be better managed. The Hospital Readmissions Reduction Program under the Affordable Care Act was adopted to examine the high rate of readmission and apply financial penalties to hospitals that had higher than expected readmission rates for targeted conditions (Zuckerman et al., 2016). Hospital readmissions within 30 days after discharge accounted for more than \$17 billion in avoidable Medicare expenditures (Jencks et al., 2009). While this phenomenon of chronic illness is not new, it has to be examined due to concerns with shifting demographics, the growing cost of health care, and consumer perceptions (Rackow & Fine, 2013). If change does not occur, many hospitals will not remain viable. Without significant changes in the management of chronic disease, rising costs, poor outcomes, and a continued epidemic of uncontrolled chronic conditions will worsen. This quantitative study argues the importance of statistical analysis to measure the impact of care management and the relationship with chronic care, and can serve as a predictive

analysis to identify patients at risk for readmission and potentially prevent occurrence through appropriate intervention.

The strength of utilizing a solution based intervention, such as care management, provides for an early intervention associated with multi-dimensional and a systemic resolution on how to manage difficult and complex problems related to chronic conditions (Baptista et al., 2016) and an opportunity to connect skilled specialists to evaluate and support patient need. I found, several researchers used systematic reviews to examine the scientific literature of care management to further understand the facilitation and barriers to implementing CCMs, such as, restructuring medical practices to create partnerships between health systems and communities (Davy et al., 2015).

Other researchers examined the positive opportunities to improve system-level reorganization that facilitated more comprehensive and coordinated care in chronic conditions, for example, (a) changing staff roles and responsibilities to efficiently treat one or more chronic disease and (2) self-management training programs for patients with chronic conditions (Stellefson, Dipnarine, & Stopka, 2017). These system level investments are both expensive, time consuming, and initially unstable (Goderis et al., 2016). Other researchers examined the approach of proactive encounters to: (a) address standard work flow methods, (b) address gaps in individual care with an outpatient setting, (c) increase efficiency, (d) and to improve the reliability and consistency of physician staff support (Kanter, Martinez, Lindsay, Andrews, & Denver, 2010). Researchers found the most robust results are obtained when multiple elements of the CCM were incorporated together (Muntinga et al., 2012). The weakness of the CCM was

the inherence of the chronic care problem with no significant change as the adult population age. To reduce inadequate outcomes, the care management approach was used as a systematic solution to: (a) proactively detect healthcare risk, (b) assess care needs, and (c) coordinate care for chronic diseases (Muntinga et al., 2012).

Conceptual Foundation

The CCM, a social science theory developed by Ed Wagner, MD, MPH, served as the conceptual foundation (Vogeli et al., 2007) to support the existing theory and is the rationale for the implementation of evidence-based activities to improve care for chronic illnesses (Glasgow, Whitesides, Nelson, & King, 2005). The model is widely accepted as a transformational approach and framework for producing healthy communities and multi-dimensional solutions to a complex problem (Wagner, Austin, & VonKorff, 1996). Similar to evidence-based guidelines, the CCM framework synthesized systematic changes with an intention to remain flexible when new evidence emerges (Group Health Research Institute, 2017). The Kaiser Permanente Washington Health Research documented that more than 133 million people, half of all Americans, live with some sort of chronic condition (Bodenheimer, Chen, & Bennett, 2009). The number is projected to increase by more than 1% per year by 2030, resulting in an estimated population of 171 million people in need of better coordination of chronic disease management.

Several literature reviews showed deficiencies requiring immediate attention in the practice of managing chronic conditions for the elderly due to: (a) poorly resourced programs, (b) lack of care coordination and planned care, (c) lack of active follow-up to ensure best outcomes, and (d) inadequate training for patients to manage their illnesses.

Overcoming these deficiencies required nothing less than a transformation in health care, from a system that was essentially reactive—responding mainly when a person is sick—to one that is proactive and focused on keeping a person as healthy as possible (Wagner, Austin, & VonKorff, 1996; Calkins, Boulton, Wagner, & Pacala, 1999). There is a strong need to assist with the correction of many deficiencies in the current management of chronic diseases, such as diabetes, heart disease, depression, asthma, and other associated diagnoses (Stockwell, Madhavan, Cohen, Gibson, & Alderman, 1994; Kenny, 1993).

Selection of Chronic Care Model

Dr. Ed Wagner's CCM was used as a well-established theoretical framework to illustrate a comprehensive approach for the chronically ill in an integrated setting (Barr et al., 2003). As an organizational approach, CCM was selected to proactively change the management of care for the chronically ill by using a unified methodology to improve quality of care, reduce health costs, and enhance the patient experience. The model of care provided essential elements that demonstrated guidance to shift from an acute episodic health system to one that employed effective solutions to manage chronic disease and relevant to the argument that real outcomes do occur when clinical systems reconfigure themselves, specifically, to address the needs and concerns of chronically ill patients. The CCM broader scale involved the patient, his or her family, a healthcare organizer, which proactively provided a patient-centered, evidence-based approach to appropriate care plans. Challenges related to CCM: (a) a need for a semantic approach to improve the management of chronic conditions and unplanned readmissions, (b) management of vulnerable patients through a tracking and follow-up process for those

who did not seek regular care, (c) development of a delivery system to ensure coordination of services are structured to reach a broader population, and (d) more patient-centered filters to keep patients and families engaged (Hussain et al., 2016). CCM demonstrated options to a systematic delivery care plan in the new millennium of healthcare and was one of the responses to the Hospital Readmission Reduction Program under the Affordable Care Act. Conducting this study would influence the practice of moving from a staggered reaction to proactive planning and population-based analysis (Coleman, Austin, Brach, & Wagner, 2009).

Chronic Care Model – Six Components

I examined a broader perspective of the six components of Wagner's CCM as a systematic measure to encourage high-quality chronic disease management (Institute for Healthcare Improvement, 2017). These 6 components: (a) self-management, (b) the healthcare delivery system, (c) decision support, and (d) clinical information systems demonstrated a set of activities to improve patient care and reduce medical needs within an at-risk population (Agency for Healthcare Research and Quality, 2012). Each component cohesively proposed an interaction to adopt change for an effective and sustainable improvements (Chin, 2007). This included: healthy coaching, routine check-ins, on-call assistance, safe homes (entrance and exit), medical equipment, medical devices, and wheelchairs as proactive measures to keep the patients engaged, mobile, vibrant, and proactive throughout their treatment (Bodenheimer & Berry-Millet, 2009). Healthcare organizations utilized these six fundamental tools in an effort to improve quality care and decrease health inequalities (Fiscella, 2000). The model was adopted by

the World Health Organization as the framework for care on a broader range of chronic conditions (Epping-Jordan, 2004). Clearly, this model is a comprehensive and promising way to conceptualize a path to better care for people with chronic conditions.

Table 1

Six Key Interdependent Components of the Chronic Care Model

Community resources	Developing partnerships with community organizations that support and meet patients' needs
Clinical information	Developing information systems based on patient population to provide relevant client data
Delivery system design	Focus on teamwork and an expanded scope of practice for team members to support chronic care
Decision support	Integration of evidence-based guidelines into daily clinical practice
Self-management support	Emphasis on the importance of the central role which patients have in managing their own care
Organizational support of health care	Program planning that includes measurable goals for better care of chronic illness

Conceptual Proposition

Management of chronic conditions is complex, burdensome for an at-risk population, and costly for healthcare systems. Outcomes would improve and cost would be reduced only if, proven clinical interventions were better implemented. However, the complexity of chronic care services appears to make clinical changes particularly challenging (Harris, 2017). Conceptually, a proposed proposition should review the integrated delivery of care to include care management and a comprehensive discharge

process. This would assess overlapping in health services and improve integration across a continuum of care, Valentijn (2013) shared, a three-tier systematic level proposal of integration that supported integrative functions of care: macro, micro, system, and client service advancement. At the macro system level, partnerships were shared across a spectrum that incorporated traditional and professional boundaries. At the micro level, the clinical coordination improved the focus on patient care and reduce the level of silos within the professional, institutional, and sector base to ensure disease intervention guidelines were adopted. Valentijn (2013) explained, the importance of linking financial, management, and information systems as a means to achieve performance-based awareness and to facilitate successful integration of care. More importantly, the systematic levels of care created social and medical service resources. These resources allowed for more effective coordination and delivery of services in order to mobilize information management in support of a healthcare team. Multidisciplinary teams included care coordinators, as well as, more communicative learning environments for better delivery systems. The perspective of these team skills improved patient-assessment, goal setting, population growth, and enhanced problem-solving while providing needed information to care linkage. The system level reviews conceptualized chronic care as complex, but also highlighted the complicated silo effects within care practices between healthcare, social services, and related support. The silo effect led to partial service access, which became burdensome for patients, and compromised treatment linkages (Davies, 2011; Tieman, 2007). The conceptual proposition also examined the overall systematic and strategic components necessary for a more

successful implementation of change in chronic care. Using these theories to guide and evaluate change showed more generalized findings and had particular value in structuring clinical change in chronic and complex care.

Theory Applied for Chronic Care

In similar ways, previous literature utilized the CCM as evidence-based practice to support a robust approach to transforming the delivery of care across a spectrum of healthcare settings. Stellefson et al., (2017) conducted a literature review on the CCM and diabetes management in U.S. primary care settings, using the *Cochrane* database from 1999-2011 to support the systematic review. The database included 16 randomized controlled trials and settings to include primary care and private practices that showed the CCM approach was effective in managing diabetes in U.S. primary care settings. System-level reorganization was one of the leading sources to improve the coordination of diabetes care. In addition, disease registries and electronic medical records were used to establish patient-centered goals, monitor patient progress, and improve gaps in care. The trials concluded with CCM as a positive outcome for diabetes care in a primary care setting, these indicators lead to rerouting patients from hospitalization and towards a self-management approach to care.

Theory Rationale

Evidence-based practice using care management strategies supported the theory rationale. I used a collection of interrelated concepts to guide the research study to determine the variables that would be measured. In this case, readmission was selected as the dependent variable and care management was selected as the independent variable. I

statistically examined the impact of care management with readmission in an elderly population to validate predictive or non-predictive impact to optimize a clear interpretation and understanding of findings. The CCM supported the theory rationale to address why there is an increased burden associated with chronic illness, often resulting in permanent conditions of residual disabilities, caused by non-reversible pathological alterations that require rehabilitation (Reynolds et al., 2018).

Key Variables and Concepts

Several empirical studies were reviewed as evidence-based practice to support key variables.

Baldonado (2017) conducted a study on avoidable readmissions and concluded that frequent usage of emergency room visits was a cause for the high rate of hospital readmissions and reflected low quality care, increased costs, and decreased patient satisfaction. Baldonado (2017) noted, that the High Risk High Cost (HRHC) patient with complex health conditions and functional limitations would go to emergency rooms and hospitals and would need more supportive services. Rich (2012) explained that frequent emergency room visits were the result of a vulnerable patient population who usually took a shift downward sought acute emergency treatment rather than steady long-term care for remediation (Rich, 2012). The article examined the problem of patients with complex medical issues who encountered various barriers to healthcare. Carayon (2010) reflected in the same article the complexity of systemic failures which compromise patient safety. In the same article, McEntee (2009) stated that these barriers to care were

presented at the patient, provider, and systematic levels, and included limited patient knowledge, resource constraints, and communication issues.

Baptista et al., (2016) studied the CCM as a systematic approach to restructure healthcare systems. The aim of the systematic review was to examine studies that evaluated different elements of the CCM in patients with Type 2 diabetes mellitus (T2DM) and to assess the influence of the CCM on different clinical outcomes.

Borgermans (2013) explained the complexity of chronic care through a theoretical lens. The different types of theories that focused on the complications of chronic care required an adaptive approach to understanding the unpredictability of patients who had poor social support and limited financial resources. Complexities in chronic care required an evaluation to decrease repeated readmissions, medication noncompliance, and poor attitudes between clinicians and patients; however, cooperation mediated a better working relationship and reciprocation.

Bulgaru-Illiescu (2013) described an empirical study on how the CCM influenced the social determinants of healthcare services and health more generally. The study showed that CCM changed the primary care environment with the aim of improving the clinical performance of healthcare organizations and the utilization of healthcare services for patients. Both goals were reached by acting on the social determinants of health through the social capital pathways, an opportunity to connect within and amongst social networks. The CCM linked healthcare systems with communities aiming to improve primary care functionality outcomes of disease management. Improved utilization of health services was achieved through productive interaction between patients, providers,

and other healthcare professionals. Bodenheimer, Wagner, & Grumbach (2013) also noted, that the CCM changed the primary care environment with the aim of improving the clinical performance of healthcare organizations and the utilization of healthcare services by patients. Bulgaru-Illiescu, (2013) concluded the CCM benefitted people at greatest risk for ill-health; however, these were only theoretical arguments and further empirical evidence was required.

Clancy (2006) reflected on the systemic failures of programs amongst national and global health institutions that showed different transitional levels of care with patients of complex medical problems, often needing moderate or high level medical decisions. Leawood (2013) in a pilot study concluded that patients facing extremely complex medical systems had challenges in navigating the transitions across the healthcare spectrum. He further concluded that there was no standardized intervention that fit all patients and it was essential to “think outside of the box” and customize the needs of every patient (Leawood, 2013). Hence, there was a need for varied evidence-based practices to deliver more robust patient-centered care. Particularly, challenging was the transition from hospitalization to outpatient clinical care. This intervention sought to minimize the use of the emergency room and hospitalizations via a multi-disciplinary approach with longitudinal, clinic-based care management. The standardization of customized care demonstrated a decrease in emergency department visits and hospitalizations and an increase in cost-savings. However, more data was required to compare the results to the literature as the model of customized care is currently being piloted for system-wide implementation.

Coleman, Austin, Brach, & Wagner (2009) conducted a literature review on the CCM intervention to improve care of chronic illness. The criteria of the search included an empirical evaluation to examine the current six elements of the CCM, financial implications, and health outcomes for diabetes patients. The study of Coleman, Austin, Brach, & Wagner (2009) confirmed that redesigning healthcare using the CCM led to improved patient care and better health outcomes. The model also supported the need for a readiness to transform the daily care for patients with chronic illnesses from acute and reactive to proactive, thus resulting in better performing healthcare institutions with more successful patient satisfaction.

Fabbian et al., (2015) conducted an international retrospective study on a cohort of patients that utilized the emergency room and was readmitted to general inpatient medicine. The study was conducted in the Department of Medicine at an international hospital. A comparison was reviewed of early and late readmissions, based on emergency department diagnoses. The method of research was a cross-sectional study of all admitted patients to the department of medicine. The elderly percentage was approximately 26% of the cohort resulting in two thirds readmitted within 1 year with causes related to pulmonary (asthma). A logistic regression analysis independently evaluated factors associated with readmission. The study found that age remained a risk factor for early pre-hospitalization for elderly patients. The study showed a significant need for more appropriate utilization and control of readmissions.

Freund (2016) conducted a cluster randomized clinical trial using primary care practices as units of randomization to minimize contamination bias to see if care

management intervention changed clinical outcomes. In a small primary care setting, nurse-led care management interventions were examined with interventional focus on patient who were at-risk for future healthcare. The trial used certified medical assistants as starters with guided tools and geriatric resources for assessment and elderly care. The cohort of over 2,000 patients met the primary diagnosis of type 2 diabetes, chronic obstructive pulmonary disease, or chronic heart failure and a likelihood of hospitalization in the upper quartile of the population. The results concluded after 24 months of intervention that medical assistant based care management in small primary care practices did not significantly reduce all-cause hospitalizations, but did improve quality of life and general health. The role of care management had variations in title; however, the focus remained on the cause and effect of managing patients towards an outpatient setting in all clinical categories that included diabetes, asthma, and hypertension and less on readmissions or hospitalization stays.

Friedman, Jiang, & Elixhauser (2008) conducted a study on the cost of hospital readmission and the complexity of managing chronic conditions. The factors were based on an empirical relationship of MCCs that affected readmission and hospital care. The study examined three approaches that could relatively reduce healthcare cost: (a) target specific services to analyze the predictability of readmission, (b) utilize the pay for performance approach for potential savings, and (c) refine the management of chronic conditions. The costs were significantly higher than well care patients.

Joynt & Jha (2012) examined a systematic review on average preventable readmissions. The article focused on the misguided emphasis on 30 day readmissions,

with an outline of three contributing factors: (a) 30 day metrics on readmission of community populations reflected a small portion of community related factors, (b) the unclear emphasis that readmission rates were attributed to poor quality, and (c) high readmission rates favored the results of low mortality, noting the causes of readmissions which occurred within 3 days after discharge or even 7 days after discharge were much more under the hospital's control, and 30 day readmissions, that are far more preventable. Focusing on near-term readmissions would motivate clinicians, who generally felt more responsible for these types of events. The Center of Medicare and Medicaid Services provided hospitals with timely data on their near-term readmission rates, which hospitals could use for internal quality-improvement efforts.

Karam, Radden, Berall, Cheng, & Grunier (2015) examined the urgent need for effective geriatric interventions to meet the health service demands of the growing elderly population. The primary objective of the study was a systematic review of existing interventions within emergency room (ED) targeted towards reducing ED revisits, hospitalizations, nursing home admissions and deaths in older patients after initial ED discharge. People aged 65 years and older account for 12–21% of all ED visits. In the same article, Aminzadeh & Daiziel (2002); Ottawa (2011) noted, the overall general population was at 14% readmissions with several studies suggesting after being seen in the ED, the needs of older patients often remain unaddressed. Four electronic databases were searched to carry out the systematic review in June 2012: *Medline* (PubMed), *CINAHL*, *Embase* and *Web of Science*. A total of 2826 articles were identified. Titles and abstracts were screened based on the following criteria: (a) focused analysis of older age

groups for general understanding, (b) discharged patients from ED not admitted directly to a hospital or nursing home, and (c) reduced adverse events after an ED visit. The results examined two themes for a better framework: (1) the intensity of the intervention design for the elderly population consisted of: (a) referrals, (b) program/follow up, and (c) integrated model of care; and (2) the type of strategy used to identify eligible study participants. Each intervention was assigned to one of three mutually exclusive categories based on the intensity of the intervention; from the least to most intense, categories were: (a) development of targeted interventions, (b) implementation of rigorous evaluations using comparison studies, and (c) continuous occurrence to keep up with the growing demand for health services for older adults. At the end, better evidence was required to determine which programs work best and why, where, and when such programs should be implemented.

Kim, Kim, & Lee (2017) conducted a statistical international study on a chronic disease management program (CDMP) to improve multilevel interventions on blood pressure (hypertension) and glycemic (diabetes) controlled by strengthening the function of clinics as the primary care institutions. The study aimed to evaluate the effectiveness of chronic disease management programs on the appropriateness of medication adherence and persistence in hypertension or in type-2 diabetes patients. Descriptive analysis was conducted to describe baseline characteristics of the population. Baseline characteristics between the shifters and non-shifters in the chronic disease management program (CDMP) and control groups were compared using a *t* test for continuous variables and chi-square test for categorical variables. The results showed the control group had no

significant differences in baseline characteristics between the clinic shifters and non-shifters.

Lehnert et al., (2011) outlined a statistical review on the healthcare utilization and cost of elderly patients with chronic conditions. The systematic review identified and summarized 35 studies which investigated the relationship between MCCs and healthcare costs for the elderly population, as well as, the utilization of emergency room and the frequency of unplanned readmissions. The review found a positive correlation with patients who had high comorbidity versus those patients who participated in the ambulatory care setting with conditions that could be pre-arranged and readmissions prevented due to significant continuity of care.

Logue, Smucker, & Regan (2016) conducted a retrospective multi-regression study to identify data available at the time of hospital admission that predicts readmission risk. The purpose of the study was to identify data elements used at admission and associated with higher 30-day readmission risk. Analysis was conducted on adult patients admitted to a family medicine service. Data were abstracted from hospital administrative sources and electronic medical records. The results noted several related predictors for a 30-day hospital readmission using the Charlson Comorbidity Index. The Charlson Comorbidity Index consists of 19 categories of comorbidities and provided a prediction of a 10 year mortality for a patient who had a range of co-morbid conditions.

McCarthy, Ryan, & Klein (2015) conducted an expert review on the evidence of care models designed to improve outcomes and reduce cost for patients with complex needs. The study reviewed contributing factors that arched a successful care management

program. These programs became sustainable threads of care adopted in practices across a spectrum of healthcare settings. The care management programs did not demonstrate a clear savings in cost of readmission; however, it did show modest results to an already fragmented fee for service care system.

Naylor, Aiken, Kurtzman, Olds, & Hirschman (2011) outlined a systematic randomized clinical trial, with an average sampling size of 64.7 years (age range: 32.7–76.0 years). The trial focused on chronically ill adults transitioning from acute care hospitals to other settings to reduce readmissions based on the guidelines of the Affordable Care Act of 2010. The study noted with good coordination of care to include an integrated discharge planning process, sustainable transitional care did have benefits to fewer readmissions. For millions of older adults who transition from one healthcare setting to another with chronic conditions, it was common for this population to lose their independence and be managed by others. The traditional medical model of caring for people with chronic diseases mostly focused on the illness rather than on the management of the patients, an expensive, and often ineffective process.

Nutting et al., (2007) conducted a statistical analysis to examine the elements of the CCM and its association with high quality care for diabetes within a collaboration diabetes priority program from Colorado. The study utilized multiple analytical methods to analyze the reflected changes in primary care practice and components of CCM. The results suggested a relatively modest intervention using the CCM had significant improvement in diabetic care.

Pavon, Zhao, McConnell, & Hastings (2014) conducted a retrospective, observational study on the use of electronic health record (EHR) data to examine the association between inpatient medication exposure and risk of hospitalization. In the same article, Jencks, Williams, and Coleman (2009) noted, the frequency of hospital readmissions were costly and life threatening for many Medicare beneficiaries.

Shah, Chen, O'Rourke, Mohanty, & Abraham (2011) outlined a statistical analysis of care management for the uninsured. The study examined whether chronic care programs, expanded in the primary care setting as a safety net for underserved populations, would reduce the frequency of emergency room visits of low income adults. The study also examined whether this population would likely be readmitted. The study resulted in showing that there was no difference for those patients who systematically were navigated with care management intervention to avoid high inpatient days and uninsured versus those who were lower risk, uninsured, and enrolled in the same program.

Solberg et al., (2006) conducted a quantitative study on the care quality and implementation of the CCM. The study used administrative data to measure quality care of patients with diabetes and heart disease through a cross-sectional population. The study examined a transformation approach to care delivery with attention to a systematic process for chronic conditions. Using the CCM as an example, the study noted there were no significant care changes in service. However, the delivery system design, in the transformation efforts, was most effective to improve healthcare outcomes.

Stellefson et al., (2017) outlined a systematic review on the CCM and particularly on diabetes management in U.S. primary care settings. The study examined the CCM as an approach to restructuring medical care that created a partnership between health systems and communities. The systematic review examined several studies of a diverse population and suggested with an effective CCM, diabetes could be self-managed in a primary care setting with systematic access points for providers to intervene with patients. The study recognized that multiple components of CCMs were used to support disease registries; however, utilizing an EMR could establish better patient-centered collaboration and patient progress as well as identify gaps for improvement.

Vestjens, Cramm, & Nieboer (2016) examined an analytic approach to understanding the elements of integrated care and its effect on patient outcomes for the elderly population. A theoretical model facilitated the evaluation of integrated primary care and the underlying mechanisms, such as care management, medical review, and self-support with a working multidisciplinary team that ensured elderly patient care interacted positively.

Zhang, Ferguson, Simonsen, Chen, & Tseng (2014) conducted an economic and operational analysis on the Hospital Readmission Reduction Program, as a response to a CMS call to action and part of the U.S. patient protection and Affordable Care Act, on the perspective of encouraging hospitals to reduce readmission. The study examined the impact of the Hospital Readmission Reduction Program and the comparison of data analysis on the simulation of reducing readmissions amongst model hospitals on the west coast with the hopes of reducing cost.

Rationale for Selected Variables

The rationale for variables selected was to examine the unknown elements of the phenomena by selecting the best subset of predictors for chronic illness. The intention is to statistically examine the predictive impact of care management and unplanned readmissions for future financial planning, staffing, and care coordination. To address chronic illness, readmission was selected as the dependent variables and care management was selected as the independent to study as covariates. The care management role examined a range of activities to prevent return for care at a high financial cost that is tied into age related concerns. The readmissions role examined opportunities to interface with a care team to reroute at-risk patients to a more effective panel management (Kirby, Dennis, Jayasinghe, & Harris, 2010). Both roles provided an effective systematic approach as an evidence-based strategy that demonstrated the ability to reduce the frequency of unplanned episodic readmission and ED usage (Clarke, Bourn, Skoufalos, Beck, & Castillo, 2017).

Care Management in a Hospital

The concept of care management at a public teaching facility in an urban community is one of a broader strategy to address the management of chronic conditions and the reduction of readmissions within an integrated health system. Most urban communities with an African American population are a very different than many other parts of the world. These communities have a high prevalence of multiple chronic diseases, such as diabetes, hypertension, stroke, congested heart failure, and asthma as contributing factors that interface with many socioeconomic circumstances. As a

collaborative effort, community hospitals with an at-risk population often adopt other programs such as Project Re-Engineered Discharge, an initiative designed to improve transitional care and reduce readmissions to hospitals from home or other care settings.

Most public health teaching facilities in the metropolitan urban communities have a sustainable integrated care management program that engage the role of the care managers within a multi-disciplinary team. The team effectively identifies potential at-risk population that benefits from appropriate external or internal sources, as needed. The role of registered nurses (RNs) as care managers is far beyond the traditional practice of bedside care, it includes the title of a “health coach” as champions to help prevent illness and promote wellness. Today, RNs chart new paths in an emerging healthcare industry, such as care coordinators, transition of care representatives, community liaison workers, informatics, telehealth services, and clinical leaders in society (Robert Wood Johnson Foundation, 2015).

The Institute of Medicine (2001) noted, that with the rapid changes in the care manager’s role, the field of care management is re-tooling to build a healthy workforce who understands a more comprehensive care plan and are able to address issues of aging, medication compliance, home environment, substance abuse, nutrition, financial constraints, and transportation, such are the major issues care managers must interface when working with an at-risk population. With the baby boomer population older than 65 years of age, who are numbered at 44.7million in 2013 or 14% of the United States population, 1 in every 7 Americans (Administration on Aging, 2016), have at least one chronic illness. The healthcare industry remains unprepared to support such an at-risk

population and/or meet their social needs (John, 2008). Guided practices used by care managers have a range of interventions that are customized to meet the patient's needs, for example, routine visits in the home, follow-up-appointments, reminder calls, medication reconciliation, education/teaching, transportation, teach back regimens for better understanding, entitlements, and benefits (National Commission on Correctional Health Care, 2017). All of these coordinated services are standard care management practices to (a) reassure self-management, (b) provide continuity of care, and (c) reduce unplanned readmissions.

Health Ecosystem

As healthcare transforms into a more integrated model of care aimed to reduce readmissions, a collaborative ecosystem is important to achieve continuity of care, financial integrity, and quality outcomes. Trends in healthcare are leaning towards provider incentives, with a greater emphasis on consumer centric to improve the patient's experience, emerging technology, and the adoption of integrated delivery services (Biomedical Health Research, 2014 & Weldon, 2015). A healthy eco-system shares a therapeutic standard to establish a common practice for patient education, discharge planning, interdisciplinary clinical support, and family partnership. Sustainable health includes state of complete physical, mental, and social well-being by enabling people to realize decent livelihoods and pursue their life purpose. At point of entry, the public healthcare facilities standard practice includes a comprehensive evaluation of the patient care plan in consultation with physician to re-route an unplanned readmission, if feasible, to homecare support, applications for other interventions, nutrition management,

medication compliance, and education. As healthcare re-invents its mission, hospitals will need a more efficient process to further plan the care of at-risk patients by using innovative programs to reduce readmissions.

Synthesis

A collection of studies formed a theory on care management for chronic conditions in an African American elderly population. Empirical studies conducted were similar to the goals of this study and several examined care management as a team-based, patient-centered approach to assist patients in managing their complex medical conditions more effectively. One primary care team, with in the collection of studies, conducted a parallel review using various mixed methods retrospectively to describe the known facts of care management in: (a) functionality, (b) linkage to primary care, and (c) communication between patient and provider for continuity of care (Cotisel-Tomoaia, 2015). A larger synthesized study was conducted to identify care management trials on type 2 diabetic patients over a decade. There were 52 studies identified, that demonstrated heterogeneous results in terms of improvements in process measures and paucity of data on patient-important outcomes. The study found care management interventions were associated with some improvement in surrogate outcomes, e.g. small reductions in hemoglobin A1C and LDL cholesterol levels (Eggington et al., 2010). However, the best available evidence offered limited certainty about the impact of care management for patients with type 2 diabetes. Despite the fact that some of the included trials were of sufficient size and duration, there was almost no data regarding benefits of care management on patient-important outcomes, such as living longer, independence,

feeling better, or suffering with fewer complications. Current literature did not reflect a trustworthy endorsement of a single model or delivery method for care management for patients with type 2 diabetes. Further research was needed to evaluate whether existing models versus the newer innovative models of care improve outcomes of importance to patients (Eggington et al., 2010).

Naylor, Aiken, Kurtzman, Olds, & Hirschman (2011) noted a systematic review of the overall findings of care management in a controlled study and demonstrated programs that resulted in mixed results. The synthesized study agreed that care management was a multidimensional activity incorporating integration of care relevant to hospital discharge to home and the coordination of care. Others, such as Clancy, 2006 & Bulgaru-Illiescu, 2013 had mixed conclusions on the reduction of hospital usage, healthcare cost, and the incentive goal in the current Medicare hospital payment policies to reduce hospital readmission, which conflicted with the goals of care management. The findings also indicated smaller sectors of healthcare settings, mostly benefitting, from care management programs which traditional practices in primary care utilized a smaller scale of care management functionality.

Other authors examined a combination of studies for disease management intervention for patients with chronic obstruction that resulted in mixed conclusions, the first was based solely on the disease management intervention, that could be arranged and incorporated according to the CCM of Dr. Ed Wagner, the second review focused on COPD (asthma) and other diseases that required a more process-oriented coordination of care, from the perspective of the patient and the caregiver (Glasgow et al., 2002). Studies

relevant to diabetes and hypertension had shared practice of utilizing care management programs as an effective contribution, but noted more research and statistical analysis was needed for better prediction of patients' needs. These studies were based on the effectiveness of care management. Concurrent to these studies, a statistical gap remains unaddressed for care management and the elderly African American population between the ages of 65-80 years.

Gap Analysis

Based on the synthesis summary and a collection of studies, the literature acknowledged the need to utilize existing and innovative best practices to improve population health outcomes for chronic disease. However, the known factors in the literature review showed: (a) the population ≥ 65 aged years, with two or more emergency admissions are responsible for 38% of hospital readmissions amongst many healthcare facilities and urban communities, and (b) population with complex chronic illness requires targeted interventions from programs, such as home health, care management, and transition of care. This statistical study will provide a better understanding on the types of chronic illnesses that require care management to reduce unplanned readmission. The effectiveness of avoiding readmission cannot be judged by tracking admission rates without careful comparison with a control group.

Summary and Conclusions

Accumulated evidence appeared to support the CCM as an integrated framework to redesign guiding practices. Although, there was work to be done in the areas of cost effectiveness, studies suggested designing chronic care management as an effective

model to improve patient outcomes and serve as best practice with an interdisciplinary approach to encourage behavioral changes. The benefits of incorporating the CCM for treatment of chronic conditions include: (a) reducing the utilization of emergency rooms, (b) decreasing medical cost, (c) enhancing patient experience, (d) improving population health, (e) as well as answering the call to reduce avoidable readmissions. Much research on the CCM did not focus on high quality, but rather on strategies for improvement (Wagner, Davis, Homer, Hagedorn, & Austin, 2002). The literature already acknowledged care management as a solution from utilization management to a model that addresses the needs of the whole person. Using the CCM as the theory of choice provided a platform for care coordinators to coordinate the regimen of medications and other treatments that can facilitate access to community resources and provide patient education for better understanding. As healthcare continues to build upon the care management concept with a more robust integrated model, a comprehensive provider incentive program, and increased linkage to primary care access, the literature acknowledges that all of these components take time to yield definitive results. Not all readmissions are preventable, as noted in several studies; however, hospitals could do more to reduce unnecessary readmissions. The Center of Medicare and Medicaid Services boldly charged hospitals to reduce readmissions or be fined. The approach placed many hospitals on notice to find a strategic plan to fix the problem; for right now care management seems to be the innovative strategy to best manage chronic disease. (V. Salmon, Personal Communication, Feb, 2018).

Chapter 2, summarized the literature reviews on current knowledge, substantial findings on the impact of care management and readmissions, syntheses of empirical studies to address the gaps, and related ethical concerns.

Chapter 3 will include a statistical methodology on the impact of care management and readmissions for chronic care of the African American elderly population between ages 65-80 years. The study will examine a collection of data, sampling and sampling procedures, research questions and hypotheses, threats to internal and external validity, ethical concerns, and research limitations. The statistical review will analyze the predicted performance on unplanned readmissions with a population care managed or non-care managed. The research held with respect to this dissertation was an applied one, but not new. Rather, there exists numerous scholarly research studies on readmissions; however, limited regarding the philosophy of care management on an African American elderly population (Collis & Hussey, 2003).

Chapter 3: Research Method

Introduction

The problem with chronic illnesses are the reoccurring readmissions that are costly and a burden to patients and the healthcare system. In this study, I sought to evaluate the impact of the care management intervention on readmission in a specific population. The purpose was to conduct an evaluation and report the results to a modest group of healthcare leaders. Globally, chronic diseases—such as diabetes, hypertension, asthma, and many others—are epidemics with an increased focus shifting from treating acute illness to assisting patients in managing the work of living with such conditions (Sav, Salehi, Mair, & McMillan, 2017).

Research Design and Rationale

There were several research design options to consider for this quantitative study, such as, quasi-experimental, retrospective, prospective, and experimental. However, a retrospective design was deemed the most appropriate for studies examining statistical trends, data points, and pre-and post-analysis to strategically address readmissions (British Medical Journal, 2017). For this study, I selected a retrospective designed to evaluate historical data on 2 separate cohorts with one or more chronic condition. A prospective design was not considered due to the random measures for a variety of variables that could be relevant to the development of the phenomena. (Mann, 2003; Frankfort-Nachmias, Nachmias, & Dewaard, 2008). Most prospective designs participants are enrolled into the study before they develop the disease or outcome. Descriptive statistics included the dependent variable = readmission and the independent

variable= care management, the controlled variables included age and gender, the disease state variables for care managed or non-care managed patients, and finally, a comparison of both cohorts was conducted for conclusions. Qualitative study was not considered, because statistical data was needed for comparative purposes. Researchers in similar studies have used quantitative research methods to successfully measure similar outcomes of care management, the impact of readmissions for chronic conditions, and the influence on healthcare costs (Adams, 2010). Past statistical researchers used a cohort population to calculate the variables for specific outcomes and to examine the phenomena and ecological history of the conditions (Mann, 2003).

Public health facilities, continuously examines data-driven processes as a focus to maximize efficiency to improve outcomes. In this study, I performed an analysis on the effectiveness of care management and readmissions on an elderly African American population between the ages of 65 and 80 years using secondary data from a public health facility. Appropriate archival guidelines, security protection, and storage of data was followed. A priori test was used to estimate sufficient sample size to achieve adequate power for a retrospective cohort, and a post hoc test was used to analyze relationships in the data to test significant differences between two cohorts

Randomization would not have been appropriate for this study because it did not meet the criteria for purposeful sampling of two cohorts with different exposures. Other optional designs I considered, were cross-sequential studies to examine a comparison of two or more equivalent longitudinal studies covering different time periods. However, this study was time sensitive; therefore, using a common practice of secondary de-

identified data would successfully measure predictive relationships to improve clinical outcomes (Adams, 2010; Frankfort-Nachmias et al., 2008).

Methodology

A system of methods was used to identify, select, process, and analyze information about the impact of care management with readmissions for 2 cohorts with one or more chronic illness. The study critically evaluated the validity of reliability using a specific procedure and methodology to examine de-identified data on data African American men and women between the ages of 65 to 80 years; care managed or non-care managed with similar commonality in chronic diseases. The data was a mixed population, economically disadvantaged, with contributing factors related to insufficient coordination of care, age, low income, insurance coverage, and other urban concerns (Fitzpatrick, Powe, Cooper, Ives, & Robbins, 2004).

Sampling and Sampling Procedures

Sampling and Sampling procedures was used as a specific process to predetermine the number of observations selected from a larger population in the study that represented a consumed group (Ogula, 2005). The primary goal was to collect a sample, or a small collection of units from a much larger population, to study a smaller group and to accurate generalizations about the larger group. I considered two types of samplings: probability and nonprobability (Center for Innovation in Research and Teaching, 2016). A probability sample described the likelihood that the phenomenon would occur, but a nonprobability sample described the subset of the studied population.

The nonprobability sample design was the most effective for this study to examine the subset cohort that represented the larger population of individuals with chronic illness.

The cohort data were extracted and de-identified from a systematic source to meet the study criteria. Inclusion criteria included patients who were 65–80 years of age; African American; male and female, diagnosed with diabetes, hypertension, asthma or multiple chronic illness. Excluded criteria were other ethnicities, patients outside of the age range, ethnicity, address, income, and education. Alpha level (Type I or Type II) also known as the p -value > 0.05 , was used to identify the chance of error, which was the normal acceptance. Researchers have indicated there would be a 20% chance of error and the confidence level at 95% indicated 95% that the null hypotheses would be rejected with a margin of error $m = 5\%$ (Green & Salkind, 2010). The G* Power software showed three levels of effect size—small, moderate, and large—as the controlled effects. The effect size identified the strength of the correlation of the variables. The larger the effect size, the stronger the relationship between two variables; however, due to the sample size, a small effect size were selected. The sample size were calculated using the multiple logistic regression and paired sample f -test to arrive at the appropriate sample size. The multiple linear regression calculated the alpha level at 0.05, effect size 0.15, power of .80, and three predictors, yielding an estimated sample size of 190. This sample size controlled the Type II error rate and provided an opportunity to examine a potential 5–10% for sampling, which would support those who do not meet the criteria and if there were any drop rates based on lack of participation in the chronic care population.

Archival Data

The electronic archival data were extracted from a public healthcare facility with in a northeastern metropolitan area. Archival data consisted of date of service, both pre- and post-analysis, categorical covariates; gender and age, as the basis for the study over a specified time. Data collected were de-identified, systematically coded to identify each cohort with one or more chronic illness. Data was transferred to the principal investigator in an Excel format, and encrypted on a hard drive. After completion of the study, data was destroyed. Data collection from city agencies and academic institutions for the purpose of research required an IRB review that stipulated: (a) research could not involve merging any data sets in such a way that might be identified, and (b) researcher could not enhance the public data set with identifiable or potentially identifiable data.

To gain access to extract retrospective data, the study required a letter or certification of approval from BRANY and the appropriate approval chain to conduct a study to ensure current compliance with research stipulations (U.S. Department of Health and Human Services, 2017). In addition, a required approval determination from the Biomedical Research Alliance of New York (BRANY) System to Track and Approve Research (STAR) program. BRANY is the premiere source for research support services for hospitals, academic medical centers, and investigators. Also, the study followed the appropriate guidelines by Walden University for research data collection and execution.

Variable Operationalization

The variable operationalization determined the definition and measures for the selected variables. In Table 2, the variable operationalization described the interpretation,

scales, and typology used to measure multidimensional concepts. Categories consist of care management as the independent variable with an assigned code 1 for care managed and code 0 for non-care managed. The same coding was considered for readmissions as the dependent variable = code 1 for readmission and code 0 for non-readmissions. Each were divided by male and females. Continuous numerical variable was age and gender was classified as categorical, distinctly identified for a finite group. The study identified age through a lettering format A = 65–70, B = 71–74, and C = 75–80; gender was characterized as 1 = male and 2 = female; a nominal scale was used for the controlled variables 1 = yes and 0 = no. ICD 10 CM coding in Table 3 was utilized to identify the association of the diagnosis as the primary reason for emergency department visits and readmissions.

Table 2

Variable Operationalization

Dependent variable		
Readmissions	1 = Readmission 0 = No Readmission	Measurement of readmissions
Independent variable		
Care management	Nominal scale 1 = Care managed 0 = Not Care Managed	Measurement of care management
Covariates		
Age	Ordinal scale A = 65–70 B = 71–74 C = 75–80	Age group (age 65–80)
Sex	Nominal Scale 1 = Male 2 = Female	Gender participants (female and male)
Chronic illness		
Diabetes	Nominal scale 1 = Yes 0 = No	Participant has diabetes. Participant does not have diabetes.
Hypertension	Nominal scale 1 = Yes 0 = No	Participant has hypertension. Participant does not have hypertension.
Asthma	Nominal Scale 1 = Yes 0 = No	Participant has asthma. Participant does not have asthma.
Multiple Chronic	Nominal Scale 1 = Yes 0 = No	Participant has multiple chronic illnesses. Participant does not have multiple chronic illnesses.

Table 3

Diagnosis Codes

Diagnosis	ICD 10-CM Codes
Diabetes	250.0, 250.8, 250.10, 250.13, 250.20, 250.22, 250.30, 250.32
Hypertension	401.0, 401.9, 402.10, 402.90, 403.0, 404.0
Asthma	493, 493.01, 493.2, 493.9

Data Analysis Plan

Statistical Package for the Social Sciences (SPSS), a leading statistical software, was used to provide the analysis for this study. All data were stored in the SPSS data file, Version 24 (IBM) for Windows 10. The data analysis examined any outliers that occurred during extraction, leading to Type I or Type II errors. To examine the research questions, a logistic regression was conducted to investigate whether independent variables predicted the dependent variables by having two or more categorical levels. The logistic regression model was selected as the method for binary outcomes (Hosmer, Hosmer, LeCessie, & Lemeshow, 1997) and examined the collective effect of the independent variables presented with a coefficient χ^2 and 1 degree of freedom. Other statistical analysis included the Wald test, also known as the chi-square test. Wald test was used to examine whether the explanatory variables had significant levels of certainty in the results of the study by using: (a) likelihood ratio, and (b) score, which was often the less common, or called the Cox model. When applying a logistic regression model, either one of the statistical models was under consideration; however, for this study, the Wald test was selected for its simplicity to produce symmetric confidence intervals and to examine the significance of the care management variable where $p > 05$. The Wald test tested samples from a de-identified population and influenced the parameters on the distribution of patients between two groups (male and female). Additional testing included, the Hosmer-Lemeshow goodness of fit test, frequently used in risk prediction models, as the statistical test for logistic regression. The Hosmer-Lemeshow goodness of fit test was one of the important aspects in decision-making for model fit when finalizing the results. The

test assessed whether or not the observer variable provided an expected result within the subgroup of the model population and whether the assumption was correct with no conflict in the data.

The sampling for the Hosmer-Lemeshow goodness of fit test was divided according to predicted probabilities or risk, specifically on estimated parameter values for each observation in the sample, for example, $\beta^0, \beta^1, \beta^p$ with the probability that $Y = 1$ was calculated (The Stats Geek, 2014). In this case, the binary outcomes for covariates X and Y were already established. The advantage of the Hosmer-Lemeshow type test was the broad analysis on estimated groups that showed the probabilities of the test would be understood by subject matter experts and could be used only with binary response models. The disadvantage of the Hosmer-Lemeshow was the value of the statistics depended on the analytics that defined a specific group or population based on a group strategy (Hosmer, Hosmer, LeCessie, & Lemeshow, 1997). The coefficient χ^2 -goodness of fit test calculated the degrees of freedom at 1, G power .80, error probability = .05, effect size of 3, and calculated sample size of 190 data points.

The study included: (a) an error-prevention strategy to reduce problems, but did not eliminate them, (b) a data cleaning process to address any errors in data, and (c) a process to repeat the cycling screening, diagnosis, and editing of suspected data abnormalities, which examined missing values that required further examination based on interruptions and unavailability of the targeted information. Computer-based errors were rescreened for any indication of distinguished oddities, such as excess of data, outliers, inconsistencies, strange patterns in the distribution, or any unexpected analysis resulting

in other types of inferences and abstractions (Van den Broeck, Argeseanu-Cunningham, Eeckels, & Herbst, 2005). To reduce suspected data, the study automated the screening process to flag any uncertain data patterns (Van den Broeck et al., 2005).

Statistical Test to Conduct Hypotheses

Testing the hypothesis was an essential procedure in statistical analysis for empirical research and evidence-based medicine (Banerjee, Chitnis, Jadhav, Bhawalkar, & Chaudhury, 2009). The purpose was to conduct the hypothesis to detect if any care management intervention affected upper and lower critical values and to determine if enough evidence was available to reject the hypotheses; consequently, the results would formulate a false hypothesis.

Research Questions and Hypotheses

The following research questions and hypotheses were used as a framework to guide this study.

RQ1: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 years with diabetes?

H_01 : There is no predictive relationship between care management and readmission among African American patients aged 65–80 with diabetes.

H_11 : There is a predictive relationship between care management and readmission among African American patients aged 65–80 with diabetes.

RQ2: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 with hypertension?

*H*₀₂: There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with hypertension.

*H*₁₂: There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with hypertension.

RQ3: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 with asthma?

*H*₀₃: There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with asthma.

*H*₁₃: There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with asthma.

RQ4: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 years with multiple chronic illnesses?

*H*₀₄: There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with multiple chronic illnesses.

*H*₁₄: There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with multiple chronic illnesses.

Threats to Validity

The study examined internal threats to validity as a selection of bias, attrition, unanticipated events, maturation, and instruments to ensure interpretation was not impeded by systematic review (Demotes-Mainard & Gluud, 2016) nor by any observed

differences that would directly affect the independent and dependent variables, such as, (a) expired patients in the mist of the study, (b) patients who relocated and did not return to the emergency room during the study time frame, and (c) patients who passed the age limit during this study. Other threats to validity were systematical, for example, data entry errors leading to duplications and mistakes and data not being available due to computer malfunctions that required manual retrieval. This study used a control group selected from a sample population which had the same concurrent history. To minimize the threat to validity, the study considered a shorter duration of testing to reduce the likelihood of threats. For any interference, the study considered a statistical change, such as a random selection sampling and random assignment of participants. However, to adjust for a group difference, the study would require a combination of the regression analysis to examine the influence of the independent variable on a dependent variable while removing the effect of the covariate factor. In this case, using interpreted one-way ANCOVA to identify significant difference between two or more independent unrelated groups on a dependent variable with a pretest would help to reduce error variance and thus produce a more powerful test than one designed with no pretest data (Stevens, 1996). The power of the test would represent the probability of detecting differences between the groups being compared (Dimitrov & Rumrill, 2003). Consideration for the ANCOVA was declined.

External Validity

External validity examined the extent in which the results of the study could be generalized and applied to two validities: population validity or ecological validity. The

threat to population validity required a generalized population, which was risky, when sampling from an accessible population; however, it was recognized that the external validity could be generalized across other situations, people, and time frames. Ecological validity showed a high validity as a validation that this research could be applied to everyday life and be applicable in other settings. Ecological validity for an at-risk population showed challenges related to environment and family support. However, the threat to population validity for at-risk population was related to access for follow-up services, proper nutrition, and insurance coverage. These were common attributes that contributed to the validity of the study and external validation was important.

Ethical Concerns

Ethical standards governed the study as a protection for dignity and the rights and welfare of the de-identified participants. Several publications on ethical standards were reviewed, such as the Nuremberg Code, the Declaration of Helsinki, the Belmont Report, and the U.S Code of Federal Regulations: The Common Rule. The ethical standard selected for this study was the Belmont Report and the U.S. Code of Federal Regulations: The Common Rule, as required by IRB procedures with the Biomedical Research Alliance of New York. I examined the potential ethical concerns that would hinder the data extraction process. De-identified data were used to ensure privacy protection, thereby, eliminating any major ethical concerns with the recruitment process for this research. If there were any concerns related to data collection or obstacles, the study would have been re-evaluated by the committee chair for recommendations, there would have been re-submission of data requests, and I would have opted for a different topic of

study. However, there were no concerns. Human participants were not applicants in this study; therefore, informed consents were not required to collect data. The study was approved by the IRB Board and all levels of institutional permission were completed to include a completion of the appropriate collaborative institutional training initiative (CITI Program), a web-based educational course in research ethics, to enhance the knowledge of ethical research. Research data agreement was approved on December 2018 to extract appropriate numerical resources. A systematic retrospective review was based on two elements of descriptive analysis: age and sex. Data collection were not inclusive of address, medical record numbers, income, social security numbers, name, and phone numbers utilized or obtained. Protection for confidential data, to include storage procedures, data dissemination, and destruction was followed. The study identified de-identified information through a categorical data process, such as males and females, age was identified through alphabetical lettering and ethnicity remained the same for all participants. I ensured the policies and procedures were adhered to, using a password-protected EMR system, data were stored by hard drive, secured, and locked with sole access by the principle investigator, as required, for a 7 year duration.

Summary and Conclusion

In Chapter 3, I examined the methodology approach on the impact of care management and readmission for chronic disease in an African American elderly population between ages 65-80 years, the specific research methodology designed to address the phenomena and the statistical approach expected to result in a predictive data performance that can be used for forecasting unplanned readmissions.

Chapter 4, I will provide the final analysis of the study, including a summarized approach of data collection, tables, graphs, detailed findings, and final results.

Chapter 4: Results

Logistic Regression analysis was conducted to address four research questions and examine the predictive impact of care management and readmission with an African American elderly population between the ages of 65-80 years, while controlling for the potential confounding effect of age and gender.

Research Questions and Hypotheses

Four research questions (RQs) and their associated hypotheses focused my data collection and analysis.

RQ1: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 years with diabetes?

H_01 : There is no predictive relationship between care management and readmission among African American patients aged 65–80 with diabetes.

H_11 : There is a predictive relationship between care management and readmission among African American patients aged 65–80 with diabetes.

RQ2: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 with hypertension?

H_02 : There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with hypertension.

H_12 : There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with hypertension.

RQ3: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 with asthma?

*H*₀₃: There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with asthma.

*H*₁₃: There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with asthma.

RQ4: Is there a predictive relationship between care management and readmission among African American patients aged 65–80 years with multiple chronic illnesses?

*H*₀₄: There is no predictive relationship between care management and readmissions among African American patients aged 65–80 with multiple chronic illnesses.

*H*₁₄: There is a predictive relationship between care management and readmissions among African American patients aged 65–80 with multiple chronic illnesses.

Data Collection

Secondary data were collected from a population with chronic illness from January 2016 to January 2018. Data collected used an inclusion criteria consisting of 2 cohorts who were 65–80 years of age, male and female, and diagnosed with one or more chronic illnesses. The 2 cohorts consisted of African American elderly patients who were seen in the emergency department more than once and either readmitted or not readmitted within 30 days. Electronic data were scrubbed and de-identified per data agreement and IRB protocol.

Data Extractions

Data extraction were conducted through a clinical software system, scrubbed, de-identified, exported into an Excel spreadsheet, and accessed for statistical testing using SPSS. Exclusion criteria were based on children who were newborn to 18 years of age, and adults who required critical care intervention were withdrawn from the study.

Collection of a small sample of the population was the primary goal of the data extracted to produce accurate generalizations and to reduce the threat to validity.

Data Analysis Procedures

The final results were extracted from SPSS Version 24 (IBM) for Windows 10 and stored in a data file. The data analysis included an examination for outliers that could, in turn, result in Type I or Type II errors. To analyze whether an independent variable predicted the dependent variable, I used the logistic regression model an accepted method of analysis for a binary outcome (Hosmer et al., 1997). Logistic regression examined the significant collective effect of the independent variable presented with a coefficient χ^2 with 1 degree of freedom. There were several statistical options using the logistic regression model to include (a) Wald test, (b) likelihood ratio, and (3) score, called the Cox model, which was often the less commonly used model. Any of the models could have been considered, but for this study, I selected the Wald test because of its simplicity of scientific inquiry to produce symmetric confidence intervals, which examined the significance of the care management variable where p -value = <0.05 . With the Wald test, I examined samples from a de-identified population that influenced the parameters on the distribution of patients between two groups (male and

female). Analysis of variance (ANOVA) was not used as a continuous dependent variable because logistic regression requires dependent variables to be dichotomous (Field, 2013).

I used a data screening process to distinguish any oddities, such as outliers, inconsistencies, strange patterns in the distribution, unexpected results or other types of inferences and abstractions. Automated screening identified suspected data and flagged any uncertain data patterns (Van den Broeck et al., 2005). The study included error-prevention strategies that reduced problems, but did not eliminate them. The first prevention strategy included a double check of data, second strategy, looked at redundancy, and duplication, third strategy, a data cleaning process incorporated as a strategy to address any data problems, if they occurred. Next, a repeated cycle of screening were incorporated, diagnosed, and edited for suspected data abnormalities. If there had been missing values, the study would have required further examination due to interruptions of the data flow and the unavailability of the targeted information. Thereafter, the data would be rescreened for any computer errors (Van den Broeck, et al., 2005).

Data Characteristics of Sample

Samples were obtained from an electronic system using a coding process: yes or no to determine cohort care managed or non-care managed and the same for readmission or non-readmission.

Data Discrepancies/Risk Adjustments

Data discrepancies were common, however, I excluded missing data from the analysis and adjusted data to avoid discrepancies. Each categorical analysis showed

predictor results for (a) number of chronic illness patients with diabetes, (b) number of chronic illness patients with hypertension, (c) number of chronic illness patients with asthma, and (d) number of chronic illness patients with multiple chronic illnesses.

Results

I conducted a comprehensive analysis to address the research questions. The population ranged in age 65–80 ($n = 577$) in a shared combination of (male, $n = 265$, 44%; female, $n = 312$, 54.1%). This study did not include residential demographics, level of education, or marital status. Three subcategories were identified in this section: (a) descriptive statistics that characterized the sample, (b) evaluations of the statistical assumption that were associated with conducting a logistic regression, and (c) a report of statistical findings. For the final model, the dependent variable was readmission and the independent variable was care management; the logistic regression also included the predictor variables age and gender.

Descriptive Statistics

Descriptive statistics described the basic features of the data in the study and a simple summary of the sample. The sample consisted of 577 data points extracted electronically from patients who visited the emergency room with one or more chronic illnesses. The minimum age was 65 years and the maximum age was 80 years, with a median average of 70.71 years of age. The sample viewed four categories: asthma, hypertension, diabetes, and multiple chronic diseases. Selected measures of frequency were studied in SPSS to calculate the percentage of care management intervention and readmission occurrence. Descriptive statistics are displayed in Table 4 for each chronic

illness. Sampling for each chronic disease consisted of 190 data points from 65–80 years of age to include descriptive statistics, gender, and age.

Table 4

Descriptive Statistics

Variables	n	Frequency	Percentage
Dependent Variable	577		
Readmission		287	49.7%
No Readmission		290	49.6%
Independent Variable	577		
Care Managed		207	35.8%
Not Care Managed		370	64.1%
Covariates	577		
Males		265	44.95%
Females		312	54.1%
Age 65–80	577		
Age 65–70		331	56.0%
Age 71–74		75	12.7%
Age 75–80		171	28.9%
Diabetes	189		
Males		99	53.2%
Females		90	46.8%
Age 65–70		100	53.8%
Age 71–74		34	16.7%
Age 75–80		55	29.6%
Hypertension	196		
Males		87	41.0%
Females		109	58.3%
Age 65–70		94	50.3%
Age 71–74		13	7.0%
Age 75–80		80	42.8%
Asthma	192		
Males		85	44.0%
Females		107	55.0%
Age 65–70		125	64.8%
Age 71–74		36	18.7%
Age 75–80		31	16.1%
Multiple Chronic Illnesses	577		
Males		265	44.0%
Females		312	54.1%
Age 65–70		331	56.0%

Age 71–74	75	12.7%
Age 75–80	171	28.9%

Logistic Regression

A binomial logistic regression were used to predict a dichotomous dependent variable based on one or more continuous or nominal independent variable. In the logistic regression method, the syntax command in SPSS, tested the 95% confidence level, classification, predictive observation, statistical significance, and odds ratio for one or more predictor variables.

Statistical Findings

Logistic regression examined the research questions of the predictive relationship between care management and hospital readmission for chronic illness patients with asthma, diabetes, hypertension, and multiple chronic illnesses. The categorical variable used age, gender, and care management; yes or no was categorized as a nominal level of measurement. The dependent variable, readmission, was dichotomous. There were five assumptions examined: (a) binary dependent variable, (b) assumption of minimal variable, continuous, (c) linearity testing, (d) Hosmer Lemeshow goodness of fit test, and (e) independence of errors. All assumptions were met.

Research Question 1

The first research question, the predictive relationship between care management and readmissions for diabetes, examined the impact of care management and readmissions for a diabetes cohort between the ages of 65-80 years. The hypotheses for research question one were tested using a logistic regression model. The testing analyzed

the independent variable: care management and the binary dependent variable: readmissions.

Diabetes Cohort. Logistic regression was performed to determine the impact of care management on readmissions for a diabetes cohort. The logistic regression model used the dependent coding variable “0” no readmission and “1” readmission as the original and internal value. The overall model of significance for the diabetic cohort was $p\text{-value} < .05\%$, demonstrating the probability that the calculation was significant for this study and indicating there was a statistical difference between cohorts care managed and cohorts not care managed for RQ1. The overall model of significance described the statistical correlation between care management for a diabetic cohort as Wald $\chi^2 = .333$, $df = 1$, $p = .564$. The Hosmer Lemeshow Test, $p = .525$, indicated the model was a good fit for the data; the model showed a 61.0% correct prediction of a diabetes cohort. The results supported the hypotheses and the predictive relationship between care management and readmissions amongst elderly African American patients with diabetes between the ages of 65-80 years. Overall, the data analysis for RQ1 found an association with care management and 75% lower odds of readmission with a 95% confidence interval ranging from 52% to 87% lower odds of readmission for a diabetic cohort with confidence interval of two data points CI [.130, .475]. The lower odds showed readmission was less likely to occur with the diabetic cohort without care management intervention. Predictors were tested with a lower odds ratio at $[\text{Exp}(B) = .249]$ indicating a positive association between care management and readmission. The strength of this

data showed diabetic patients with a higher rate of care management intervention had lower odds of readmission resulting in better outcomes and sustainable improvements.

Table 5

Logistic Regression for Care Management and Readmission for Elderly African Americans with Diabetes

	(B)	p value	Exp(B)	95% Confidence for Exp(B)	
				Lower	Upper
Care management Covariate	-1.392	.000	.249	.130	.475
Age 65–70	-.777	.048	.460	.213	.994
Age 71–74	-.374	.467	.688	.251	1.883
Age 75–80					
Participant gender	.432	.202	.649	.334	1.260
Constant	1.677	.000	5.351		

Note. N = 189

Research Question 1 – Summary of Findings

Based on the findings, the inclusion of control variables with the logistic regression model did improve the predictive power of the model; therefore, a statistical significance ($p=.000$) was associated with readmissions. Therefore, for research question one, the null hypothesis was rejected, and the alternative hypothesis was accepted.

Research Question 2

The second research question, the predictive relationship between care management and readmissions for hypertension, examined the impact of care management and readmissions for a cohort between the ages of 65-80 years. The hypotheses for the second research question were tested using a logistic regression

model. The testing analyzed the independent variable: care management and the binary dependent variable: readmissions.

Hypertension Cohort. Logistic regression was performed to determine the impact of care management on readmission for a hypertension cohort. The logistic regression model used the dependent coding variable “0” no readmission and “1” readmissions as the original and internal values. The overall significance model in the hypertension cohort, a p-value $< 0.05\%$, demonstrated the probability that the calculation was significant for this study and indicated there was a statistical difference between cohorts care managed and cohorts not care managed for RQ2. The overall model of significance described the statistical correlation between care management for a diabetic cohort as Wald $\chi^2 = 5.731$, $df = 1$, $p = .017$. The Hosmer Lemeshow Test, $p = .530$, indicated the model was a good fit for the data; the model showed a 61.0% correct prediction of a diabetic cohort. The results supported the hypotheses and the predictive relationship between care management and readmission amongst elderly African American patients with hypertension between the ages of 65-80 years. Overall, the data analysis for RQ2 found an association of care management and 55% lower odds of readmission with a 95% confidence interval ranging from 51% to 77% lower odds of readmission for the hypertension cohort with confidence interval of two data points CI [.227, .863]. The lower odds showed readmission was less likely to occur with a hypertension cohort with care management than with a hypertension cohort without care management intervention. Although, the impact for care management was significant for the hypertension cohort, it was not as significant for the diabetic cohort at a confidence

interval level at 75%. Predictors were tested for the hypertension cohort with a lower odds ratio at $[\text{Exp}(B) = .443]$ indicating a positive association between care management and readmission. The strength of this data showed hypertension patients with a high rate of care management intervention had lower odds of readmission resulting in better outcomes and improvements.

Table 6

Logistic Regression for Care Management and Readmission for Elderly African Americans with Hypertension

	<i>(B)</i>	p value	Exp(<i>B</i>)	95% Confidence for Exp (<i>B</i>)	
				Lower	Upper
Care management	-.814	.017	.443	.227	.863
Covariate					
Age 65–70	-.145	.654	.865	.460	1.629
Age 71–74	1.277	.128	3.586	.693	18.555
Age 75–80					
Participant gender	-.180	.583	.835	.439	1.589
Constant	-.752	.005	2.122		

Note. N = 196

Research Question 2 – Summary of Findings

Based on the findings, the inclusion of control variables with the logistic regression model did improve the predictive power of the model, and there was a statistical significance ($p=.017$) associated with readmissions and hypertension.

Therefore, in research question two, the null hypothesis was rejected, and the alternative hypothesis was accepted.

Research Question 3

The third research question, the predictive relationship between care management and readmission for asthma, examined the impact of care management and readmission for a cohort of chronic illness between the ages of 65-80 years. The results support care management as an intervention to unplanned readmissions. The hypotheses for the third research question were tested using a logistic regression model. The testing analyzed the independent variable: care management and the binary dependent variable: readmissions.

Asthma Cohort. Logistic regression was performed to determine the impact of care management on readmission for the asthma cohort. The logistic regression model used the dependent coding variable “0” no readmissions and “1” readmissions as the original and internal values. The overall model of significance described the statistical correlation between care management for an asthma cohort as Wald $\chi^2 = .009$, $df = 1$, $p = .923$. The Hosmer Lemeshow Test, $p = .998$, indicated the model was not a good fit for the data; and the model indicated a very low percentage care managed within the asthma cohort, indicating a statistical difference between cohorts care managed and cohorts not care managed. The results did not support the hypotheses and the predictive relationship between care management and readmissions amongst elderly African American patients with asthma between the ages of 65-80 years. Overall, the data analysis for RQ3 did not show a predictive association with care management intervention and readmissions for asthmatic patients. The higher odds ratio showed a +4.9% of readmission with a 95% confidence interval CI [.401, 2.743] ranged from 60.0% lower odds to 174% higher odds of readmission. Predictors were tested for asthma with an odds ratio at [Exp (B) =1.049]

indicating an association between care management and readmission at 88% predicted correctly, resulting in the hypothesis that care management did not have an impact on readmission amongst elderly African Americans between the ages of 65-80 years with asthma; therefore, the null hypotheses was accepted. The strength of this data showed care management was not an added value to reduce readmissions. Patients in this cohort were more likely to engage in self-management with the appropriate asthma supplies, outside resources, and primary care intervention.

Table 7

Logistic Regression for Care Management and Readmission for Elderly African Americans with Asthma

	<i>(B)</i>	p value	Exp(<i>B</i>)	95% Confidence for Exp(<i>B</i>)	
				Lower	Upper
Care management Covariate	.047	.923	1.049	.401	2.743
Age 65–70	-.421	.457	.656	.216	1.994
Age 71–74	-.738	.343	.478	.104	2.198
Age 75–80					
Participant gender	-.147	.751	.864	.349	2.139
Constant	-1.603	.004	.201		

Note. N = 192

Research Question 3 – Summary of Findings

Based on the findings, the inclusion of control variables with the logistic regression model did improve the predictive power of the model, and there was no statistical significance ($p=.923$) associated with readmissions and asthma. Therefore, for research question three, the null hypothesis was accepted and the alternative hypothesis was rejected.

Research Question 4

The fourth research question, the predictive relationship between care management and readmissions for multiple chronic illnesses, examined the impact of care management and readmissions for a cohort of chronic disease between the ages of 65-80 years. The results supported care management as an intervention to unplanned readmissions. The hypotheses for the fourth research question were tested using a logistic regression model. The testing analyzed the independent variable: care management and the binary dependent variable: readmissions.

Multiple Chronic Illness Cohort. Logistic regression was performed to ascertain the impact of care management on readmission for the multiple chronic illness cohort. The logistic regression model was statistically significant using the dependent coding variable “0” no readmissions and “1” readmissions as the original and internal values. The overall model of significance described the statistical correlation between care management for the multiple chronic illness cohort as Wald $\chi^2 = 9.271$, $df = 1$ $p = .002$. The Hosmer Lemeshow Test, $p = .845$, indicated the model was a good fit for the data; the predicted corrected percentage was 62.0% readmission for MCCs. The results supported the hypotheses and the predictive relationship between care management and readmission amongst elderly African American patients with multiple chronic illness between the ages of 65-80 years. Overall, the statistical data for RQ4 found an association but not a predictive association of care management with 41.5% lower odds of readmission and a 95% confidence interval ranging from 78.7%-58.6% lower odds of readmission for the multiple chronic illness cohort. In this case, the correlation of care management ranged

between two data points CI[.414, .826]. The data points showed the multiple chronic illness cohort required a different type of care management intervention due to the level of comorbidities and the frequency of readmissions; however, the single chronic illness cohort showed care management intervention was effective with a care plan team. The strength in this data showed an overall significance in the multiple chronic cohort with a p-value <0.05% demonstrating the probability that the calculation was significant for this study.

Table 8

Logistic Regression for Care Management and Readmission for Elderly African Americans with Multiple Chronic Illnesses

	<i>(B)</i>	p value	Exp(<i>B</i>)	95% Confidence for Exp(<i>B</i>)	
				Lower	Upper
Care management Covariate	.536	.002	.585	.414	.826
Age 65–70	–.764	.000	.466	.318	.683
Age 71–74	–.221	.439	.802	.459	1.402
Age 75–80					
Participant gender	–.206	.236	.814	.579	1.144
Constant	.776	.000	2.173		

Note. N = 577

Research Question 4 – Summary of Findings

Based on the findings, the inclusion of control variables with the logistic regression model improved the predictive power of the model, and there was a statistical significance ($p = .002$) associated with readmissions and multiple chronic illnesses. Therefore, for research question four, the null hypothesis was rejected, and the alternative hypothesis was rejected.

Summary

Based on the data collected, the results showed an imminent need for care management in a population less studied. Analytics were critical to the presentation of this study to ensure the measuring effects supported population health initiatives in the elderly population and provided a rapid deployment of care management solutions. Overall, Chapter 4 addressed a gap in the literature and contributed to the statistical absence of research by examining several variables related to the predictive relationship on the impact of care management with readmissions on individuals within an African American community between the ages of 65-80 years. The data analysis found the diabetes, hypertension, and multiple chronic illness cohorts who were care managed had a lower risk of readmissions; however, the asthma cohort did not require care management, remained sustainable, and was not associated with risk of readmission. Age and gender were not major factors in the results of the predictive relationship between care management and readmission for chronic illness. The study showed, specifically, the diabetes cohort had 75% lower odds of readmission than the hypertension cohort at 55%. The diabetes cohort showed a better outcome; more specifically, it had a lower odds ratio. The asthma cohort showed a very low predictive relationship at a +4.9% higher odds of readmission for care management intervention, revealing patients were more self-managed and sustainable. The number of unplanned readmissions for the asthma cohort were very low, and the predictor of age and gender was not relevant. The multiple chronic illness cohort showed a lower odds of 41.5%, which was the lowest of the single chronic illness of diabetes and hypertension cohort. The multiple chronic illness cohort

was the most sensitive to comorbidities and poorer day-to-day functionality, contributing to a higher rate of readmissions and demonstrating a need for a different type of care management intervention.

Chapter 5, I will provide the purpose of the study, the nature of the study, interpretation of the findings, limitations, and recommendations for future research studies. Finally, the study will examine critical elements of the research that support positive social change and serve to highlight the very essence of the research phenomena.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Chronic disease is one of the leading causes of high health care costs, comorbidity, and mortality among the African American population. Chronic disease has become a public health epidemic among many ethnic groups, specifically African Americans. The purpose of this quantitative research was to explore the association between care management and hospital readmission among African American patients between 65 and 80 years of age who had one or more chronic condition. I used retrospective data collected from January 2016–2018 from an electronic database. The research was supported by the theoretical framework of the CCM. The model was used as an organizational approach to help manage a chronic care population. Within the model, there were six contributing factors that addressed a collaborative environment to improve and sustain chronic care outcomes between patient and clinical coordination. Four research questions and hypotheses guided the study to address the predictive relationship of care or no care management in patients with diabetes, hypertension, asthma, and multiple chronic illnesses.

For this research, I explored the extent to which an association between diabetes, asthma, hypertension, and multiple chronic illnesses was found to be statistically significant. The findings of this study contributed to the literature on chronic illness as a widespread epidemic that has burdened health care institutions with unprecedented and unplanned readmissions to the hospital in an already stressed system. These results offered insight into predictive planning and programmatic investments that could affect

the outcomes and quality of life for the elderly African American population. The results of logistic regression showed a statistical significance between care management and readmission among elderly African American patients. The diabetes cohort showed 75% lower odds of readmission, with a 95% confidence interval indicating readmission was less likely to occur, representing positive association with care management intervention. The hypertension cohort showed 55% lower odds of readmission, with a 95% confidence interval indicating readmission was less likely to occur, indicating a positive association with care management, and lastly, the multiple chronic illnesses cohort showed 41.5% lower odds of readmission, with a 95% confidence interval indicating readmission was less likely to occur, representing a positive association with care management. The null hypotheses were rejected for three chronic illness cohorts in this study and the hypothesis was accepted for one. The Hosmer Lemeshow Test was used to predict expectations with the dependent and independent variables. The test indicated the model was a good fit for data for three chronic illnesses. The asthma cohort did not show a lower odds ratio and displayed a higher odds ratio of +4.9%, indicating a lower need for care management intervention due to other therapeutic interventions.

In the next section of this chapter, I interpreted the findings considering the current literature on the relationship between care management, readmission, and chronic diseases. The results are organized according to the research questions and hypotheses. The chapter concludes with a summary of the discussion.

Diabetes Cohort

The first research question focused on the relationship between care management and readmission to the hospital for the elderly diabetic African American population. Drawing from previous literature on diabetes chronic disease, I hypothesized that care management intervention and a chronic disease, such as diabetes, can be associated with reduction in numbers of readmissions to the hospital and medical costs and an increased proportion of patients receiving appropriate medication and follow-up care (Eggington et al., 2012). The American Diabetes Association (2017) noted, that diabetes was one of the most serious health problems the African American community faces today. Compared to the general population, African Americans are disproportionately affected by diabetes (American Diabetes Association, 2017). In studies where intensive diabetes treatment was applied, such as the Action to Control Cardiovascular Risk in Diabetes study, using the same HbA1c as treatment target for people from different ethnic backgrounds, showed a higher risk of hypoglycemia for those of Asian, African, or Hispanic origin (Wolffenbuttel et al., 2013). A study on racial-ethnic disparities showed the early onset of diabetes in a multiethnic study influenced by racial-ethnic disparities is related to risk factors that include BMI, smoking, and diet. Other multifaceted constructs included geographical origins, as well as social, cultural, and socioeconomic factors. The number of cases of diabetes across ethnic groups, particularly African Americans, was greater than in the Hispanic population. The study noted greater emphasis on the varying factors that influence the development of diabetes (Kulick et al., 2016).

The results of the logistic regression showed a significant predictive relationship between the dependent variable (readmission) and independent variable (care management). These findings are consistent with studies that found older diabetic adults had an increased risk of multiple coexisting medical conditions and common complications with mortality and comorbidities in African American communities (Kirkman et al., 2012), but they benefitted from a care management intervention that used in-person education, self-management, and monitoring interventions to address readmissions.

Currently, many patients with complex or comorbid conditions must interact with multiple healthcare providers. Lack of effective coordination can lead to adverse events (Tomoaia-Cotisel et al., 2016). The results in this study showed support to Tomoaia-Cotisel et al.'s (2016) findings on the functionality of care management programs that strengthen the linkage and relationship between patients and provider for better outcomes. While these results, provided strong evidence about the relationship of care management and readmission for a diabetic cohort, they were not predicated on demographics, comparative ethnicities, or income, but only on the definitive role of care management in readmission with diabetic patients. The statistically significant findings quantified the likelihood that readmission would be reduced based on the intervention of care management and suggested that diabetes patients', integrated care could be managed with better outcomes.

Hypertension Cohort

The second research question focused on the relationship between care management and readmission for hypertension in the elderly African American population. The prevalence of hypertension in the African American population in the United States is among the highest in the world. Hypertension is the most commonly diagnosed condition among African American 60 years and older and is the single most important risk factor for cardiovascular disease (e.g., ischemic heart disease, heart failure, stroke), kidney disease, and dementia. Compared with other ethnic counterparts, African Americans develop hypertension at an earlier age, their average blood pressure is much higher and they experience worse disease severity. Consequently, African Americans have a 1.3 times greater rate of nonfatal stroke, 1.8 times greater rate of fatal stroke, 1.5 times greater rate of heart disease death, 4.2 times greater rate of end-stage kidney disease, and a 50% higher frequency of heart failure; overall, mortality due to hypertension and its consequences is four to five times more likely in African Americans. (Ferdinand & Armani, 2007). The increased prevalence of hypertension and excessive organ damage is likely due to a combination of genetics and environmental factors. At-risk patients with severe or multiple medical issues and the chronically ill are some of the major drivers of rising health care costs (Baldonado, Hawk, Ormiston, & Nelson, 2017).

Similar to this study, evidence-based interventions were introduced in a large systematic hospital in California with primary results showing reduction in readmissions and frequent emergency room usage in partnership with the intervention of care coordination. The California systematic study noted patients who were care transitioned

into a clinic visit, follow-up care, scheduled appointments, and resources for durable medical equipment showed reduced readmission and greater sustainability in managing their chronic diseases (McIlvennan et al., 2015). Drawing from previous literature on hypertension and chronic diseases, care management programs for chronic diseases, such as hypertension, were associated with a reduced length of stay in hospitals and reduced medical costs, with an increased proportion of patients receiving appropriate medication, healthy dietary restrictions, and follow-up resources (American Heart Association, 2017). More than half of the hypertensive patients in the United States are over age 60 years. African Americans are disproportionately affected by hypertension in all age groups, including the elderly, suffering a higher burden of hypertension-related complications compared to other U.S. populations (Still, Ferdinand, Ogedegbe, & Wright, 2015). The CCM identified the essential elements of a health care system that encourages high quality chronic disease care (American Heart Association, 2017).

The results of the logistic regression showed a significant predictive relationship between the dependent variable: readmission and the independent variable: care management. These findings were consistent with prior studies, which found hypertension as a growing health care burden and a leading cause of hospitalization and readmission (Lionakis et al., 2012). Preventing readmission for heart failure related to hypertension is an increasing priority and incentive to develop new strategies to improve unplanned readmissions. Americans in general are prone to hypertension; however, identifying health system strategies to reduce hospitalization would be valuable to all patients and the healthcare industry. Lionakis et al., (2012) conducted a systematic

review of interventions, such as providing care management, scheduling follow-up appointments, fostering communication between provider and patients, and providing follow-up calls. They found no single intervention alone could reduce readmission; however, a more collaborative and comprehensive intervention reported greater success (Ziaecian & Fonarow, 2016). The study confirmed that when care management interfaced with hypertension, outcomes were better.

Existing studies on hypertension in the African American population showed that nearly 67 million adults in the United States (30.4%) have hypertension, and fewer than half (46.5%) have their hypertension controlled (CDC, 2010). The American Heart Association projects that the direct medical costs for hypertension will increase from \$69.9 billion in 2010 to \$200.3 billion in 2030 (Heidenreich, Trogon, & Khavjou, 2011). The American Heart Association noted, the prevalence of high blood pressure in African Americans was the highest in the world. One of the leading causes of death and hospitalization in African Americans in urban communities is heart disease, specifically in African American women, who are less likely than other ethnic women to be aware that heart disease is the leading cause of death (American Heart Association, 2016). According to the American Heart Association, cardiovascular disease kills nearly 50,000 African American annually, while only 52% of African Americans are aware of the signs and symptoms of a heart attack and only 36% of African American women know that heart disease is their greatest health risk (AHA, 2016). The New York City of Department of Health noted, that many deaths from heart disease are preventable or controllable through manageable factors, such as reducing smoking, lowering cholesterol,

monitoring diabetes, and combatting obesity through social regimens (New York State Department of Health, 2017). In summary, results from RQ 2 contributed further insight into the relationship between care management and readmission for the hypertension cohort.

Asthma Cohort

Asthma affects between 4% and 13% of adults in the United States aged 65 years and older. This population are >5 times more likely to die from asthma than from a younger counterpart. By 2050, the number of people in the world aged 65 years and older is expected to triple, yet asthma remains under-recognized, undertreated, and a challenge to properly diagnose and treat. Asthma in older adults is shown to have a significant impact on quality of life. Many times, asthma in the elderly co-exist with other conditions, such as obesity or chronic obstructive pulmonary disease (COPD), all of which are common among this population and, as a result, often complex and difficult to spot. The elderly population who are often overlooked for asthma prevention (National Institutes of Health, 2017) are concerned regarding side effects of medication, so adherence to therapeutic regimens is often poor. Practical strategies to improve asthma outcomes in older people have been studied infrequently and the goals of self-management suitable for younger age groups may not be applicable in this group (Akinbami, Moorman, & Liu, 2011). Consequently, asthma in older people are deserving of further attention not only to the basic mechanisms of the disease, but also to the precision in diagnosis and effective therapeutic strategies, including those that involve self-management and device usage. People over aged 65 years with asthma have

undetected symptoms and are less likely to report and present to medical care. A physical disability can lead to difficulty in accessing treatment and using inhaler devices to control asthma (Gillman & Douglass, 2012). Also, drawing from previous literature on asthma, chronic disease care management intervention was not hypothesized as an intervention in the chronic disease of asthma.

The statistics for research question three did not show a predictive association with care management intervention for asthmatic patients. The results of the logistic regression showed a 61% predictive relationship between the dependent variable (readmission) and independent variable (care management) was not statistically significant. These findings further substantiated previous studies that focused on asthmatics as one of the most common medical complications, but manageable with medical therapy and education. Similar studies showed, asthmatics with one or more exacerbation had reduced readmissions through self-management education including an action plan for more and better self-treatment of asthma care (Kruis et al., 2013). Patients more often initiated treatment by themselves, whereby they could then be successfully treated with oral steroids at an early stage (Sridhar, 2008). As the population of the United States continues to age, there has been a renewed interest in evaluating, monitoring, treating, and counseling older adults with asthma (Baptist, Deol, Reddy, Nelson, & Clark, 2010). Results from research question three contributed further insight into the relationship between care management and readmission for the asthma cohort. The statistically significant findings quantified that the likelihood of readmissions would not be relevant in the asthmatic cohort studied.

Multiple Chronic Conditions Cohort

The fourth research question focused on the relationship between care management and readmission for patients with multiple chronic illness in the African American elderly population. Drawing from previous literature on multiple chronic illness, it was hypothesized that care management can be associated with reduced length of hospitalization (Eggington, 2012). Approximately 60% of elderly patients have a minimum of two chronic conditions, according to the Center for Disease Control and Prevention (2017). For many elderly, coping with MCCs is a real challenge. Learning to manage a variety of treatments while maintaining quality of life can be problematic. Most elderly want to understand their medical conditions and are interested in learning how to manage. Utilizing care management strategies are often beneficial overall and can improve patient outcome (National Institute on Aging, 2017). To mitigate MCCs, Parekh, Goodman, Gordon, Koh & HHS (2011) noted, a strategic framework is needed for guiding efforts to manage MCCs, to provide better tools, and information to healthcare, public health, and social services who deliver care to individuals with MCCs. Parekh et al., (2011) also noted, the need to identify best practices and tools to promote a systematic approach to the assessment and management of this complex population, including the prevention of additional comorbidities.

The results of the logistic regression showed a significant predictive relationship between the dependent variable (readmission) and independent variable (care management). These findings further substantiated previous studies that focused on multiple chronic illness, highlighting how multiple chronic illness populations suffer

suboptimal health. There is an urgent need not only to achieve better health outcomes but also to reduce rising health care expenses, and enhanced attention to this population is critical to improving quality healthcare, and cost (Parekh et al., 2011). The problem with MCC amongst African American remains a rapidly escalating concern in the management and medical challenges associated. (American Association of Retired People Policy Institute, 2009; Schneider, O'Donnell, & Dean, 2009). The combined effects of increasing life expectancy and the aging of the population undoubtedly will further increase the associated societal burden of chronic illnesses among future populations of older people (Parekh et al., 2011).

As population's age, the time people live with disabilities and chronic disease is increasing such that the rates of MCCs are close to three quarters of older adults in developed countries (Divo, Martinez, & Mannino, 2014). African Americans have a high risk for multiple chronic illnesses and genetic predispositions for certain diseases, such as obesity, insulin resistance, and diabetes as a result of complications from poor glycemic control. As such, the prevalence of these health risks, along with other racial disparities in overall health, all contribute to the risk of multiple chronic illnesses in the African American population in the United States (Baldonado et al., 2017). Despite the growth of these health problems, the delivery of health services has continued to employ outmoded "silo" approaches that focus on individual chronic diseases rather than on multiple chronic illnesses. Parekh et al., (2011) acknowledged that MCCs can overwhelm individuals, their families, others who care for them, healthcare professionals, service providers, and our systems of care. The number of Americans with MCCs will continue

to increase as a function of the aging population, the continued existence of chronic disease risk factors, and the impact of modern medicine.

To date, there has not been an attempt to offer an action-oriented framework that outlines national strategies to maximize care coordination and improve health and quality of life for the multiple chronic illness population; however, the results have confirmed that a care management intervention seeks to alleviate care fragmentation for patients with complex and/or comorbidity conditions who must interact with multiple health care providers. The lack of effective coordination can lead to adverse events (Tomoaia-Cotisel et al., 2016). While these significant results provided strong evidence about the relationship of care management and readmission for a population with multiple chronic illness, there is an absence of demographic analysis, as well as comparative analysis in the areas of other ethnicities, education, and income. Thus, studies have not been able to provide the definitive answer regarding the role of care management in the realms of readmission for multiple chronic illness, the results from research question four contributed insight into the relationship between care management and readmission for the multiple chronic illness cohort in an urban environment. The statistically significant findings quantified the likelihood that readmissions would be reduced based on the intervention of care management with the diabetic, hypertension, and multiple chronic cohort suggested integrated care could be managed with better outcomes.

Interpretation of the Chronic Care Model

The CCM was the theoretical framework for the transformational approach to improving chronic conditions. The social science theory developed by Dr. Ed Wagner

established and validated a comprehensive approach to caring for the chronically ill. As a conceptual framework, the CCM provided structure to individuals with MCCs, their families, and public health systems, and communities. This approach optimized health and quality of life and helped manage the burden of one or multiple conditions. The benefit of utilizing the CCM proved to be effective in three of the chronic illness, diabetes, hypertension, and multiple chronic illnesses as studies shared responsibility between patient and provider to achieve the vision of optimum health and quality of life for individuals. The fourth chronic illness, asthma, utilized a more efficient self-management component of the chronic care model under community resources. Overall, the six components of the CCM contributed to functionality and clinical outcomes associated with disease management. The study showed that the CCM once applied resulted in statistical evidence that the approach actually reduced readmission in one or more chronic illness. Statistically, the results provided reasonable justification for hospital based programs to secure better resources to optimize and facilitate chronic care programs for patient care. Systematically, studies show more healthcare institutions are creatively developing new models of care management as a fundamental practice using the CCM as a template.

Limitation of the Study

The present findings must still be interpreted based on the limitations of the study. The main limitation of this study was attributed to the archival data collection. I used 2 years retrospective data for the topic studied; however, there were many other years that could have been incorporated to shed light on a continuous epidemic. Additionally, the

study could have revised the methodology to collect more data on the diagnosis related to each chronic disease: diabetes, asthma, hypertension, and multiple chronic illnesses. The study could have shown a broader perspective on other ethnicities and on healthier patients; however, the results would have systematically showed a different analysis, causing the sampling to be unrepresented in the operationalization of the variables.

Other limitations included a relatively small sample size of elderly African American with one or more chronic illness between the ages of 65-80 years with a care management intervention to reduce readmission, which limited the contextualization of the results of the study. Other potential confounding factors in the study were unobserved risk factors that were important to the delivery and coordination of patient care for readmissions, such as socioeconomic status, Medicaid and Medicare mix factors, geographic location, level of education, and income. These were further limiting factors that could have played an important role in the study's outcome. These unobserved risks were potential confounding factors in the regression model that could have affected the study by influencing the dependent and independent variables, causing a false association. Risk adjustments in the regression analysis was limited to age and gender; however, for a more fluid comparison, other measured factors could have been considered such as past medical history, other diseases, medical complications, and comorbidities for each cohort prior to this study. Also, data collected for this study was from secondary sources as existing data, and as such, there could have been underreporting of such diseases which may have limited the researcher's ability to fully assess the association between care management and readmission for one or more chronic

illness. I selected care management as the appropriate intervention for chronic illness to reduce readmissions; however, there were several other interventions which could have been selected, such as transition of care and care coordination. Care management was the most strongest strategic tool and provided a lineage approach to managing chronic conditions.

A simple correlation was not enough to arrive at the conclusion of causation, but multiple correlations, all determined by the triangulating of data, and resulted in the conclusion that the combination of care management with one or more chronic diseases reduced readmissions. However, I could have examined other unmeasured factors for chronic illness, such as smoking, obesity, and quality diets, all of which could have influenced the results.

Recommendation for Future Research

Current literature showed limited information on the care management approach to reduce readmissions. Aligning care management with physician services can significantly improve the patient's experience as well as financial and clinical care outcomes. Further research is needed to: (1) statistically examine the cause and effect of multiple care management programs with one or more chronic illness, (2) compare technological services to support the management of chronic illness remotely, and (3) explore a qualitative study on the experience and perspective of the elderly population with care management intervention, this is a seldom heard group. These additional research inquiries will provide trending analysis to reduce length of hospital stays and the number of readmissions.

Implication for Positive Social Change

The growing elderly population has an increasing need for healthcare related services. As the diagnosis of chronic disease identified in > 65, healthcare leadership will be required to further manage the impact on elderly care. The National Caucus and Center on Black Aging African American (2017) noted, a growing concern on who will attend to the aging African American population. Current perceptions of older adults who are members of the minority community create an experience of discrimination beyond that of ageism. Some physicians are less patient-centered and less positive towards the African American elderly population compared to other ethnicities (Cooper-Patrick et al., 1999; Johnson, Roter, Powe, & Cooper, 2004). Healthcare providers may need additional training to understand the ways in which cultural context informs how patients perceive or receive healthcare information and intervention (Hansen, Hodgson, & Gitlin, 2015). To address social changes, providers are encouraged to address attitudes and stereotypes of older adults, especially in the African American population. It must be recognized that many African Americans grew up with segregated healthcare, social service systems, and faced with continual discrimination; therefore, it is extremely important to show them respect within the clinical setting and establish a rapport. This is inclusive of using respective names, Mr. or Mrs., unless permission is given otherwise (Hargrave, 2010).

Other implications include healthcare disparities related to comorbidities in chronic illness for diabetes and heart disease related to hypertension. These chronic illnesses can be linked to a population underinsured and having limited access to consistent healthcare as well as a population accustomed to eating cultural foods that are

rich in cholesterol and fats. Nonetheless, these are all manageable parameters that can be aligned with a care management program for better outcomes. Lastly, implications in diabetes and hypertension were consistently related to mortality and morbidity risk compared with other ethnicities. These health risks, i.e. elevated blood pressure have a dramatic effect on life expectancy for African American men and women (Lackland, 2014).

As healthcare progresses, the broad spectrum of care management will continue to include: (a) partnership with primary care for safer homes and the availability of medical devices for ambulatory movement as a requirement to improve quality of life, and (b) monitoring of families to ensure that day-to-day regimens continue to be followed, such as appointments and medication. Care management will continue based on optimistic financial investments as a partial solution to reduce readmission; however, the implications of social change to include care management as a change agent was statistically demonstrated in this study. For positive social changes, there are three recommendations to advance care management: (a) hospital-based practice, (b) organizational structure, and (c) systematic changes.

Hospital-Based Practice

Care management generally was limited to impacting how care was delivered; however, the broad definition includes disease management whereby patients are encouraged to improve their health status proactively for one or more chronic conditions to avoid unnecessary future healthcare costs and unplanned readmissions. This dissertation showed care management as a promising team-based and patient-centered

approach designed to assign patients and support teams in ways to manage medical conditions more effectively (Center for Health Care Services, 2017). As a hospital-based practice, providers must identify populations with modifiable risks to manage and coordinate care in ways that would achieve the goals of cost savings, improve quality, and enhance patient experience. While all patients are likely to benefit from basic elements of care coordination, such as effective communication and the efficient exchange of information among care providers, it is critical that providers understand which patients are likely to benefit. This requirement is particularly important for high risk and high cost populations. To manage resources sustainably, practices must accurately identify individuals and populations with controlled risk factors, and by doing so, health and social change will have systematic results. Careful management of selected populations may increase the quality of care as a social intervention by improving the delivery of appropriate clinical preventive services and addressing safety concerns, such as medication reconciliation to avoid duplication and prescription errors, and finally, efficiency, by reducing unnecessary utilization of services. Poor execution of transition of care between hospital and home or primary care was associated with increased risk (Kripalani, Jackson, Schnipper & Coleman, 2007). Hospital-based practices should examine modifications to improve health outcomes, positively influencing psychosocial concerns, as well as help patients achieve goals that produce better health outcomes. Patients with certain factors, such as one or more multiple chronic illnesses, ethnicity, age, metabolic risk factors, smoking status, and psychosocial issues benefitted from a

care management intervention. As a positive social change, hospital-based institutions should begin to relinquish the traditional health care norms to make a difference.

Organizational Structure

Leaders in healthcare should establish an organizational structure to support the workforce development for care management with a consistent approach to developing training techniques, thus leading organizations to achieve higher efficiency, productivity, and job performance, as well as to foster behaviors conducive to learning. Workforce development to support care management must focus on continuous development of skills and competencies that will ultimately contribute to high staff satisfaction, lower turnover, and better care management services. With skills and knowledge, the workforce can model a care management service across healthcare systems, translating to stronger financials, better outcomes, and evidence of better coordinated care (Lewin Group, Inc., 2016). In a rapidly changing health care delivery system, there is a need for an expanded care management workforce that is capable of caring for individuals with complex chronic conditions. The benefits of investing in workforce development would reduce staff turnover and improve performance, resulting in an efficient and effective care plan (Lewin Group, Inc., 2016).

Systematic Changes

Electronic Health Records replacing outdated paper records has been a massive game changer for everyone in the medical world. Systematically, society has an obligation to provide and streamline technological services to support patient care. Mobile Health (mhealth), known as the medical and public health practice supported by

mobile devices, such as phones, patient monitoring devices, personal digital assistance and other wireless devices, is a growing appeal of mobile solutions for health promotion and health care delivery. Mobile Health has the potential to support successful management of chronic conditions and health behavior changes. As pilot studies become large-scaled and trials and information turn into best practices, Mhealth will be a worthwhile future investment and a research opportunity to further understand the fundamental effects on the reduction of readmissions for one or more chronic illness for elderly African Americans (Matthew-Maich et al., 2016).

Conclusion

To maximize performance in care management this dissertation showed that the investment in programmatic intervention for specific chronic illnesses does reduce readmissions. Based on the statistical results of this dissertation, information to support predictive relationships between care management and readmission for one or more chronic illness was demonstrated and can be shared with healthcare leaders, policy makers, and regulatory reviewers as a template to plan and re-route unplanned readmission to an integrated setting. The presented information and data provided insight into a strategic solution to enhance quality care by utilizing care management intervention. However, there remains a significant amount of unknown literature on the impact of care management and readmission with the African American population between the ages of 65-80 years in an urban community. There were multiple studies on readmission and various ethnic groups; however, studies on care management in specific age groups were scarce. I tested the relationship between care management and

readmission for four chronic conditions. Findings showed three out of the four chronic conditions had significant impact on readmissions; however, one did not have a positive impact. Based on the results, care management alone would not reduce all readmissions, but care management does have an active role in leading a worldwide epidemic to better coordination of care. This study provided insight into the predictive relationship when care management is interfaced with the management of one or more chronic illness. It showed a conventional need to invest in comprehensive care management programs for elderly patients to improve health outcomes and reduce hospitalization stays. By developing care management practices, healthcare systems can address cost savings and reimbursement rates, support the success of population health initiatives, and reduce emergency room visits. These amendments in practice will contribute to social change by addressing a public health epidemic.

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