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Chronic Obstructive Pulmonary Disease Readmissions and Mortality in Veterans Administration Hospitals

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This is to certify that the doctoral study by

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Walden University
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Abstract

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Administration Hospitals

by

Carolyne S. Davis

MHA, Walden University, 2015

BHA, Ohio Christian University, 2013

AAS, Southern State Community College, 2011

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration

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Abstract

Rates for chronic obstructive pulmonary disease (COPD) have continued to increase, resulting in readmission tracking by the Centers for Medicare and Medicaid for community hospitals and Veterans Health Administration (VHA) hospitals. By using the Andersen healthcare utilization model as the theoretical framework, the purpose of this quantitative correlational research was to examine differences in 4,879 COPD readmission and mortality rates in VHA hospitals for the four Veteran Administration (VA) regional districts—Northeast, Southeast, Continental, and Pacific—as well as and between rural and urban VA hospitals. Secondary data was acquired from an open website through the Centers for Medicare & Medicaid Services. Using one-way analysis of variance (ANOVA) tests, Research Questions 1 and 2 addressed the four VHA regions concerning COPD mortality rates and readmission rates, but there were no statistical differences. An independent t test addressed Research Questions 3 and 4 to determine differences with COPD mortality and readmission rates in urban and rural VA hospitals, but again no statistical differences were found. Using a regression analysis, the fifth research question addressed 30-day readmission rates and 30-day mortality rates in urban and rural VA hospitals, which did show a significant association, as mortality rates were higher in urban rather versus rural VA hospitals. This study will promote positive social change by providing hospital administrators and researchers a clearer understanding of the concerns associated with COPD mortality rates in rural and urban VA hospitals. With this understanding, developing programs that address the unique needs of these populations may strengthen patient outcomes, policies, and protocols.

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Dedication

This dissertation is dedicated to my wonderful family. I would like to thank my husband, Rickey, who has supported me through this process and has sacrificed so much while I pursued my dreams. To my children, Sidney, Brandon, Abigail, and Micah. I can only hope each of you grow to appreciate and love education as much as I do. To appreciate working hard toward your goals, to give yourself completely in whatever you choose to do, and to strive to make the world a better place. To my grandmother, I miss you so much every day. This would not have been possible without you teaching me to love without ceasing and to give unconditionally. To my father, I hope you are proud. The first Dixon to graduate college, and the first to receive a doctorate. Thank you, for pushing me to be more than I ever thought I could be. So many times, I wanted to give up but my promise to you kept me going. To my mother, I believe I have just enough of your stubbornness which also helped to pull me through. I miss you mom; I hope you are proud as well. I cannot believe all that has happened in my life as I have gone through this doctoral process. Losing all of you within during in the middle of this program was enough to make me want to just give up, yet here I am. I love all of you beyond measure. This is not just my doctorate; it is yours as well.

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I would also like to thank my committee members Dr. Brittany Smalls and Dr. Robert Hijazi for all your help throughout this dissertation journey as well as a thank you to Dr. Zin who helped me to understand and appreciate the value of statistics.

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Section 1: Foundation of the Study and Literature Review

Medicare penalties assessed on hospitals for readmissions increased to $528 million in 2017, $108 million more than in 2016 (Boccutti & Casillas, 2017). A few causes affecting readmission rates are patient income levels, insurance type, social support, education, and language barriers (Mayr et al., 2017). A hospital readmission transpires when a patient is admitted to a hospital within a specified period after being discharged from an initial hospitalization. Medicare defines the readmission period as 30 days and includes hospital readmissions to any hospital, not just the hospital at which the patient was formerly hospitalized, and for any hospital stay regardless of the reason for readmission (Centers for Medicare and Medicaid Services [CMS], 2015). This all-cause definition is used in calculating both the national average readmission rate and each hospital's specific readmission rate (Boccuti & Casillas, 2017).

The CMS considers many readmissions to be preventable and determined that the following be monitored: chronic obstructive pulmonary disease (COPD), chronic heart failure, diabetes, acute myocardial infarction, and pneumonia. These diagnoses are frequently seen when examining readmissions using CMS criteria (Mayr et al., 2017). COPD is a progressive lung disease that causes such symptoms as wheezing, coughing, chest tightness. Though smoking has been noted as the leading cause of COPD, there are other ways to develop the disease and of those diagnosed with COPD, 25% have never smoked (U.S. Department of Veterans Affairs, n.d.). Other causes of COPD have been linked to dust, chemicals, air pollution, and a genetic disease known as alpha-1 antitrypsin l (U.S. Department of Veterans Affairs, n.d.). For example, many veterans

with COPD have participated in combat deployments and were exposed to potentially toxic lung irritants (U.S. Department of Veterans Affairs, n.d.). One study found that 923,646 military personnel who served during Operations Enduring Freedom/Iraqi Freedom/New Dawn received VA health care between January 2002 through December 2014 and 32,076 (3%) of the personnel had a coded diagnosis of COPD. Of the 32,076 patients, 22,156 (69%) were identified as newly diagnosed COPD cases (Schneiderman et al., 2018).

This research focused on whether there was significant difference between COPD readmissions and COPD mortality rates for veterans in the four administrative regions Veterans Administration (VA) Pacific District, VA Continental District, VA Northeast District, and VA Southeast District. Additionally, rural, and urban hospitals were assessed to determine whether there was a significant difference in relation to COPD readmissions and mortality rates.

Problem Statement

Readmissions have become a concern for hospitals, health care providers, insurance companies, government providers, military hospitals, and the CMS due to the costs associated with readmissions and the reason for readmissions—quality of medical care (CMS, n.d.). A few of the specifics related to readmissions may involve poor adherence of instructions with patient medications, lack of medical follow-up, and inadequate hospital discharge processes (Geboers et al., 2015). Lack of instructional education between care providers and patients has also been associated with an increase

in medical costs within many healthcare organizations as well as hospitals specific for veterans (Haun et al., 2015).

Globally COPD has been considered one of the most common respiratory diseases (World Health Organization, 2019), which may be a cause for readmission. COPD is considered the 3rd leading cause of death in the United States and is thought to be increasing more quickly than other major illnesses (COPD Foundation, 2019). COPD among adults in the United States represents between 5.1% and 6.2% of the overall adult population, and in the veteran population, COPD is even higher ranking at 8.8% (Pyarali et al., 2018). Research has also shown that of deployed military personnel, 69% experienced respiratory symptoms and in 2011, those respiratory diseases, which included COPD, were accountable for over 250,000 medical encounters among active-duty U.S. military personnel and further that COPD was the fourth leading cause for hospitalization among veterans (COPD Foundation, 2019).

The higher rate in COPD among military personnel is thought to be due to smoking or tobacco use, which is often used as a coping mechanism to relieve stress, increase energy, and decrease appetite among military personnel (Pyarali et al., 2018). Additionally, mon-tuberculous mycobacteria is often diagnosed or thought to be part of a COPD exacerbation due to the common signs and symptoms between the two, but data among this population is limited, and even less is known about regarding the veteran population; however, there has been an increase in non-tuberculous mycobacteria rates since 2012 and an increased risk of mortality for veterans (Pyarali et al., 2018). Research has also shown that markers of COPD and emphysema were associated with veterans

living with HIV, making it important for follow-up and treatment for veterans with COPD and HIV as well as smoking cessation programs (Triplette et al., 2018).

The Veterans Health Administration (VHA) oversees healthcare for those who are active duty and those who have retired from military service. The VHA is considered the largest unified healthcare system within the United States (U.S. Veteran's Health Affairs, n.d.). Currently, the VHA is encountering many of the concerns within healthcare that non-VHA hospitals are facing such as readmissions, patient-centered care, education, and mortality rates (U.S. Department of Veterans Health Affairs, n.d.). But military personnel are faced with insurance options that may not always fit their needs. For example, they can have both Medicare coverage and insurance through the VHA; however, both insurances do not work together. For the VHA to cover, in most situations veterans are required to receive healthcare services at a VHA hospital. To receive Medicare benefits, veterans are required to receive healthcare services at a Medicare-certified facility (MedicareInteractive.org, 2015).

Though many readmissions are unavoidable, some may occur due to poor quality of care or other factors (CMS, 2015). It is crucial that administrators are aware of methods to decrease healthcare costs by decreasing hospital readmissions not only within nongovernmental hospitals but also VA hospitals. Communication and attention to patients' long-term care needs have come to the forefront as possible factors involved in hospital readmissions. For instance, chronic disease, including COPD, accounts for 20% of all Medicare hospital admissions and readmissions (McIlvennan et al., 2018). There have been studies associated with patient education but none related to COPD patients

readmitted to VHA hospitals and studied according to location (Bailey et al., 2015).

Furthermore, there was a gap in literature pertaining to COPD readmissions and mortality

for the different regions of the VHA hospital system (Balaban et al., 2015). This study

addressed this research gap by exploring COPD readmissions and mortality for the four

VHA regions and rural and urban hospitals. Knowledge gained could provide VHA

administrators with information that would help them focus on ways to improve care and

learn best practices in different areas of the country.

Purpose

The purpose of this quantitative correlational research was to determine whether

there were statistically significant differences for COPD patient readmissions and

mortality rates between the four VA regions and rural versus urban hospitals. By

determining whether there were regional differences, the underlying reasons could be

further assessed, and policies can be established to improve care. Decreasing

readmissions could help hospital administrators by lowering healthcare costs and

improving patient outcomes.

The dependent variables were COPD readmissions and mortality rates. The

independent variables were the four VA hospital districts and rural/urban hospitals within

the United States. The secondary data were available for the regional districts through

Medicare.gov. The VA is divided into four regional districts: Northeast, Southeast,

Continental, and Pacific. The Northeast district consists of 18 states, Southeast district

contains 13 states including Puerto Rico, the Continental district is comprised of 11

states, and the Pacific district encompasses 11 states and the Philippines. Puerto Rico and

the Philippines were not included in the study. Additionally, a total of 126 urban and rural hospitals were included in this study. These data were available through the VA website and available to the public.

Research Questions

Research Question 1: Is there a significant difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District?

H_01: There is no significant difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

H_a1: There is a significant difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

Research Question 2: Is there a significant difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District?

H_02: There is no significant difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

H_a2: There is a significant difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

Research Question 3: Is there a significant geographical influence for COPD readmission rates of veterans in urban and rural VA hospitals?

$H_0$3: There is not a significant geographical influence with COPD readmission rates for veterans in urban and rural VA hospitals.

H_a3: There is a significant geographical influence with COPD readmission rates for veterans in urban and rural VA hospitals.

Research Question 4: Is there significant geographical influence with COPD mortality rates for veterans in urban and rural hospitals?

$H_0$4: There is not a significant geographical influence with COPD mortality rates for veterans in urban and rural VA hospitals.

H_a4: There is a significant geographical influence with COPD mortality rates for veterans in urban and rural VA hospitals.

Research Question 5: Is there an association between 30-day readmission rate for COPD and the 30-day mortality rate?

$H_0$5: There is no association between 30-day readmission rate for COPD and the 30-day mortality rate.

H_a5: There is association between 30-day readmission rate for COPD and the 30-day mortality rate.

Theoretical Framework

The framework used for this research was based on the Andersen healthcare utilization model, which seeks to clarify factors that identify how individuals access health services (Babitsch et al., 2012; Hirshfield et al., 2016). The four factors of this

model are environment, population characteristics, health behaviors, and outcomes (Babitsch et al., 2016). The first factor, environment, plays an important role in the beginning phases of care because of issues such as the healthcare system near patients as well as the external environment related to air and water safety (Babitsch, et al., 2016). In this study, this factor applied to the location of the hospital (urban vs. rural). The next factor is population, which includes a patient's predisposing characteristics and the resources available. Predisposing characteristics are things such as social factors like education, occupation, ethnicity and contextual factors like demographic and social compositions of the surrounding community, the values, and what is acceptable or considered to be cultural or political norms (Hirshfield et al., 2016).

The third factor within the model is known as health behavior. Health behaviors are impacted by health experiences such as a person's perceived idea of what their healthcare needs are and whether they are derived from one's own experiences or the community which surrounds that person (Hirshfield et al., 2016). The final factor is known as outcomes and pertains to a person's health practice and their use of health services. This phase is made of perceived health status, evaluated health status, and overall consumer satisfaction (Hirshfield et al., 2016).

Anderson's behavioral model, as seen in Figure 1, has been used extensively in studies to show a framework of how patients and environmental factors can impact a patient's behaviors and outcomes (Babitsch et al., 2012). Andersen's behavioral model was used in a study involving Appalachian women who were considered to be from vulnerable populations and substance abuse treatment. The study provided contributing

research to social work addiction literature as well as highlighting the importance of understanding the role of cultural factors treatment utilization among Appalachian women (Victor et al., 2017). Additionally, Li et al. (2016) used the model in the study to show the impact of disposing, qualifying, and needs for health services among the rural populations in Guangxi, China. Chronic diseases were observed along with the association of health service utilization. Important predictors were age, gender, marital status, family size and education level. The study found factors that contributed to hospitalization: travel time to the nearest health facility, utilization of physician visits, and healthcare expense.

Figure 1

Flow Process Used in Anderson's Behavioral Model
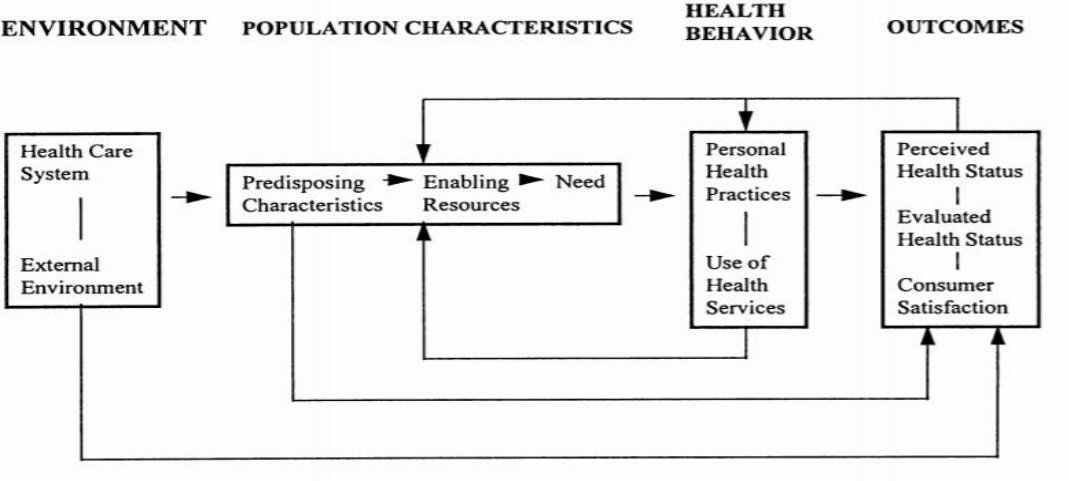
Since the Andersen healthcare utilization model is frequently used in healthcare studies to show equitable and inequitable relationships concerning patients and their healthcare services, this model relates to this research concerning how VA administrators may manage COPD patients to more effectively reduce readmissions. Furthermore, many

veterans have adjustment issues related to their environment after they leave active duty and often a lack of understanding about how to access services and the environmental issues associated with the model relate to this concern (Hirshfield et al., 2016).

Possible Analytic Strategies

One possible statistical test suitable for this study was the *t* test, which involved evaluating data values. This test can be used for paired or unpaired groups and assesses whether the means between the two groups are statistically different from one another making it appropriate to be used with randomized studies (Social Research Methods, 2019). Another statistical test used was the ANOVA. An ANOVA tests the significant differences between groups to assist in accepting or rejecting the null hypothesis (How To Statistics, 2018). The ANOVA helps to decrease the chance of a Type 1 error—falsely concluding significance when there is no real effect present. The ANOVA was appropriate in my study as it has been used in similar studies to test if one treatment is more effective than another in a certain sample population. By applying ANOVA testing to secondary data sets, the researcher can see the generalizations of groups that differ, but not specifically which groups (du Prel et al., 2010). By using ANOVA in this study, I tested the significance of the differences between COPD readmission rates for veterans in the VA Pacific District, VA Northeast District, VA Continental District, and the VA Southeast District. Additionally, a regression analysis was used to determine whether there were significant differences in COPD readmissions and mortality rates in urban and rural hospitals.

Literature Review Related to Key Variables and Concepts

The purpose of this literature review was to report on articles related to the topics of this research. These topics included a systematic focus on the variables associated with this study: COPD 30-day readmissions and mortality rates in veteran hospitals in four U.S. regions. COPD is considered one of the most common respiratory diseases. Among adults in the United States, COPD represents between 5.1 and 6.2% of the overall adult population and in the veteran population, COPD is even higher ranking at 8.8% (Pyarali et al., 2018). The articles in this section support the problem, purpose, and scope of this study.

Literature Search Strategies

Articles were found by using Walden University online library databases including ProQuest, PubMed, Science Direct, Sage, National Institutes of Health, and MEDLINE, and ICPSR. Google Scholar and Research Gate were also used. Search strategies included peer-reviewed literature since 2014 and prior seminal literature by using key search words *readmissions*, *COPD*, *VA readmissions*, *Veterans Hospitals*, *mortality rates*, *outcomes*, *chronic illness*, *chronic disease*, and *Hospital Readmission Reduction Program* (HRRP; CMS, n.d.).

Military Health System

Many of the Military Health System hospitals and clinics can improve their productive effectiveness (Bastian et al., 2016). Best practices from the Army should be shared with the other service branches, as research has found no association between efficiency and wellness over time in the Military Health System (Bastian et al., 2016).

Costs and Social Attributes

Federal spending on health care is expected to rise by 20% by 2050, and as of 2011, total health care spending exceeded $2.7 trillion (Bastian et al., 2016). As with the national trends in health care costs, the Military Health System budget increased from $19B in 2001 to $49B in 2014. Contributing factors associated with increased health care costs in military hospitals include decreasing eligibilities of healthcare services, treatments, or programs for retirees, and more than a decade of expanding personnel levels and deployments (Bastian et al., 2016).

Another reason for rising healthcare costs is that the VA system has performed worse in the area of readmissions despite performing the same or better as non-VA systems when it comes to quality measures (Wray et al., 2019). Readmission rates may differ due to social characteristics frequently not added in readmissions models (Wray et al., 2019). For instance, veterans who utilize VA care tend to have a lower education level and are less likely to have employment, which is information not applied in CMS readmission models reasoning that social risk factors may play a role in hospital (Wray et al., 2019).

Veterans Hospitals

Over the past 25 years improving quality of care has been the focus of the Department of VA healthcare system (Segal et al., 2019). The VA has made efforts to improve quality throughout its national system; however, there is evidence that health outcomes vary between VA hospitals across the United States. Such evidence was

identified as factors like quality-of-care culture of data collection, feedback, and behavior change as well as process-of-care measures (Segal et al., 2019).

Congestive Obstructive Pulmonary Disease

COPD Military

COPD has been the third leading cause of morbidity and mortality among non-military personnel as well as a common cause of illness and death among veterans, who may be at a higher risk for COPD than non-military (COPD Foundation, 2019). Since 2001 more than 2.7 million U.S. military personnel were deployed to Southwest Asia and Afghanistan (Garshick et al., 2019). During deployment military personnel were exposed to elevated amounts of particulate matter and other inhalational exposures from multiple sources, including desert dust, burn pit combustion, and other industrial, mobile, or military sources, increasing the chance of military personnel developing COPD (Garshick et al., 2019).

COPD Outcomes for Veterans

Studies have examined the 30-day risk-standardized readmission rates and hospital profiling within the VHA. Based on 3 years of data from VA hospitals, one study found an increasing number of facility admissions, and four hospitals had risk-standardized readmission rates worse than the national average for patients seen with acute myocardial infarction, heart failure, and pneumonia. Using the readmission measure created by the CMS may not be a useful tool to extricate performance or to drive quality improvements for readmissions (Wray et al., 2019).

Further, clinical trials have shown some patients with chronic conditions such as diabetes or COPD do not obtain, accept, or follow recommended care. This lack of adherence along with an increase in the aging population, increased comorbidities, and social differences or gaps within communities with chronic health conditions amplifies the need for health focus within the health care setting (Carter et al., 2018). The high incidence of chronic health conditions along with increases in hospital readmissions has led researchers to investigate instances of patient navigation using resources beyond the hospital visit to assess the various factors involved in patient care that may also affect hospital readmissions. Undesirable health-related outcomes such as poor physical health, poor fitness, increased rates of hypertension, arthritis, and mortality have been strongly associated with low health literacy (Geboers et al., 2015), which impacts all types of hospitals. Demographic and epidemiological transitions have also had an impact on chronic disease, including COPD, with the aging population. With an increase in life expectancy, a large portion of the elderly population suffers from some type of chronic illness or disease, leading to an increase in exacerbations with their disease or condition as well as an increase in mortality (Damiani et al., 2015).

Signs and Progression of COPD

There are four main stages of COPD that range from mild, moderate, severe, and very severe. Though pulmonary function tests, commonly referred to as a spirometry or lung function test, were thought to be the best way to predict if a person had COPD, today caregivers not only focus on the patients pulmonary function tests but also factor in such things as shortness of breath, cough, oxygen levels, stretched out or larger lungs,

and chronic conditions in addition to the COPD (COPD Foundation, 2019). Currently

there is no cure for COPD; however, there are many treatments, management strategies,

and guidelines recommended by both the American Association of Respiratory Care

Practice Guidelines and the American Thoracic Society Clinical Practice Guidelines

(Global Initiative for Chronic Obstructive Lung Disease, 2019).

COPD exacerbations have been noted as the natural disease process in which a

sudden event causes more sputum, coughing, and shortness of breath than the patient's

normal baseline (Global Initiative for Chronic Obstructive Lung Disease, 2019).

Exacerbations have both short- and long-term clinical consequences, causing a huge

burden on the healthcare system worldwide—making up over 50% of the total health care

costs for COPD—as well as being a leading factor in morbidity (Qureshi et al., 2014).

Exacerbations continue in frequency as the disease process progresses; each exacerbation

brings less lung function and eventually reduced physical activity (Qureshi et al., 2014).

Health Disparities Associated with COPD

Research has indicated multiple factors that may lead to COPD rates. The

worldwide problem of COPD has been growing due better outcomes for other diseases, a

high population who have been exposed to toxic inhalants, and socioeconomic status

(Pleasants et al., 2016). Differences in health behaviors, sociopolitical factors, and social

and structural environmental exposures also impact COPD. For instance, the use of

tobacco, occupations with toxic inhalants, and indoor biomass fuel exposure have a

higher rate of COPD (Pleasants et al., 2016). According to the World Health

Organization (2017), 90% of deaths in COPD patients occur for those in low-income and

middle-income countries. Other research has noted similar findings regarding low socioeconomic status being a factor with COPD disease. In a study on China, though health insurance coverage reached 99% in Taiwan, within rural villages the access to health care was still low, and it was even lower among the mountainous aborigines who also had an increase in mortality rates (Chan et al., 2014). Further, Burkes et al. (2018) found that many COPD patients in rural areas were employed by facilities that manufactured synthetic-fibers, pig farms, carpenters, agricultural businesses, and beauty care, causing regular contact with different types of fine dusts such as wheat flour, animal feed or grain, metal, cotton dust, or fumes (Burkes et al., 2018). For veterans, there has been an increase in veteran outpatient use of chronic opioid therapy, especially for those younger, White, female, and living in the rural United States; COPD was the most common diagnosis for those in the program 6 months prior to hospital admission (Mosher et al., 2014).

30-day Readmissions

Reasons and CMS Penalties

When a patient has been discharged from a healthcare facility and returns within 30 days of the initial discharge, it is considered a readmission, which are often costly, unforeseen, and even avoidable (CMS, n.d). Due to the exorbitant price of these readmittances the CMS frequently imposes fees on healthcare facilities. Many times, patients are diagnosed with a specific type of disease and then a different reason for a return visit (CMS, n.d.). For example, a patient with a diagnosis of COPD has been discharged from the hospital only to return 7 days later due to his/her diabetes. It is

possible the hospital focused only on treatment for the COPD and not the diabetes, yet after discharge weather temperatures, eating habits, and other issues could have contributed to the diabetes causing a readmission.

The American Care Act (ACA) included a clause assigning penalties for patient readmissions 30 days after discharge (CMS, n.d.). This program is a Medicare value-based plan which reduces healthcare facility payments, based on increased readmissions. By linking health care payments to health care quality, the program supports the national goal of improving health care (CMS, n.d.). Given the high impact of patient load on healthcare systems, COPD was added to the Medicare Hospital Readmission Reductions Program in 2015, resulting in financial penalties for COPD readmissions within 30 days of hospital discharge (Portillo et. al., 2018).

Contributing Factors for Readmissions

Contributing factors to patient readmissions are believed to be concentrated around such factors as literacy, self-management, patient understanding, and education given by the healthcare providers. For instance, increased readmissions have shown an increase with poor self-management (Powell & Kripanlani, 2017). Another possible factor that contributes to readmissions is the concern regarding patients who suffer from psychiatric or behavioral health needs (Balaban, et al., 2015). Recommendations to help patients understand their medications and instructions include using simple language, practicing teach back methods, demonstration of the use of assistive devices, providing visual medication schedules, pictographs, and other multimedia aids. Powell & Kripanlani (2017), recognized many physicians tend to overestimate their patients'

literacy level, therefore increasing the need for improvements in patient advocacy and education.

30-Day Readmissions for Veterans

According to an article by Portillo et al., (2018), in a coast-to-coast evaluation of Medicare claims, only 50% of patients readmitted have a primary care physician (PCP). Ambulatory care practitioners with the US Department of Veterans Affairs (VA) health care system are integrated into patient aligned care teams. Each care team is comprised of team members such as a primary care physician, pharmacist, registered nurse, social worker, respiratory therapist, or other healthcare provider. Each team member provides a different area of need for the patient such as patient education, chronic disease management, and medication optimization, and each team member contributes their unique training and expertise preparing the patient for their follow-up visit within 30 days of their hospital discharge (Portillo et al., 2018). Thirty-day readmission rates of 22.6% were found for patients with COPD.

The VHA works in partnership with the CMS to provide patients information about the quality and safety of the care received (CMS, 2016). Of Veterans enrolled within the VA healthcare system, about 50% are eligible for Medicare services. These services also allow the patients to have some decision allowance with such concerns as to how and where they accept and obtain inpatient services (CMS, 2016).

Readmissions rates have shown a substantial increase in primary care service areas among patients with multiple chronic conditions in non-Veteran's hospitals (Basu, 2015). Another study by (Herrin et al., 2015), found a significant relationship between

readmissions of patients diagnosed with acute myocardial infarction, pneumonia, and

heart failure and the location of their hospital within the county demographics. According

to (Nuti, 2016) a comparison study between non-VA hospitals and VA hospitals showed

VA hospitals had higher rates for both readmissions and mortalities for acute myocardial

infarctions, pneumonia, and heart failure.

Coordination of Care for Veterans

In a study by (Cordasco, et al, 2019), authors examined improving care

coordination for veterans. Care coordination was described as assisting patients with

navigating healthcare services within the VA system and non-VA systems to receive the

need care without duplicating care or services and by avoiding missed opportunities. It is

well understood that coordinating care is crucial for improving patient health, outcomes,

experiences, decreasing costs, and patient surveys. It is also understood many Veterans

have more than one specific condition contributing to ailing health (Cordasco, et al,

2019). A State of the Art (SOTA) conference was held in March of 2018, supported by

the VA Health Services Research and Development (HSR&D) service and the VA's

Office of Primary Care as well as the Office of Community Care. Goals of the conference

were (a) examining care coordination relevant to Veterans' care; (b) distinguishing care

coordination approaches; and (c) identifying a research agenda and recommendations, for

increasing VA's knowledge and use of evidence-based approaches (Cordasco, et al,

2019). Findings from the study suggest further coordinating efforts between researchers,

VA, and non-VA providers to work together to collectively achieve strategies and

frameworks to make available patient experiences to maximizes safety, quality, and efficiency (Cordasco, et al, 2019).

In another study by Herbert and Chuan-Fen, (2015), assessed readmission rates and costs for HF and COPD, two of the more common readmission diagnoses reported. Datasets examined were comprised of VA administrative datasets, non-VA medical care data, Medicare claims and facility surveys of clinical practices for HF (Herbert & Chuan-Fen, 2015). Factors examined within a year after the initial admission were healthcare costs including VA, fee-basis, and Medicare costs, self-reported by either the chief of medicine, cardiology, or pulmonology, heart failure or COPD focus clinics, programs and activities, standardized orders, performance measures, and clinical reminders, as well as, discharge practices and follow-up which include quality measures, patient education, follow-up calls, and scheduling of a follow-up visit (Herbert & Chaun-Fen, 2015). The impact of the study found that the burden of readmission costs of HF and COPD are quite substantial. Factors found resulting in lower readmission rates were facilities which had patient focused education and hospitalists which actively practiced at the facilities (Herbert & Chaun-Fen, 2015).

Costs of Hospital Readmissions

For the fiscal year 2018, CMS has reported 2,573 for non-VA hospitals will face reduced reimbursement from Medicare under the Hospital Readmissions Reduction Program (HRRP) (Rau, 2019). Other statistics show $564 million in payments will be withheld by CMS under HRRP, which is an increase from 2017 (Rau, 2019).

Non-VA hospital readmission costs have reached 41.3 billion for patients readmitted 30 days have discharge with Medicare beneficiaries contributing to $26 billion annually and $17 billion of those are unnecessary (Agency for Healthcare and Research Quality, 2018). In 2017, CMS penalized over 2,500 hospitals by more than $564 million for excessive 30-day readmissions (Agency for Healthcare and Research Quality, 2018). According to the Agency for Healthcare and Research Quality (2018), top areas contributing to 30-day readmissions in 2017 were congestive heart failure with 134,500, septicemia with 92, 900, pneumonia with 88,800, COPD and bronchiectasis, with 77,900 and cardiac dysrhythmias with 69,400 readmissions. According to Carey and Stefos (2016), administration could expect to save $2140 for the average 30-day readmission prevented. Estimated cost savings for heart attacks, heart failure, and pneumonia patients, were $3432, $2488 and $2278 (Carey and Stefos, 2016).

Urban Versus Rural VA Hospitals

One study examined the diagnosis and management of COPD care between urban and rural VA hospitals in Minneapolis, Minnesota. It was noted that fewer rural hospitals were able to provide spirometry testing for COPD patients as well as recognizing fewer COPD patients had prior spirometry testing ever compared to their counterparts. However, many rural hospital clinics were in the beginning process of implementing on-site spirometry with a centralized interpretation and quality control (Swanson, Westanmo, Rector, Rice , and Duane, 2016).

In another study, findings revealed rural patients used VA hospitals more than urban if they lived in the South, but they used VA hospitals less in other states. Results

from the study also showed rural VA patients were hospitalized less often for mental disorders except for respiratory diseases and revealed very rural patients relied on VA hospitals more than urban patients (West, Weeks, and Charlton, 2015).

Gap in Literature

While there were many studies related to 30-day hospital readmissions, including COPD readmissions, there was a gap in the literature associated with readmissions and mortality rates among V.A. hospital patients. To address this gap, secondary data for COPD patients from V.A. hospitals in the four VHA districts was addressed and analyzed in this study. COPD is considered the third leading cause of death in the U.S. and is increasing along with other major illnesses in both general and military populations (Triplette, Justice, and Attia, et al., 2018).

Conclusion of Literature Review

A thorough literature review was conducted concerning articles about COPD 30-day readmissions and mortality rates in V.A. hospitals. Literature supports COPD as one of the largest causes for readmissions in healthcare; however, there was a literature gap when analyzing V.A. hospitals. The literature review described multiple articles concerning many aspects of readmissions and COPD and described an important health care problem that needs to be addressed on many levels. Readmissions have become a concern for hospitals, health care providers, insurance companies, government providers, military hospitals, and the CMS (CMS, n.d.). The literature emphasizes that COPD is considered one of the most common respiratory diseases. COPD among adults in the US

represents between 5.1 and 6.2% of the overall adult population and in the Veteran population, COPD is even higher ranking at 8.8% (Pyarali et al., 2018).

Definitions

For the purpose of this study, the following terms were defined:

30-day Readmissions: An unintended hospital admission for a person who was discharged within 30 days prior from a previous hospital admission. (Mayo Clinic, 2017).

Chronic Obstructive Pulmonary Disease (COPD): An inflammatory disease-causing obstructive airflow from the lungs. Exposure to inhalants such as chemical, particulate matter such as dust, irritating gases, and smoking have been known to cause COPD (Mayo Clinic, 2017).

Mortality: Death resulting from a specific illness, disease, or cause. Data indicates numbers of death by place, time, and cause (World Health Organization, 2019).

Socioeconomic Status: Position, ranking or social classification of an individual or groups of people. Often measured by education, income, and/or occupation (American Psychology Association, 2019).

VA Regions: There are currently four districts: Northeast, Southeast, Continental, and Pacific. Each region is comprised of multiple states and each state is comprised of specific VA Hospitals (U.S. Department of Veterans Affairs, n.d.).

Veterans Affairs Hospital: A hospital facility designated by the VHA to evaluate and treat veterans specifically (U.S. Department of Veterans Affairs, 2021).

Assumptions

An assumption is defined as being an unexamined belief and the following assumptions relate to this study (Ekstom Library, 2019). One assumption was that COPD readmissions and mortality rates for all VA hospitals regions were the same in hospitals throughout the United States. A second assumption was that data gathered from the CMS website was an accurate predictor of readmissions and mortality rates among VA hospital regions within the U.S. (CMS.gov., n.d.). A final assumption was that all VA hospitals submitted correct information about COPD readmissions and mortality rates and that information in the secondary data set was accurate.

Limitations

Limitations are common in all types of research studies and are often beyond the researcher's control. This is typically related to model constraints, research design, or funding (Theofanidis & Antigoni, 2019). Readmission and mortality rates are obtained from the CMS patient data, which was limited to data for patients who are 65 years of age and older (Burke, Frakt, Khullar, Orav, & Jha, 2017). Possible constraints such as time, funding, and access to the populations of the study are unknown.

Scope and Delimitations

The scope of this study was to understand if VA hospital regions differ in relation to COPD readmissions and COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District. Additionally, 126 urban and rural VA hospitals were included in this study; this data was available through the VA and available to the public. This specific focus was chosen because these

factors were key components for quality of care and improved patient outcomes for VA hospitals regionally.

Delimitations are defined as boundaries which the research establishes and are within his or her control. These boundaries are focused on the study's theoretical background, objectives, research questions, and variables (Theofanidis & Antigoni, 2019). Delimitations for this study were limited to the use of data comparisons between VA hospitals. Secondary data was extracted from public datasets and analyzed as presented without manipulation. Unknown conditions could influence variability with responses given upon interviews, visits, and surveys (Wargo, 2015).

Significance, Summary, and Conclusion

Through careful examination of COPD readmissions and mortality rates within VA hospitals, this study potentially provided a better understanding of the effects of COPD 30-day readmissions and mortality rates and contribute to advancing healthcare practices, knowledge, and understanding by healthcare administration. Both readmissions and costs are possibly affected by demographical regions. It is estimated there are more than 35,000,000 hospital readmissions each year, based on the 36% rule, 12,600,000 of these admissions (Leuck, 2017). Readmissions are currently a primary focus in healthcare and with more emphasis on patient-centered care, increased medical costs, and patient choices it is important to analyze if there are differences within VA hospitals regionally. Understanding COPD 30-day readmissions and mortality rates in VA hospitals will help healthcare administrators improve care for veterans, expand best practices, and reduce costs.

Section 1 introduced the problem of regional differences in COPD readmissions for VA Hospital patients. This section defined the introduction, the nature of the study, definitions, assumptions, scope and delimitations, limitations, and significance of the study. Section 2 explored the research questions further in terms of the variables explored, research design, methodology, and validity.

Section 2: Research Design and Data Collection

Readmissions have been a concern for hospitals, health care providers, insurance companies, and government providers, which include military coverage and the CMS, due to the high cost of health care services (HRRP, 2018). Additionally, readmissions involve poor adherence to instructions with patient medications, lack of medical follow-up, and inadequate hospital discharge processes (Geboers et al., 2015). Andersen's behavioral model of health care utilization provided a foundation for this research examining differences among regional groups regarding COPD readmissions and mortality based on COPD readmissions in this study. In this section, I describe the research design, methodology, and analytical tools that were used to address the research questions.

Research Design and Rationale

The purpose of this quantitative study was to examine possible differences in COPD readmissions and mortality based on COPD readmissions among veterans in the VA regions and urban/rural locations. Decreasing readmissions may help hospital administrators by lowering health care costs and improving patient outcomes. The dependent variables were COPD readmissions and mortality rates, and the independent variables were the four VA hospital districts and rural/urban hospitals within the United States. A quantitative analysis was appropriate for this study due to the secondary data that was obtained and analyzed from the CMs.

Methodology

Study Population

All states that reported data concerning COPD readmissions and mortality rates were included in the study. Three states did not report any data: New Hampshire, Alaska, and Hawaii. The 47 states included in the study had the data elements related to hospitalization of veterans in a VA hospital within one of the four U.S. VA regions, COPD 30-day readmissions rates, and COPD mortality rates related to readmissions. Figure 1 provides an illustration of these four divisions.

Figure 2

Veterans Administration Regional Districts
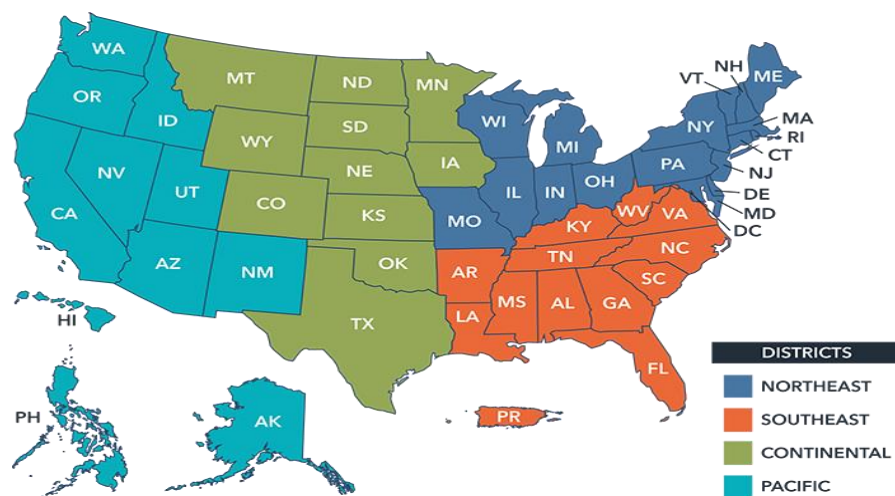
Note. From "Regional Offices Websites," by U.S. Department of Veterans Affairs, n.d. (https://www.benefits.va.gov/benefits/offices.asp). In the public domain.

Sampling for VA Regions: Research Questions 1 and 2

The sample included data from the 47 states that provided information to the

CMS. This sampling was relevant considering COPD affects over 11 million Americans,

and occurrence of the disease was thought to be 3 times higher for the veteran population

(Portillo et al., 2018). VA regional districts consist of four districts that provide services

and address issues, problems, concerns within the districts. Table 1 provides an

illustration of these four regions as well as information pertaining to the study population.

The CMS data for this study consisted of patients from 275 VA hospitals with a diagnosis

of COPD. The data also consisted of mortality rates for the same VA hospitals (U.S.

Department of Veterans Affairs, 2021). The secondary data were collected between July

1, 2015 to June 30, 2018.

Table 1

*Veterans Administrative Regions with Mortality and Readmission Rates July 1, 2015 to
June 30, 2018*

VA Administrative Regions	Number of States in Each Region	COPD Patient Readmissions	Mortality Events
Northeast	17	11,002	9,713
Southeast	12	10,972	9,687
Continental	11	4,864	4,358
Pacific	10	5,478	5,102
Total Population	50	32,316	28,860

Note. Data are from U.S. Department of Veterans Affairs (2021).

Sampling for VA Rural and Urban Hospitals: Research Questions 3 and 4

The sample included data from the 126 rural and urban VA hospitals. The

hospitals were chosen randomly from each administrative region and based on similar

sizes of the rural hospitals. The data were open-sourced data from Medicare.gov and are

categorized in Table 2.

Table 2

*Veterans Administrative Hospitals' Mortality and Readmission Rates July 1, 2015 to
June 30, 2018*

VA Administrative Hospitals	Number of States*	Rural and Urban Hospitals**	COPD Patient Readmissions ***	Mortality Events***
States with Rural VA Hospitals	15	15 rural Hospitals	2,201	1,998
States with Urban VA Hospitals	45	100 urban hospitals (15 were chosen hospitals of similar sizes will be chosen)	2,200	1,900
Total Patients			4,401	3,898

Note. Data are from U.S. Department of Veterans Affairs (2021)
*The states do not total 50 as this information concerns how many of the states have urban and rural hospitals and several have both.
**15 urban hospitals will be chosen that have similar bed sizes to the rural hospitals.
***The number of patients for rural and urban hospitals will be similar once the hospitals are chosen. Therefore, the number of patients for urban hospitals are an approximation.

Methodology: Secondary Data

The secondary data set pertaining to COPD readmissions and mortality rates

within VA hospitals were obtained from the Department of Veterans Affairs. This

information was available to the public and did not require special permission (CMS,

2019). A quantitative analysis was conducted to analyze the data and to provide a

systematic investigation into the understanding of the differences, if any, between COPD

readmissions and mortality rates among the four VA regional hospitals. The dependent

variable was COPD readmissions and mortality rates. The independent variables were the

four VA hospital regions within the United States and urban and rural hospitals. Hospitals that were designated as rural and urban are located on the VA website (VHA.org).

Research Questions and Hypotheses

This study included the following research questions and corresponding hypotheses:

Research Question 1: Is there a significant difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District?

H_o1: There is no significant difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

H_a1: There is a significant difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

Research Question 2: Is there a significant difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District?

H_o2: There is no significant difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

H_a2: There is a significant difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

Research Question 3: Is there a significant geographical influence for COPD readmission rates of veterans in urban and rural VA hospitals?

H_o3: There is not a significant geographical influence with COPD readmission rates for veterans in urban and rural VA hospitals.

H_a3: There is a significant geographical influence with COPD readmission rates for veterans in urban and rural VA hospitals.

Research Question 4: Is there significant geographical influence with COPD mortality rates for veterans in urban and rural hospitals?

H_o4: There is not a significant geographical influence with COPD mortality rates for veterans in urban and rural VA hospitals.

H_a4: There is a significant geographical influence with COPD mortality rates for veterans in urban and rural VA hospitals.

Research Question 5: Is there an association between 30-day readmission rate for COPD and the 30-day mortality rate?

$H_0$5: There is no association between 30-day readmission rate for COPD and the 30-day mortality rate.

H_a5: There is association between 30-day readmission rate for COPD and the 30-

Data Analysis Strategies

The quantitative analysis, using correlational statistics, analyzed whether VA hospitals in the four regions shown a difference with COPD readmissions or mortality rates. Data was displayed in tables, graphs, or charts. Regression analysis was used as an analysis strategy.

Additionally, a statistical test was used in the ANOVA. An ANOVA is used to test the differences between groups to assist in accepting or rejecting the null hypothesis (Statistics, How To, 2018). The ANOVA helps to decrease the chance of a type 1 error, which is falsely concluding significance when there is no real effect present. The ANOVA was appropriate in this study because it had been used in similar studies to determine whether one treatment was more effective than another in a certain sample population. By applying ANOVA testing to secondary data sets, the researcher can determine the differences among groups (Prel, Röhig, Hommel, & Blettner, 2010). Another statistical test suitable for this study was the t-test, which involved evaluating data values. This test can be used for paired or unpaired groups. Additionally, a regression analysis was used to determine if there were significant geographical influences with COPD mortality rates for veterans in urban and rural hospitals.

<div align="center">Power Analysis and Sample Size Estimation</div>

Four VA Administrative Regions: Power Analysis for Readmission Rates

A statistical analysis was performed to determine the appropriate sample size for the study. Determining the minimum sample size enhanced the validity of the analysis. I used a statistical calculator designed to perform this task (Creative Research Systems,

2012). Calculations included a confidence level of 95%. The confidence interval was 5 and the population was 32,316 patients admitted with COPD to VA hospitals in the four districts between July 1, 2015 and June 30, 2018. This analysis indicated that a minimum of 380 patients would be needed for the first research question. I will use the total population of 32,316 patients with COPD to analyze the data.

Four VA Administrative Regions: Power Analysis for Mortality Rates

A statistical analysis was performed to determine the minimum sample size for the second research question. Determining the minimum sample size enhanced the validity of the analysis. I used a statistical calculator designed to perform this task (Creative Research Systems, 2012). Calculations included a confidence level of 95%. The confidence interval was 5 and the population was 28,860 COPD patient mortality rates in VA hospitals in the four districts between July 1, 2015 and June 30, 2018. This analysis indicated that a minimum of 379 patients would be needed for the second research question.

Power Analysis for Urban and Rural VA Patients

A statistical analysis was performed to determine the minimum sample size for the third and fourth research questions based on the Medicare data. Determining the minimum sample size enhanced the validity of the analysis. I used a statistical calculator designed to perform this task (Creative Research Systems, 2012). The rural totals for the categories are 1,928 patients for mortality and 2201 patients for readmissions. Similar numbers were randomly chosen for urban regions using hospitals of similar sizes (U.S Department of Veterans Affairs, (2021). Therefore, the total estimates were 3,856 for

COPD VA mortality patient events and 4402 for VA COPD patient readmissions.

Calculations included a confidence level of 95%. The confidence interval was 5 and the

population was 3,856 for COPD patient mortality rates in VA hospitals and COPD

patient readmission rates of 4,402 between July 1, 2015 and June 30, 2018. This analysis

indicated that a minimum of 35 patients would be needed for the third and fourth research

questions.

Data Collection and Management

After the proposal and oral presentation were approved, Walden University's

Institutional Review Board (IRB) conducted a review of the secondary data. The

application (Form A) was submitted to the IRB staff along with other required forms and

communication until all requirements were met, and the information met the university's

ethical expectations. The data analysis did not begin until after the IRB committee had

provided approval and permission to proceed.

Threats to Validity

Internal Validity

Patient misdiagnosis could be an internal threat to the validity of the CMS data

used for this study. Diagnosis of patients upon discharge or death may or may not be

correct due to data availability. Accuracy of the 2018 data was dependent on what was

reported to CMS from the participating VA hospitals.

External Validity

Secondary data for this study originated from data collected through the CMS.

The study was population based and sorted by VA hospitals, states, COPD readmission,

and mortality, which was applicable because COPD is a 30-day risk measurement required by CMS (2019). The COPD readmission and mortality data were limited to VA hospital patients.

Ethical Considerations

The data collected from the 2018 CMS study were contained in a public use site, and secondary data had been patient de-identified to ensure that there were no risks associated with confidentiality of protected health information. Data collected for the study was downloaded and stored to my personal computer and deleted upon study completion.

Summary

In Section 2, I described the proposed study design and collection methods to determine whether there is a difference between 30-day readmission and mortality rates among VA hospital districts and between urban and rural VA hospitals. Section 2 also included the proposed methodology. Section 3 provides the statistical results related to the research questions and associated hypotheses.

Section 3: Presentation of the Results and Findings

COPD is the third leading cause of death, and readmissions have become a

concern (CMS, n.d.). The primary purpose of this quantitative study was to determine the

association between COPD readmissions and mortality rates by examining the

relationship between rural and urban VA hospitals within the four VA regions within the

United States. The research questions addressed whether there was a difference among

mortality and readmission rates for veterans in the four VA regions and between rates for

urban and rural hospitals as well as whether there is an association between 30-day

readmission rates for COPD and 30-day mortality rate. Characteristics of the secondary

data used for this study were VA patients with a COPD diagnosis or VA patient's death

considered to be COPD related. Individualities such as age, race, gender, and insurance

were not applied as it did not pertain to this study; however, these could be beneficial in

future studies. Geographical location of hospitals used for secondary data were VA

hospitals within the Continental, Pacific, Northeast, and Southeast districts within the

United States and comprised of both rural and urban inhabitants.

Data Collection of Secondary Data

Data, Time Frame, and Discrepancies of the Data Set

After receiving IRB approval (09-04-20-0492934) from Walden University, the

deidentified data were analyzed using the IBM Statistical Package for the Social Sciences

version 25 (SPSS). The secondary data obtained for this study was acquired from an

electronic data source through the CMS. In gathering data for the COPD readmissions

and mortality rates, the initial sample size for the secondary data sets were comprised of

68,293 readmission and mortality rates for both non-VA and VA hospitals as well as for

other diseases and illnesses such as acute myocardial infarction, pneumonia, diabetes,

during 2016–2019.

After exclusions, the COPD readmission and mortality data totaled 4,879. The

data were deidentified in an Excel spreadsheet. Data sets were first filtered by the specific

intent of readmission, mortality rates, and VA hospitals. Information was then filtered by

state excluding the District of Columbia, Puerto Rico, and the Philippines because they

are not considered states within the United States.

Study Results

After completing the collection, organization, and description of the secondary

data set, statistics and hypothesis testing were performed to test for relationships within

the secondary data set. The statistical tests used for this study were independent *t* tests,

ANOVA tests, and linear regression. The independent *t* test is often used to compare the

means of two groups, which can be done through parametric or nonparametric statistical

inference (Tae, 2015). One-way ANOVA testing is used for evaluation of three or more

groups of continuous data (Nawi et al., 2020). Significant differences between subgroups

of the study are accomplished by using multiple comparison analysis. The ANOVA helps

to decrease the chance of a type 1 error, which is falsely concluding significance when

there is no real effect present. The ANOVA was appropriate in this study because it has

been used in similar studies to determine whether one treatment is more effective than

another in a certain sample population. By applying ANOVA testing to secondary data

sets, the researcher can determine the differences among groups (Prel et al., 2010).

Further, a basic but reliable and commonly used predictive analysis is the linear regression test. This test is a process of pinpointing which variable or variables have impact on a specific topic. Performing a regression determines which factors matter the most and which factors can be ignored as well as how the factors can influence one another (How to Statistics, 2018). Regression tests can be used to identify the strength of the effect that the independent variable or variables have on a dependent variable, to forecast effects or impact of changes, and to predict trends and future values. The type of linear regression used for this study was a simple linear regression which is one dependent variable (interval or ratio), and one independent variable (interval or ratio or dichotomous).

Research Question 1

Is there a significant difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District?

One-Way ANOVA Testing

Research Questions 1 and 2 were analyzed by utilizing the one-way ANOVA testing. ANOVA is a hypothesis-based test that test equality among two or more groups and examines if the differences in sample populations are due to error or if there are specific causes leading to the differences in the sample population. In accordance with the one-way ANOVA analysis, data collected will either prove or disprove the null hypothesis that all three determinants on average, produce the same response. One-way ANOVA testing is reliable under the following assumptions: (a) variances among the

sample populations are equal, (b) responses for groups are independent and identically

dispersed, and (c) response variables are typically distributed (Mackenzie, 2018).

Hospitals were divided into four separate districts according to the U.S. Department of

Veterans Affairs.

As shown in Table 3, the data elements represent direct variable information for

mortality rates of the geographical districts participating hospitals (n = 177) for the

January 1, 2016 through June 30, 2019. The participating VA hospitals within the VA

Pacific district is (n = 21), VA Continental district is (n = 17), VA Northeast district is (n

= 44), and the VA Southeast district is (n = 35). Mean values for the VA Pacific district =

8.01, VA Continental district = 8.5, VA Northeast district = 7.94, and VA Southeast

district = 8.24. The total mean score for all districts = 8.12. To see if a difference in mean

scores reaches significance, see Table 4.

Table 3

One-Way ANOVA for COPD Mortality Rates in each VA District

Districts	n	Mean	*SD*	*SE*	95% CI Mean		Min	Max
					Lower Bound	Upper Bound		
VA Pacific	21	8.0119	1.18553	.25870	7.4723	8.5516	5.90	9.85
VA Continental	17	8.5235	1.19545	.28994	7.9099	9.1382	6.40	10.70
VA Northeast	44	7.9364	1.01846	.15354	7.6267	8.2460	6.15	10.35
VA Southeast	35	8.2413	.83009	.14031	7.9291	8.4994	6.60	10.00
Totals	177	8.1184	1.03313	.09551	7.9292	8.3076	5.90	10.70

Table 4

Tests of Homogeneity of Variances

Ave. _30 D		Levene Statistic	df1	df2	Sig.
	Based on Mean	1.669	3	113	.178
	Based on Median	.997	3	113	.397
	Based on Median and with adjusted df	.997	3	98.042	.397
	Based on trimmed mean	1.647	3	113	.183

The test of homogeneity of variances was performed to see if the variances in each of the four VA districts were equal. This was done with what is known as the Levene statistics, where the researcher is looking at the significant value to see if it is greater than .05 (How To Statistics, 2018). Levene statistics based on a comparison of medians in this study is .397. This is not a significant result, the test of homogeneity of variance was met, and the ANOVA test can be considered strong.

Tukey HSD and Games-Howell post HOC test were also performed to examine which, if any, mean differences there are between the groups being examined. Table 5 shows the significant values were above the standard .05 alpha level for all groups. The F value is used to determine whether a test was considered to be statistically significant by dividing two mean squares. The F value in this test was checked to see whether this reaches significance. The value of F is 1.522, which reaches the significance with a *p*-value of .213 (see Table 5). Table 6 shows the post-HOC results.

Table 5

ANOVA Results

Average_30D	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	4.808	3	1.603	1.522	.213
Within Groups	119.005	113	1.053		
Total	123.813	116			

Table 6

Post-HOC Test Results

	I District	J District	Mean Difference (I-J)	SE	Sig	Lower Bound	Upper Bound
Tukey HSD	Pacific	Continental	-.51162	.33481	.424	-1.3847	.3615
		Northeast	.07554	.27218	.992	-.6342	.7853
		Southeast	-20238	.28327	.891	-.9410	.5363
	Continental	Pacific	.51162	.33481	.424	-.3615	1.3847
		Northeast	.58717	.2930	.193	-.1770	1.3514
		Southeast	.30924	.30338	.738	-.4819	1.1004
	Northeast	Pacific	.07554	.27218	.992	.7853	.6342
		Continental	.58717	.29306	.193	-1.3514	.1770
		Southeast	.57792	.23243	.631	-.8840	.3282
	Southeast	Pacific	.20238	.28327	.891	-.5363	.9410
		Continental	.30924	.30338	.738	-1.1004	.4819
		Northeast	.27792	.23243	.631	-.3282	.8840
Games-Howell	Pacific	Continental	-.51162	.38858	.559	-1.5607	.5375
		Northeast	.07554	.30083	.994	-.7363	.8874
		Southeast	-.20238	.29430	.901	-.9999	.5952
	Continental	Pacific	.51162	.38858	.559	-.5375	1.5607
		Northeast	.58717	.32808	.301	-.3141	1.4884
		Southeast	.30924	.32211	.773	-.5800	1.1985
	Northeast	Pacific	-.07554	.30083	.994	-8874	.7363
		Continental	-.58717	.32808	.301	-1.4884	.3141
		Southeast	-.27792	.20799	.543	-.8241	.2683
	Southeast	Pacific	-.20238	.29430	.901	-.5952	.9999
		Continental	-.30924	.32211	.773	-1.1985	.5800
		Northeast	.27792	.20799	.543	-.2683	.8241

The homogenous subset was then evaluated to see which groups have the same mean and which have different means. Again, each group was above the standard .05 alpha level for all groups. The predictor was the mortality rate, and the outcome was the 30-day average (see Table 7).

Table 7

Homogenous Subsets Results

	District	N	Subset for Alpha = 0.05
			1
Tukey HSD	Northeast	44	7.9364
	Pacific	21	8.0119
	Southeast	35	8.2143
	Continental	17	8.5235
	Sig		.181

The analysis resulted in no statistically significant difference between groups as determined by the one-way ANOVA [F $(3,113)$ =1.522, $p < 0.05$]. A Tukey post hoc revealed that the COPD mortality rates between the VA Pacific District and VA Continental District [8.25, 95% *CI* (7.91, - 9.14) $p < 0.05$], VA Northeast District [7.94, 95% *CI* (7.63, - 8.25) $p = < 0.05$], and VA Southeast District [8.24, 95% *CI* (7.93, - 8.50) $p = < 0.05$]. Therefore, Research Question 1's results showed no statistical difference between mortality rates within the four United States VA regions, accepting the null hypothesis: There is no significant difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

Research Question 2

Is there a significant difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District?

Table 8

COPD Readmission Rates for Veterans in the Four VA Districts

Districts	n	Mean	SD	SE	95% CI Mean		Min	Max
					Lower Bound	Upper Bound		
VA Pacific	22	19.8727	1.50766	.32143	19.2043	20.5412	17.05	23.90
VA Continental	17	19.8000	1.29940	.31515	19.1319	20.4681	18.10	22.60
VA Northeast	45	20.3800	1.23456	.18404	20.0091	20.7509	17.75	23.25
VA Southeast	37	20.2311	1.89957	.31229	19.5977	20.8644	16.80	26.90
Totals	121	20.1607	1.52232	.13839	19.8867	20.4348	16.80	26.90

Table 8 shows the readmission rates of the geographical districts participating hospitals ($n = 121$) for the specific time frame Jan. 1, 2016 through June 30, 2019. The participating VA hospitals within the VA Pacific district is ($n = 22$), VA Continental district is ($n = 17$), VA Northeast district is ($n = 45$), and the VA Southeast district is ($n = 37$). Mean values for the VA Pacific district = 19.87, VA Continental district = 19.80, VA Northeast district = 20.40, and VA Southeast district = 20.23. The total mean score for all districts = 20.20. To see if a difference in mean scores reaches significance, a test of homogeneity variances is examined (see Table 11).

Table 9

Test of Homogeneity of Variances Results for 30 Day Readmission Rates

Ave. _30 D	Levene Statistic	df1	df2	Sig.

Based on Mean	1.497	3	117	.219
Based on Median	1.065	3	117	.367
Based on Median and with adjusted df	1.065	3	88.643	.368
Based on trimmed mean	1.356	3	117	.260

The test of homogeneity of variances was done to see if the variances in each of the four VA districts were equal and if the significant value is greater than .05. This was done with what is known as the Levene Statistics. The Levene statistic based on a comparison of medians is 1.065. The test of homogeneity of variance was met, and the ANOVA test can be considered strong. The F value allow is then checked to see whether this reaches significance. The value of F is .916, which reaches the significance with a *p*-value of .435 (see Table 10).

Table 10

One-Way ANOVA Results for 30 Day Readmission Rates

Average_30D	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	6.384	3	2.128	.916	.435
Within Groups	271.712	117	2.322		
Total	278.096	120			

Table 11

Post-HOC Results for 30 Day Readmission Rates

Dependent Variable: Ave_30D	I District	J District	Mean Difference (I-J)	SE	Sig	95% Confidence interval	
						Lower Bound	Upper Bound
Tukey HSD	Pacific	Continental	.07273	.49211	.999	-1.2099	1.3553
		Northeast	-.50727	.39644	.578	-1.5405	.5260
		Southeast	-.35835	.41028	.819	-1.4277	.7110
	Continental	Pacific	-.07273	.49211	.999	-1.3553	1.2099
		Northeast	-.58000	.43384	.541	-1.7107	.5507
		Southeast	-.43108	.44651	.769	-1.5948	.7327

	Northeast	Pacific	.50727	.39644	.578	-.5260	1.5405
		Continental	.58000	.43384	.541	-.5507	1.7107
		Southeast	.14892	.33819	.971	-.7325	1.0304
	Southeast	Pacific	.35835	.41028	.819	-.7110	1.4277
		Continental	.43108	.44651	.769	-.7327	1.5948
		Northeast	-14892	.33819	.971	-1.0304	.7325
Games-Howell	Pacific	Continental	.07273	.45015	.998	-1.1388	1.2843
		Northeast	-.05727	.37039	.526	-1.5059	.4913
		Southeast	-.35835	.44816	.854	-1.5476	.8309
	Continental	Pacific	-.07273	.38858	.998	-1.2843	1.1388
		Northeast	-.58000	.36495	.401	-1.5773	.4173
		Southeast	-.43108	.44367	.766	-1.6157	.7535
	Northeast	Pacific	.50727	.37039	.526	-.4913	1.5059
		Continental	.58000	.36495	.401	-.4173	1.5773
		Southeast	.14892	.36248	.976	-.8092	1.1070
	Southeast	Pacific	.35835	.44816	.854	-.8309	1.5476
		Continental	.43108	.44367	.766	-.7535	4.6157
		Northeast	-.14892	.36248	.976	-1.1070	.8092

Tukey HSD and Games-Howell post HOC test was then analyzed to see examine which, if any mean differences there are between the groups being examined. Significant values were above the standard .05 alpha level for all groups (see Table 12).

Table 12

Homogenous Subsets Results

	District	*N*	Subset for Alpha = 0.05 1
Tukey HSD	Continental	17	19.8000
	Pacific	22	19.8727
	Southeast	37	20.2311
	Northeast	45	20.3800
	Sig		.518

The homogenous subset was then evaluated to see which groups have the same mean and which have different means. Again, each group was above the standard .05 alpha level for all groups. The predictor was the mortality rate, and the outcome was the 30-day average.

The analysis resulted in a statistically significant difference between groups as determined by the One-way ANOVA [F (3,117) =1.522, $p < 0.05$]. A Tukey post hoc revealed that the COPD mortality rates between the VA Pacific District and VA Continental District [.073, 95% *CI* (-1.21, - 1.36) $p < 0.05$], VA Northeast District [.358, 95% *CI* (-1.54, - .526) $p = < 0.05$], and VA Southeast District [.358, 95% *CI* (-1.428, - .711) $p = <0.05$].

This is not a statistically significant result, subsequently there is no difference in COPD readmission rates between the four VA regions within the U.S. Districts therefore accepting the null hypothesis: There is no significant difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District.

Research Question 3

Is there a significant geographical influence for COPD readmission rates of veterans in urban and rural VA hospitals? For urban hospitals, $N = 105$, Mean = 20.1833, $SD = 1.56599$, and SE = .15283. For rural hospitals, $N = 16$, Mean = 20.0125, $SD = 1.22875$, and SE = .30719. See Table 13 for the *t* test results.

Table 13

Independent Samples t test for Readmission Rates in Urban Versus Rural Hospitals

								95% Confidence Interval of the difference	
Levene's test for equality of variances									
F	Sig	t	df	Sig. (2-tailed)	Mean Difference	SD		Lower	Upper

| Ave_30D | Equal variances assumed | .0001 | .977 | -2.041 | 115 | .044 | .57539 | .28182 | -1.13373 | -0.1706 |
| | Equal variances Not assumed | | | -2.046 | 18.393 | .055 | .57539 | .28124 | -.1.16534 | -.01456 |

To investigate if there was a significant geographical influence for COPD readmission rates of veterans in urban and rural VA hospitals an independent sample t-test was performed. The urban hospitals group ($n = 105$) associated with COPD readmissions ($M = 20.18$, $SD = 1.57$, $n = 105$). By comparison, the rural hospital groups ($n = 16$) COPD readmissions ($M = 20.01$, $SD = 1.23$, $n = 16$) was associated with numerically similar means. The significance level was .977 and the variances are assumed equal. The Sig. (2-tailed) score was lower than 0.05, meaning there is significant difference between the mean scores. Results of the independent samples t-test showed that the mean readmission rates of urban ($M = 20.18$, $SD = 1.57$, $n = 105$) and readmission rates of rural ($M = 20.01$, $SD = 1.23$, $n = 16$) was not statistically significant at the .05 level of significance ($t (115) = -2.041$, $df = 115$, $p > .05$). The independent samples t-test suggests there was no significant difference in the mean COPD readmissions between urban or rural hospitals, therefore accepting the null hypothesis: There is not a significant geographical influence with COPD readmission rates for veterans in urban and rural VA hospitals.

Research Question 4

Is there significant geographical influence with COPD mortality rates for veterans in urban and rural hospitals? To investigate if there was a significant geographical influence for COPD mortality rates of veterans in urban and rural VA hospitals an

independent sample *t* test was performed. For urban hospitals, *N* = 10, Mean = 8.0446,

SD = 1.01968, and SE = .10096. For rural hospitals, *N* = 15, Mean = 8.6200, *SD* =

1.01661, and SE = .26249

Table 14

Independent Samples t test for Mortality Rates in Urban Versus Rural Hospitals

		Levene's test for equality of variances							95% Confidence Interval of the difference	
		F	Sig	*t*	df	Sig. (2-tailed)	Mean Difference	*SD*	Lower	Upper
Ave_30D	Equal variances assumed	1.323	.252	.417	119	.678	.17083	.40996	-.64094	.98260
	Equal variances Not assumed			.498	23.140	.623	.17083	.34310	-.53869	.88036

The urban hospitals group (*n* = 102) associated with COPD mortalities (*M* =

8.0446, *SD* = 1.02, *n* = 102). By comparison, the rural hospital groups (*n* = 15) COPD

mortalities (*M* = 8.6200, *SD* = 1.02, *n* = 15) was associated with numerically similar

means. The significance level was .252 and the variances are assumed equal. The top line

of the results in table 16 shows the Sig. (2-tailed) score is higher than 0.05 therefore there

is significant difference between the mean scores. Results of the independent samples t-

test showed that the mean mortality rates of urban (*M* = 8.0446, *SD* = 1.02, *n* = 102) and

mortality rates of rural (*M* = 8.6200, *SD* = 1.23, *n* = 15) was statistically significant at the

.05 level of significance (*t* (115) = -2.041, *df* = 115, *p* >.05).

Research question 4 results show the independent samples t-test suggests there was significant difference in the mean COPD mortality rates between urban or rural hospitals, therefore rejecting the null hypothesis and accepting the alternative hypothesis: There is a significant geographical influence with COPD mortality rates for veterans in urban and rural VA hospitals.

Research Question 5

Is there an association between 30-day readmission rate for COPD and the 30-day mortality rate? To investigate if there was an association between 30-day readmission rate for COPD and the 30-day mortality rates a linear regression was conducted. See Table 15 for the regression results. See Tables 16–19 for the model summary, ANOVA, correlation results, and coefficients, respectively.

Table 15

Linear Regression Results

	Mean	*SD*	*N*
Mortality 30D	8.1184	1.03313	117
Average_Readmission_30D	20.1829	1.53896	117

Table 16

Correlation Results

		Mortality_30D	Average_Read Mission_30D
Pearson Correlation	Mortality_30D	1.000	-.263
	Average_Readmission_30D	-.263	1.000
Sig. (1-tailed)	Mortality_30D		.002
	Average_Readmission_30D	.002	
	Mortality_30D	117	117
	Average_Readmission_30D	117	117

Table 17

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Change Statistics Sig. F Change
1	.263[a]	.069	.061	1.001.3	.069	8.559	1	115	.004

a. Predictors: (Constant), Average_Readmission_30D

Table 18

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8.576	1	8.576	8.559	004[b]
	Residual	115.237	115	1.002		
	Total	123.813	116			

a. Dependent Variable: Mortality_30D
b. Predictors: (Constant), Average_Readmission_30D

Table 19

Coefficients

Model		B	SE	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	11.684	1.222		9.558	.000	9.263	14.106
	Average_Readmission 30D	-.177	.060	-.263	-2.926	.004	-.296	-.057

a. Dependent Variable: Mortality_30 Day

The predictor was the average of 30-day COPD readmissions, and the outcome

was the average mortality rates. The predictor was found to be statistically significant [*B*

= 11.684, 95% *C.I.* (*aa, bb*), $p < .05$], indicating that for everyone unit increase in the

average 30-day readmissions, the mortality rates changed by (-) 1.77 units. The model explained approximately (*R-squared * 100%*) of the variability [*R – squared = .069*].

The results for research question 5 show there is association between the readmission rates and mortality rates for COPD. Therefore, the null hypothesis is rejected, and the alternative hypothesis is retained: There is association between 30-day readmission rate for COPD and the 30-day mortality rate.

Summary

Results and findings of the analysis of the five research questions were presented in section 3, including the data collection plan, data exclusions, data inclusions, descriptive statistics, and inferential statistics. Statistics applied in the study were one-way anovas, t-tests, and linear regression. Analyses of the hypotheses and research questions and any key findings were included. This study examined if an association between COPD readmissions and mortality rates specifically examining the relationship between rural and urban VA hospitals within the four VA regions within the United States. Section 4 includes the analysis and understanding of the results, limitations of the study, recommendations for further research, and implications concerning 30-day COPD readmissions and social change.

In conclusion findings indicated there was no significant difference when examining COPD mortality rates between the 4 U.S. VA regions. There was no significant difference when examining COPD readmission rates between the 4 U.S. VA regions. There was no significant difference when examining COPD readmission rates between urban and rural VA hospitals. Findings indicated significant difference upon

assessing the COPD mortality rates between urban and rural VA hospitals with results

showing higher mortality rates among urban VA hospitals, rather than rural hospitals.

Finally, when taking all of the COPD population and comparing the COPD readmission

rates against COPD mortality rates results indicated there was a significant difference

indicating mortality rates slightly increased.

Section 4: Application to Professional Practice and Implications for Social Change

The purpose of this nonexperimental, quantitative, relationship study was to determine whether there was an association between COPD readmissions and mortality rates within the rural and urban hospitals in the four U.S. VA regions. To bring even more value to the study, geographical influence between rural and urban VA hospitals were examined as well as the influence of COPD readmissions on mortality rates. This study was strong due to robust and ethical evidence as well as time based, realistic settings. Given the multiple reasons and results of COPD readmissions and mortality rates for both rural and urban VA hospitals within the four U.S. geographical districts, these findings may be used to ensure patients, physicians, COPD navigators, respiratory therapists, and nurses continue to partner for solutions to improved, healthier outcomes for this complex disease. Section 4 includes an interpretation of the findings, limitations of the study, recommendations for further research, and implications for professional practice and social change.

Interpretation of Results

Research Question 1: COPD Mortality Rates for Veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District

The analysis resulted in no statistically significant difference between groups as determined by the one-way ANOVA [F $(3,113)$ = 1.522, $p < 0.05$]. A Tukey post hoc revealed that the COPD mortality rates between the VA Pacific District and VA Continental District [8.25, 95% CI (7.91, - 9.14) $p < 0.05$], VA Northeast District [7.94, 95% CI (7.63, - 8.25) $p < 0.05$], and VA Southeast District [8.24, 95% CI (7.93, - 8.50) p

< 0.05]. There was no statistical significance between the COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District (p =.213). Therefore, the null hypothesis was accepted, indicating no difference in COPD mortality rates between the four VA regions within the U.S. districts.

Research Question 2: COPD Readmission Rates for Veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District

The analysis shows no statistically significant difference between groups as determined by the one-way ANOVA [F (3,117) =1.522, $p < 0.05$]. A Tukey post hoc revealed that the COPD readmissions rates between the VA Pacific District and VA Continental District [.073, 95% CI (-1.21, - 1.36) $p < 0.05$], VA Northeast District [.358, 95% CI (-1.54, - .526) $p < 0.05$], and VA Southeast District [.358, 95% CI (-1.428, - .711) $p < 0.05$]. There was no statistical significance between the COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District (p =.435). Therefore, null hypothesis was accepted, indicating no difference in COPD readmission rates between the four VA regions within the U.S. districts.

Research Question 3: Geographical Influence for COPD Readmission Rates of Veterans in Urban and Rural VA Hospitals

Results of the independent samples t test showed that the mean readmission rates of urban ($M = 20.18$, $SD = 1.57$, $n = 105$) and readmission rates of rural ($M = 20.01$, $SD = 1.23$, $n = 16$) was not statistically significant at the .05 level of significance (t (115) = -

2.041, *df* = 115, *p* > .05). The independent samples *t* test suggests there was no significant difference in the mean COPD readmissions between urban or rural hospitals, therefore accepting the null hypothesis. Thus, there is not a significant geographical influence with COPD readmission rates for veterans in urban and rural VA hospitals.

Research Question 4: Geographical Influence with COPD Mortality Rates for Veterans in Urban and Rural Hospitals

Results of the independent samples *t* test showed the mean mortality rates of urban (*M* = 8.0446, *SD* = 1.02, *n* = 102) and mortality rates of rural (*M* = 8.6200, *SD* = 1.23, *n* = 15) was statistically significant at the .05 level of significance (t (115) = -2.041, *df* = 115, *p* > .05). Research Question 4 results show the independent samples *t* test suggest there was significant difference in the mean COPD mortality rates between urban or rural hospitals, therefore rejecting the null hypothesis. Thus, there is a significant geographical influence with COPD mortality rates for veterans in urban and rural VA hospitals.

Research Question 5: Association Between 30-Day Readmission Rate for COPD and the 30-Day Mortality Rate Between Urban and Rural VA Hospitals

The predictor was found to be statistically significant [B = 11.684, 95% CI (aa, bb), *p* < .05], indicating that for every 1 unit increase in the average 30-day readmissions, the mortality rates changed by (-) 1.77 units. The model explained approximately (R-squared * 100%) of the variability [R – squared = .069]. The results for Research Question 5 show that there is association between the readmission rates and mortality

rates for COPD, as mortality rates actually increased in relation to readmission rates.

Therefore, the null hypothesis is rejected.

Findings Related to Literature

Findings indicated that there was no significant difference when examining

COPD mortality rates or COPD readmission rates between the four U.S. VA regions.

Outcomes also suggested that there was no significant difference when examining COPD

readmission rates between urban and rural VA hospitals; however, findings did support

that there was a significant difference upon assessing the COPD mortality rates between

urban and rural VA hospitals with results showing higher mortality rates among urban

VA hospitals, rather than rural hospitals. Finally, results indicated that there was a

significant difference between COPD readmissions and COPD mortality rates, but

instead of COPD mortality rates being higher due to COPD readmissions, for every 1 unit

decrease in the average 30-day readmissions, the mortality rates changed by (-) 1.77 units

indicating that mortality rates actually increased.

As discussed in the literature review, COPD mortality and readmission rates are

among the higher categories for illness and disease within healthcare in both VA and

non-VA hospitals. The VHA works in partnership with the CMS to provide patients

information about the quality and safety of the care received (CMS, 2016). COPD was

added to the Medicare Hospital Readmission Reductions Program in 2015, resulting in

financial penalties for COPD readmissions within 30 days of hospital discharge (Portillo,

et al., 2018). Researchers in past studies reported VA health care systems perform similar

to or better than non-VA systems concerning inpatient and outpatient measures involving

care quality, despite variation in quality across individual VA facilities (Price et al., 2018). In another study, variations in quality across VA facilities was identified as factors like quality-of-care culture of data collection, feedback, and behavior change, as well as process-of-care measures (Segal et al., 2019). This information is found to align with this research study due to understanding that while the VA hospitals are systemized there are many variables outside of those practices and processes which can possibly impact readmissions or mortality rates. As shown in the literature review, the Andersons Behavioral Model, Figure 1 was a perfect model for this study to show in showing a framework of how environmental factors can impact a patient's behaviors and outcomes. Upon observation of VA hospitals, it was noticed that many or most VA hospitals have had a name change and many had several name changes which could make it difficult when data is being retrieved. Targeted quality focused improvement efforts to ensure veterans receive high-quality care at all VA facilities, uniform care at all VA facilities, older aged patients or sicker patients being transferred or transported to specific VA facilities which have the ability to care for higher acuity.

Urban Versus Rural VA Hospitals

In one study, researchers found an association of rural residence with a risk of COPD exacerbations requiring treatment (Burkes, et al, 2018). Again, the Andersons Behavioral Model, Figure 1 was a perfect model showing a framework of how environmental factors can impact a patient's behaviors and outcomes. This study found when examining rural and urban VA hospitals there was no significance found for COPD readmissions but found a significant difference for COPD mortality rates showing an

increase in urban VA hospitals. Possible reasons for this increase in mortality could be higher acuity, staffing ratios, increased patient census, other co-morbidities contributing to or causing death. Other possibilities for an increase in mortality could be due to socioeconomics, educational needs, or no transportation or access to care.

Readmissions and Mortality Rates Between Contributing Rural and Urban VA Hospitals

The results for research question 5 show there is association between the readmission rates and mortality rates for COPD. Findings showed for every 1 unit increase in the average 30-day readmissions, the mortality rates changed by (-) 1.77 units. Again, the Andersons Behavioral Model, Figure 1 was an ideal model for this study to show a framework of how environmental factors can impact a patient's behaviors and outcomes. Possible reasons for the decrease in mortality rates is due to better education being provided to patients by providers, patients going to the hospital upon onset of signs or symptoms of problems with COPD, patients being transferred to higher acuity facilities when appropriate, CMS withholding reimbursement to facilities with high readmission numbers.

Findings Related to the Andersen Healthcare Utilization Model

The primary conceptual framework for this study was the Andersen Healthcare Utilization Model which seeks to clarify factors that identify how individuals access health services (Babitsch, Gohl, & von Lengerke, 2012; Hirshfield, Downing, Horvath, Swartz, & Chiasson, 2016). The four factors of this Model are environment, population characteristics, health behaviors, and outcomes (Babitsch, et al., 2016). The Andersen

model is frequently used for healthcare studies and is used to theorize that patient outcomes are influenced either positively or negatively by their environment, population characteristics, health behaviors and outcomes. In this study the region or type of VA hospital would be considered the patient's environment which could contribute to a patient's outcome.

Summary of Key Findings and Interpretation

The quantitative outcome of this research study demonstrates there is no statistical difference between COPD mortality rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District. In Addition, findings observed there was not statistical difference between COPD readmission rates for veterans in the VA Pacific District, VA Continental District, VA Northeast District, and VA Southeast District. Furthermore, this research study affirms there is no geographical influence for COPD readmission rates of veterans in urban and rural VA hospitals. Additionally, findings show there is statistical significant difference between mortality rates between rural and urban VA hospitals as well as an association between 30-day readmission rates for COPD and the 30-day mortality rate between urban and rural VA hospitals when considering the overall VA population within this study.

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Limitations of the Study

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There were limitations in the research data set that influenced generalizability, validity, and reliability of the findings. Marshall and Rossman (2016) state that limitations are inadequacies of the study that could not be controlled by the researcher. Limitations found pertained to the secondary information used for this study was

complicated to sort through. Information from the CMS data set utilized was gathered between 2016 through 2019. The actual number of sample size was not available until data had been downloaded and filtered eliminating other disease readmissions and mortality statistics. Secondary data obtained did not give insight to gender, ages, other comorbidities, patient education levels, or information about the VA facilities. In retrospect, more VA hospitals participating in research studies and submitting data might have changed the outcomes of this study.

Recommendations for Future Research

Results of this research study reveal opportunities for future research. Hospital collection of data and participation in research studies is critical in adding to future research. In addition, research could be further expanded within the VA COPD readmission and mortality rates and additional factors impacting readmissions and mortality rates. Additional opportunities for research would be healthcare worker recognition of signs and symptoms in a timely manner to see if patients are treated with better procedures or therapy due to faster acknowledgement of COPD signs and symptoms. Additional research prospects would include researching patient education and teaching techniques between rural and urban VA hospitals. Types of equipment between rural and urban VA hospitals could be researched to rule out readmission and mortality rates due to the lack state of the art equipment sometimes seen at rural facilities. Other research focus could be on the disease itself and its severity stage or a timeline of interventions provided to patients. Information provided within this study provides

knowledge to healthcare administrators and providers opportunities to work together as a team to create and encourage better research opportunities.

Social Change

COPD is globally one of the most common respiratory diseases among adults in the US and represents between 5.1 and 6.2% of the overall adult population and in the Veteran population, COPD is even higher ranking at 8.8% (Pyarali, Schweitzer, Bagley, Salamo, Guerrero, Sharifi, Mirsaeidi, 2018). Being able to reduce hospital visits and inpatient stays of patients with COPD is an important approach which is important to lowering readmissions, mortality, and higher healthcare costs. This study demonstrates there is a standardization within VA regions and similarity in care between rural and urban VA hospitals with COPD readmissions and mortality rates.

Currently, hospitals are being financially penalized for excessive readmissions for patients diagnosed with COPD. The Centers for Medicare & Medicaid Services considers COPD readmissions to be preventable (Mayr, Talisa, Balakumar, Chang, Fine, & Yende, 2017). As financial penalties continue to be imposed, this study may assist health care administrators in understanding some components and potential strategies of hospital readmissions for COPD patients and better patient outcomes.

Results of this study showed for every decrease for readmissions there was an increase in mortality rates when examining both urban and rural VA hospitals. This is important to social change because focus can be given to variables influencing the mortality rates of COPD patients. For instance, are patients waiting too long to go to facilities or are facilities transferring patients to higher acuity hospitals in time?

This study encourages social change by adding transparency to the relationship between VA hospital readmissions and mortality rates between VA hospitals within the four U.S. VA districts. Healthcare providers and administrators have a responsibility to seek ways to decrease patient readmissions and mortality rates and to continually to provide better education, tests, procedures, therapy, and medications to patients. Future studies concerning VA hospitals and COPD readmissions and mortality rates among the veteran population are important.

Conclusion

This study identified the relationships between COPD readmissions and mortality rates among VA hospitals within the U.S. districts. Gathering more data, encouraging more hospital participation, expanding the focus into patient behaviors, and examining other possible factors such as age, gender, or a timeline of interventions are important ways to further COPD readmission and mortality research. Overall, this study addressed the gap in the literature regarding the relationship between COPD readmissions and mortality rates among the U.S. urban and rural VA hospitals. Results of this study concluded there were no differences between U.S. districts or among readmissions rates between urban and rural VA hospitals, but showed there were differences between mortality rates between urban and rural VA hospitals. Lastly, hospital administrators may refer to this study to focus on managing matters which may impact COPD readmissions and mortality rates among both rural and urban VA hospitals within the 4 U.S. regions.

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