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# Relationship Between Skilled Nursing Facility Nurse Staffing Levels and Resident Rehospitalizations

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This is to certify that the doctoral study by

Crystal Bowens

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Walden University
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MSN/MHA, University of Phoenix, 2012

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration



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Abstract

Readmission of skilled nursing facility (SNF) residents has become a financial and quality-of-care concern for facility leaders. SNF administrators do not know whether nurse staffing levels are impacting readmission rates. The Affordable Care Act included measures to monitor and improve quality and to penalize SNFs that have high readmission rates. The purpose of this quantitative correlational study was to examine the relationship between SNF nurse staffing levels and readmission rates using the Skilled Nursing Facility Readmission Measure (SNF RM). The theoretical framework for the study was Donabedian's structure, process, outcome model. The research questions addressed the relationship between nurse staffing levels and rehospitalization percentages for SNFs, and the relationship between RN staffing levels and rehospitalization percentages. A quantitative methodology was used to analyze publicly reported secondary data from Centers for Medicare and Medicaid Services staffing files and SNF Value-Based Purchasing (SNF VBP) program data. Pearson's correlation was used to examine the relationship and strength between nurse staffing levels and the SNF RM. The sample included 374 SNFs across Georgia that participated in the SNF VBP program. Findings from the multiple regression analysis and analysis of variance indicated no statistically significant relationship between nurse staffing levels and SNF RM rates. Facility characteristics across Georgia showed some variations in staffing levels and SNF RM rates. Findings promote positive social change by providing SNF leaders with needed information to make decisions about staffing needs when considering staffing above the state averages.  Health care leaders and policymakers might use the findings when considering recommendations for staffing regulations.

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Dedication

My work is dedicated to my family: my husband and children. I could not have done any of this without your loving support over the years. You all encouraged me even when I wanted to throw in the towel. A special thank you to my husband for believing in me and my children for allowing me the time and space to work.

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Section 1: Foundation of the Study

Readmissions to the hospital from a skilled nursing facility (SNF) within 30 days of initial discharge from the hospital is a growing concern. An estimated 18% of all residents, or roughly two million people, discharged from the hospital receive care at a SNF (Hovey, Kim, & Dyck, 2015). An estimated 24% of these SNF residents are readmitted to the hospital (Hovey et al., 2015). Many resident returns to the hospital are deemed avoidable or unnecessary (Li, Cai, Yin, Glance, & Mukamel, 2012). The SNF readmission rates indicated that 1 out of every 4 Medicare residents discharged to the SNF will return to the hospital within 30 days (M. D. Neuman, Wirtalla, & Werner, 2014). Although rehospitalization rates can vary depending on institutions and geographical regions, the common theme throughout the literature is that the readmission rates are too high (Ågotnes, Jacobsen, Harrington, & Petersen, 2016; Bogaisky & Dezieck, 2015; Herrin et al., 2015; M. D. Neuman et al., 2014; Wang et al., 2015). The current study was conducted to offer insight into the factors that may contribute to high rehospitalization rates.

There are several reasons why SNF residents may be readmitted to the hospital. Researchers have identified common causes of rehospitalizations including poor transitions in care and improper discharge communication (Burke et al., 2016), inadequate medication reconciliation (errors) and ineffective decision-making processes (Vasilevskis et al., 2017), and unplanned goals of care and unrealistic expectations of SNF providers (Feder, Britton, & Chaudhry, 2018). Nurse staffing levels is one possible factor that may impact SNF 30-day readmission rates. Many researchers found

associations between insufficient staffing and poor-quality outcomes (Backhaus, Verbeek, van Rossum, Capezuti, & Hamers, 2014; Gaugler, 2016; Harrington, Schnelle, McGregor, & Simmons, 2016), but few considered the number of nursing hours available across all three shifts. Understanding the impact that total staffing hours can have on readmission may promote better staffing.

Staffing levels have mandated minimums in SNFs that vary across the states potentially causing different quality outcomes. In 1987, the federal government set the minimum staffing standard at 2.5 hours per resident day (HPRD). This equates to 2.5 hours of nursing time spent with a resident within a 24-hour period (Paek, Zhang, Wan, Unruh, & Meemon, 2016). Despite 40 states setting higher than minimum standards, several states have elected to follow the federal standard (Paek et al., 2016). Staffing at the minimum required levels could result in insufficient staffing and poor-quality resident outcomes (Paek et al., 2016). Lower staffing levels, specifically for RNs, correlate with higher mortality rates, decreased physical functioning, more antibiotic use, greater pressure ulcers, increased readmission rates, and more weight loss and dehydration (Harrington & Carrillo, 2018). States that have implemented higher staffing standards have noted improvements in quality outcomes (Harrington & Carrillo, 2018). Improving staff levels could potentially have a positive effect on resident outcomes.

There is a need to consider recommendations to increase staffing levels. The Center for Medicare and Medicaid Services (CMS) conducted a study in 2001 that supported the need for a total of 4.1 total nursing HPRD to prevent resident harm, including 1.3 hours HPRD of licensed nursing care (LPN and RN of which 0.75 RN

HPRD) and 2.8 certified nursing assistant (CNA) HPRD (Paek et al., 2016). Other expert recommendations have included the need to increase minimum staffing levels to at least a 4.55 HPRD (CMS, 2015b). Despite the recommendations to increase mandatory minimum staffing levels, CMS and Congress have not implemented specific nurse staffing levels (Harrington & Carrillo, 2018). The Medicare and Medicaid Programs Reform of Requirements for Long-Term ruling was released in 2016 requiring nursing facilities to have sufficient staffing to ensure the safety of residents and assist staff in their ability to attain or maintain the highest practicable physical, mental, and psychosocial well-being of the residents (CMS, 2015b). All facilities certified for Medicare and Medicaid must also have an RN serving as a director of nursing for at least 8 consecutive hours a day 7 days a week, and at minimum a licensed nurse (either RN or LPN) on-site 24 hours a day 7 days a week (CMS, 2015b). Nurse staffing levels for SNFs are calculated by totaling the number of nurse staffing hours (RN + LPN + nurse aid) across all shifts and dividing it by the total number of residents, which provides a HPRD measure (Haizhen, 2014). The following is an example of this calculation: 228 (total nursing hours with 24-hour time period for RN+LPN+CNA) ÷ 91 (total number of residents) = 2.51 HPRD. Staffing at the minimum federal standard of 2.5 HPRD may not be enough to drive quality outcomes.

Nurse staffing hours are used to analyze care delivery metrics. Researchers have examined the relationship between nursing hours and resident outcomes such as wound care, falls, weight loss, and frailty (Haizhen, 2014; Lee, Blegen, & Harrington, 2014). However, whether nurse staffing hours have any impact on hospital readmissions has

been debated (Ågotnes et al., 2016; McGregor et al., 2014). Researchers have found correlations between staffing levels and rehospitalizations as a part of quality outcomes (Haizhen, 2014; Harrington et al., 2016; M. D. Neuman et al., 2014; Spilsbury, Hewitt, Stirk, & Bowmanc, 2011), but few studies have addressed the relationship between total staffing and readmission measures (Haizhen, 2014; M. D. Neuman et al., 2014). A gap in knowledge existed concerning the effects of total SNF nurse staffing levels on 30-day readmissions to the hospital.

To prepare for changes resulting from value-based purchasing models, facilities should know whether SNF nurse staffing levels affect 30-day readmissions rates. The new Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNF RM) has been used to determine financial penalties imposed on SNFs (CMS, 2015b). As part of the development of the SNF RM, CMS (2015b) provided evidence to support a relationship between improved staffing and lower SNF RM rates; however, the staffing metric used for the technical report only correlated RN staffing from the Five-Star Nursing Home Compare ratings. No other studies were found in which researchers examined the relationship between nurse staffing levels and the SNF RM. A study focused on staffing levels and the SNF RM could provide administrators with information to improve staffing and reduce readmissions. To reduce readmission rates, administrators will need to understand how nurse staffing hours impact rehospitalizations. Section 1 of this study provides the background, problem statement, purpose, research questions (RQs) and hypotheses, theoretical foundation, nature of the

study, literature search strategy, literature review, definitions, assumptions, scope and delimitations, significance, and a summary.

## Background

Health care costs in the United States continue to rise as the need for elderly care and services grows annually. In 2013, approximately $156 billion across all payers was spent nationally on nursing facilities (Harrington & Carrillo, 2018). The number of residents discharged from the hospital to the SNF has increased over the last decade (Burke et al., 2015; Burke et al., 2016; Feder et al., 2018). Spending for SNF services continues to rise as the number of residents cared for in this setting increases (MedPAC, 2018). In 2005, Medicare funded approximately 13% of nursing home care, and Medicaid covered roughly 43% of the cost for services, making the federal government the largest purchaser of SNF care and services (Spector, Limcangco, Ladd, & Mukamel, 2010; MedPAC, 2008). Spending has since increased significantly with an estimated $29.1 billion funded in 2016 by Medicare alone (MedPAC, 2018). Unnecessary or avoidable rehospitalizations account for a substantial portion of Medicare spending (Mor, Intrator, Feng, & Grabowski, 2010). Reducing unnecessary rehospitalizations from SNFs can lower health care expenditures and improve quality of care (Spector et al., 2013). Cutting costs where there is unnecessary spending in the SNFs may allow health care leaders to focus spending on other areas that impact quality.

Increasing the nurse staffing levels in SNFs may allow nurses to spend extra time with patients who have a risk of readmission to the hospital. Most SNF residents have a high risk of rehospitalization due to the diagnosis or disease processes they admit with to

the SNF (Bogaisky & Dezieck, 2015; Feder et al., 2018). An estimated 15%-25% of SNF residents are readmitted to the hospital within 30 days of discharge (Carnahan, Unroe, & Torke, 2016; Morley, 2016). Newly admitted SNF residents have multiple comorbidities or poor prognosis, or can be recovering from major surgeries, which puts them at risk for returning to the hospital (Feder et al., 2018; Ouslander et al., 2016). Many of these residents have complex medical needs causing frequent trips back to the hospital throughout their SNF stay (Feder et al., 2018). Increasing staffing may allow nurses to spend more time at the bedside managing the patient's complex needs. Based on the CMS data, the average cost for a single rehospitalization was $10,352, and overall costs to the federal government in reimbursement was more than $4 billion (CMS, 2015b; Mileski et al., 2017; Morley, 2016). Increasing staffing levels within the SNF to allow for more time to provide nursing care may have improve outcomes such as lower readmission rates.

Rehospitalizations pose a concern for health care leaders of skilled nursing facilities due to the financial expenses and associated adverse events. The Affordable Care Act (ACA) initially called for penalizing SNFs with high percentages of residents requiring rehospitalization within 30 days of a hospital discharge (Carnahan et al., 2016). Refinements to the original language of the ACA was detailed in The Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014, outlining more specific ways of measuring quality and setting parameters around the measures (CMS, 2017). The goal of the IMPACT Act is to standardize quality measures and patient assessments across post-acute care settings to improve outcomes for Medicare

beneficiaries (CMS, 2018a). As part of the IMPACT Act, three claims-based quality measures for SNFs were included. The SNF measures are aimed at improving quality and reducing readmissions back to the hospital:

1. Discharge to Community- Post-Acute Care (PAC) Skilled Nursing Facility (SNF) Quality Reporting Program (QRP),

2. Potentially Preventable 30-Days Post-Discharge Readmission Measure for Skilled Nursing Facility (SNF) Quality Reporting Program (QRP), and

3. Medicare Spending Per Beneficiary – Post-Acute Care (PAC) Skilled Nursing Facility Measure (CMS, 2017).

The implementation of these measures begins in 2018 as part of the QRP (Carnahan et al., 2016; CMS, 2017). In addition to the three upcoming claims-based measures, ACA detailed another method of measuring rehospitalizations. In Section 215 of the 2014 Protecting Access to Medicare Act, the Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNF RM) was outlined (CMS, 2018a). The SNF RM is a component of the Skilled Nursing Facility Value Based Purchasing (SNF VBP) Program and is a key metric used to determine financial incentives or penalties for readmissions until the other measures are implemented. The SNF VBP Program is a CMS initiative designed to meet the requirements outlined in the IMPACT Act by paying SNFs for quality outcomes and services provided to SNF residents during specific performance periods (CMS, 2018a). As part of the SNF VBP program, all facilities who participate in federal funding will undergo a 2% Medicare rate cut that can be earned back if readmission rates are below the established standards (CMS, 2018a). The goal of this

component of the VBP model is to affect rehospitalization behavior (Spector et al., 2013).

The pertinent measure for this study was the Skilled Nursing Facility 30-Day All-Cause

Readmission Measure (SNF RM). Determining the relationship between SNF nurse

staffing levels and readmissions may help to drive rates down and save SNFs money.

## Problem Statement

Hospitalization of SNF residents has become a significant issue for facility

leaders. Health care agencies and regulatory bodies view readmissions to the hospital as

an indicator of poor quality in SNFs (Bogaisky & Dezieck, 2015). An estimated 15% to

40% of residents return to the hospital during a Medicare A stay at an SNF (Li et al.,

2012). Research conducted on this topic has focused mainly on trends in readmission

rates or descriptions of resident characteristics that contributed to the hospital return

(Burke et al., 2016). The general business problem was that there is little evidence to

indicate whether there is a relationship between nurse staffing levels and readmission

rates for the post-acute care setting. The specific business problem was SNF owners or

operators do not know the relationship between nurse staffing levels and outcome

measures such as the SNF RM. Determining whether there is a correlation between nurse

staffing levels and the SNF RM may prove beneficial for health care leaders and advance

the research on readmissions from the SNF.

## Purpose of Study

The purpose of this study was to determine whether a relationship exists between

SNF nurse staffing levels and return-to-hospital (rehospitalization) percentages using the

SNF FM rates. The independent variables were staffing HPRD that included (a) LPN, (b)

RN, (c) CNA, and (d) compiled staffing HPRD. The dependent variable was the return-to-hospital percentages from residents sent back to the hospital within 30 days of discharge using the SNF RM. SNF data related to rehospitalization percentage and staffing HPRD were collected from the Nursing Home Compare data set. Nursing Home Compare data sets are created by the Center for Medicare and Medicaid Services (CMS) and are commonly used to gauge performance and clinical outcomes (CMS, 2016b; Foster & Lee, 2015; Li et al., 2012; Schnelle, Schroyer, Saraf, & Simmons, 2016; Wang et al., 2016). The data sets consist of information gathered from the Certification and Survey Provider Enhanced Reports (CASPER), the Online Survey Certification and Reporting (OSCAR) database, and the Minimum Data Set 3.0 (MDS 3.0).

Table 1 includes the study variables and definitions of each variables. The SNF staffing variables were further delineated as staffing levels of RN hours per resident day (RN HPRD), LPN or licensed vocational nurse hours per resident day (LPN/LVN HHPD), CNA or nurse's aide hours per resident day (CNA/NA HPRD), and total staffing (T HPRD). Resident outcomes were measured using the Potentially Preventable 30-Days Post-Discharge Readmission Measure designed by CMS. The exploratory variables included the facility characteristics.

Table 1

*Study Variables and Operational Definitions*

| Variable level | Variable category | Variable | Definition |
|---|---|---|---|
| Predictor variable | Staffing characteristics | RN hours per resident day | Total number of direct-resident care registered nursing hours for all shift in a 24-hour period divided by total midnight census |
| | | LPN/LVN hours per resident day | Total number of direct-resident care LPN/LVN nursing hours for all shift in a 24-hour period divided by total midnight census |
| | | CNA/NA hours per resident day | Total number of direct-resident care CNA/NA hours for all shift in a 24-hour period divided by total midnight census |
| | | Total hours per resident day | Total number of direct-resident care (RN/LPN/LVN/CNA/NA) nursing hours divided by total midnight resident census |
| Dependent variables | Resident outcomes | SNF RM | This outcome measure assesses the risk-standardized rate of unplanned readmissions within 30 days for residents with fee-for-service Medicare who were in residents at PPS, critical access, or psychiatric hospitals with any cause or condition (CMS, 2018b). |
| Explanatory variables | Facility characteristics | Provider Type | Medicare or Medicaid |
| | | Size | Number of operational beds |
| | | Ownership | Nonprofit, for-profit, or government |

**Research Questions and Hypotheses**

RQ1: What is the relationship between nurse staffing levels and rehospitalization percentages for SNFs?

$H_o1$: There is no statistically significant relationship between nurse staffing levels and rehospitalization percentages for SNFs.

$H_a1$: There is a statistically significant relationship between nurse staffing levels and rehospitalization percentages.

RQ2: What is the relationship between RN staffing HPRD and rehospitalization percentages for SNFs?

$H_o2$: There is no statistically significant relationship between RN staffing HPRD and rehospitalization percentages for SNFs.

$H_a2$: There is a statistically significant relationship between RN staffing HPRD and rehospitalization percentages for SNFs.

**Theoretical Foundation**

The Donabedian theory provided the theoretical foundation for this study. Donabedian (1997) developed the structure, process, outcome (SPO) theory to offer suggestions for how quality in health care can be assessed through the notion that processes drive outcomes. This framework is widely accepted and can be easily applied to health care problems to provide a better understanding of quality (Spilsbury et al., 2011). Structure refers to the features, physical appearance, or characteristics of a setting; the systems by which care takes place; and provider qualifications, all of which may affect the delivery of resident care (Ayanian & Markel, 2016; Spilsbury et al., 2011).

Processes are care delivery practices within the facility often mandated by legislative,

regulatory, and professional agencies (Ayanian & Markel, 2016; Hyer, Thomas, Johnson,

Harman, & Weech-Maldonado, 2013). Outcomes represent the resident outcomes and the

SNF's ability to meet quality standards (Ayanian & Markel, 2016). Donabedian viewed

the outcomes component of the concept as a way of validating quality (Hovey et al.,

2015). Donabedian's SPO framework is commonly used throughout health care to

measure quality (Hyer et al., 2013); therefore, the model was appropriate for this study

because it supported the concept of evaluating the structure of care (nurse staffing), the

process by which hours per resident day are calculated and considered acceptable, and the

relationship these have on quality outcomes (rehospitalizations).

### Nature of the Study

Quantitative research is the method of testing a hypothesis by analyzing distinct

variables and using statistics to show how they relate to the hypotheses (L. Neuman,

2011). Qualitative research is used to explore the significance that individuals or groups

attribute to a problem (Creswell, 2014). Based on the purpose of this study, a quantitative

method was appropriate. The mixed-methods approach is used when both qualitative and

quantitative data are collected using distinctive designs with evolving themes based on

assumptions and theoretical frameworks (Creswell, 2014). Because there was no

qualitative component to this study, a mixed-methods approach was not appropriate.

The correlational design was appropriate because a correlational study is used to

examine the relationship between variables and make predictions (see Christensen,

Johnson, & Turner, 2015). A correlational design was suitable for this study because the

purpose of the study was to examine the relationship between nurse staffing levels and rehospitalization rates. Other designs such as experimental or evaluation research are appropriate when the researcher is seeking to study the effects of manipulating variables or studying the effectiveness of interventions (Christensen et al., 2015). Experimental and evaluation research was not appropriate for this study.

## Literature Search Strategy

The process used to conduct the literature review for this study involved a variety of search methods and key words. Key words for the search strategy were derived from a search in the Walden University library databases including MEDLINE, OVID, PubMed Central, Business Source Complete, Academic Search Complete, ProQuest, and The Cumulative Index of Nursing and Allied Health Literature. I also used the Google Scholar search engine. Words related to the topic were queried using the Boolean operator terms *and* and *not* in different combinations. The operator *or* was used to connect synonyms such as *long-term care* or *skilled nursing facility*. Words contained in the article title, abstract, or index terms were used to find relevant articles. The following key words were used in the searches: *skilled nursing facility*, *hospitalizations*, *30-day readmission*, *readmissions*, *nursing homes*, *long-term care*, *readmission rates*, and *rehospitalization penalty*. Combinations of search terms consisted of staffing models and nursing homes; staffing and skilled nursing facilities; nurse staffing and quality of care; readmissions, nursing homes or skilled nursing facility, and staffing; nursing home quality and staffing standards; direct care and quality; and resident safety and staffing. Combining key words narrowed the search to research that was relevant to this study.

Once the studies were determined to be applicable to this study, they were read and added to a matrix document used for tracking. The search was expanded to other key terms when relevant studies offered additional support with other citations. Citations were cross-checked, and documents were located, read, and added to the matrix when current and relevant. For articles that were related to the subject but out of date, the "cited by" tool in Google Scholar was used to identify current articles on the same subjects. Only studies written in English were used; however, some studies from other countries addressed similar concerns with rehospitalizations and staffing. These studies were used when they offered support on the subject. The Walden University document delivery system was used to locate three studies that the library did not own. Many steps were taken to ensure a thorough search was conducted.

The scope of the literature review included studies published between 2010 and 2018, with the focus being within the last 5 years (2013-2018). This time period followed the enactment of the Affordable Care Act (Hovey et al., 2015). Studies published after this enactment were representative of current practices. The literature review included quantitative, qualitative, and mixed-methods studies. Ulrich's Periodicals Directory was used to search the title of relevant journals to determine peer-reviewed status. Information on the topic was gathered from several of the national health care websites and coalitions including the Center for Medicare and Medicaid Services, Medicare Payment Advisory Commission, and the Official U.S. Government Site for Medicare. The reference lists of relevant studies were searched to identify additional sources.

Literature was reviewed to determine whether other researchers had examined the relationship between SNF nurse staffing levels and SNF readmissions rates. Within the last 5 years, four literature reviews were conducted addressing the predictors of hospitalizations in the nursing home population (Ågotnes et al., 2016; Laging, Ford, Bauer, & Nay, 2015; Mileski et al., 2017; Yoo et al., 2015). One qualitative literature review study indicated the need for higher minimum staffing standards (Harrington et al., 2016). Ninety-one articles were reviewed as part of the current study. Methodologies varied greatly among studies. Most researchers included secondary data analysis with various national data sets. Databases included but were not limited to OSCAR, MDS 3.0, CASPER, Nursing Home Compare, Nursing Home Stay file, CMS Beneficiary files, and the Medicare Current Beneficiary Survey. Researchers also designed data collection tools to extract key data for analysis from individual medical records reviewed.

## Literature Review

The purpose of this quantitative correlational research study was to examine the relationship between SNF nurse staffing levels and readmission rates. Since the nursing home Omnibus Budget Reconciliation Act of 1987, lawmakers have mandated minimum nursing staffing hours in the SNF setting with the goal of improving quality of care for residents (Backhaus et al., 2014); however, the state of Georgia's requirement was one of the lowest staffing standards required among all states (Harrington, 2008). Low staffing standards may be related to increased rehospitalization rates.

This literature review provides a comprehensive review of the literature related to SNF nurse staffing levels; nursing levels; and challenges, barriers, and factors that

influence SNF readmissions to acute care. Donabedian's model of structure, process, and outcomes served as the theoretical foundation for the study. This section is divided into four parts based on the support and gaps identified in the literature: staffing studies, staffing and quality, readmissions, and staffing and readmissions. Each part provides information on how researchers analyzed an identified problem and described the need for further research.

The main objective of the literature review was to determine whether SNF nurse staffing levels were related to 30-day readmissions from SNFs. The relationship between staffing levels and clinical outcome measures is highly debated, yet only a few studies addressed the relationship between nurse staffing levels and readmissions from the SNF to the hospital within 30 days of initial hospital discharge (Spilsbury et al., 2011). Many researchers who examined the effect of staffing levels on hospital readmissions from an SNF conducted their studies shortly after the ACA implementation in 2010 (Ågotnes et al., 2016). No studies were found that addressed the same relationship between variables (nurse staffing and SNF RM) using a correlational design within the last 5 years. Harrington et al. (2016) reviewed multiple studies and concluded that increasing the number of RNs would decrease readmissions and negative outcomes. Other studies indicated no associations between staffing and quality, inconsistencies, or contradictory data regarding the relationship between staffing and quality outcomes (Spilsbury et al., 2011). Many researchers identified readmissions as posing financial and negative care concerns for post-acute care providers, thereby supporting the need for further study of the relationship between staffing (resources) and readmissions (Burke et al., 2016; Herrin

et al., 2015; Ouslander et al., 2016; Stranges et al., 2015). Researchers have conducted studies on staffing and quality, but little has been done to show how overall staffing in an SNF, including RN, LPN, and CNA, relates to rehospitalizations.

**Staffing Studies**

The need to increase staffing in nursing homes has been debated for decades. In 2015, there was an overhaul of the 1991 Medicare and Medicaid regulations, but no changes were made to the staffing requirements for SNFs despite the substantial changes in nursing services since that time (Harden & Burger, 2015). Several studies have addressed staffing levels and patterns, but they have varied in concentration. Many researchers have focused on SNF nurse staffing by emphasizing the importance of the education levels of staff, the impact of increasing RN hours, and the role other providers play in improving quality outcomes (Dellefield, Castle, McGilton, & Spilsbury, 2015; Harden & Burger, 2015; Hovey et al., 2015; Li et al., 2012; McGregor et al., 2014). Some researchers have identified that staffing levels vary based on the needs of the resident population and the payor types facilities predominately accept (Zhang, Unruh, & Wan, 2013). Other researchers have tried to justify the need for increased levels of staffing based on acuity (activity of daily living) but have found this task difficult because SNFs do not have a defined way to track acuity (Schnelle et al., 2016). Backhaus et al. (2014) conducted a systematic review of longitudinal studies on staffing and quality of care and found that staffing measurements varied across studies. Some researchers evaluated only full-time employees, whereas others focused on minutes, hours, and weeks of measurement (Backhaus et al., 2014). Although there is an abundance of nurse staffing

studies, the minimum federal requirements have not been changed by lawmakers to reflect an increase in nurse staffing levels in SNFs.

Several gaps were identified while conducting the literature review. The first gap was the varying studies among disciplines. The weakness of only focusing on one nursing discipline (e.g., RNs only) in a staffing study is that it does not provide a full picture of care for a resident. Nurse staffing should not be studied in isolation when there is a potential to improve resident outcomes when staffing and quality are studied together. The second gap identified was related to the consistency of measuring staff. There were no consistent way researchers measured staffing, making it difficult to compare studies. Lastly, staffing minimums vary among states, which creates challenges when attempting to study staffing concerns. These gaps indicated the need for further research on nurse staffing level in SNFs.

**Staffing and Quality**

Researchers have approached the SNF readmission problem from a variety of perspectives, many considering it to be a quality issue in SNFs. Spilsbury et al. (2011) conducted a literature review regarding staffing and quality and concluded that there were 42 different measures of quality and 52 ways of measuring staffing throughout the studies, making it difficult to make comparisons. Backhaus et al. (2014) examined the methodology used to study quality in 20 studies to determine whether there was a relationship between nurse staffing and quality. Backhaus et al. concluded that there was no consistent evidence among the quality indicators for a positive relationship between nurse staffing and quality. Many researchers who examined concerns in quality of care

classified them under one of two categories: resident characteristics or provider characteristics (Ågotnes et al., 2016; M. D. Neuman et al., 2014). Several researchers examined only provider characteristics as factors contributing to readmissions (Burke et al., 2016; M. D. Neuman et al., 2014). Provider characteristics can be relatively broad and can include nurse staffing levels. Lee et al. (2014) examined the effects of higher RN hours on quality measures (QMs) including pressure ulcers, urinary infections, weight loss, and catheter usage and found that with some QMs there was a relationship but with others there was no significance. Shin and Hyun (2015) identified that increasing RN hours could improve outcomes in several clinical areas, including decreased pressure ulcers and falls. Haizhen (2014) studied the effects of RNs and CNAs on QMs and noted a positive impact with an increase of RNs but found no evidence that increasing CNA hours improves quality. Few researchers examined the relationship between staffing and rehospitalizations (Ågotnes et al., 2016). High readmission rates should be considered a quality issue and should be studied in connection with nurse staffing levels.

Several gaps were identified in the literature on nurse staffing and quality. Many researchers had different definitions of what constituted quality, making it difficult to compare findings. Measures of quality also varied across studies. The findings related to whether staffing increases affected quality varied from study to study. Much of what researchers have studied involves how nurse staffing affects quality or resident outcomes in the nursing home, but not specifically rehospitalizations (Griffiths et al., 2016; Haizhen, 2014; Lee et al., 2014; Matsudaira, 2014; Nason, 2014; Paek et al., 2016; Schnelle et al., 2016; Zhang et al., 2013). One gap noted throughout the research is that

nursing staffing studies have addressed quality measures such as pressure ulcers or wounds, falls, infections, and other negative outcomes measured on the publicly reported databases (Yoo et al., 2015), but have not addressed readmission rates. These gaps warranted further study of nurse staffing levels and readmissions.

**Readmissions**

The literature on the relationship between nursing home residents and readmissions was extensive and provided details on the significant impact readmissions can have on resident morbidity and mortality. Readmissions pose a financial and quality concern for SNFs, yet researchers have studied readmissions in isolation of the contributing causes. Readmission rates vary among states and regions and can range from as low as 9% to as high as 60% (Graverholt, Forsetlund, & Jamtvedt, 2014). The fluctuation in rates could be due to varying causes and interventions. Much of the research on readmissions focused on specific disease processes that caused hospitalizations or interventions that impacted rehospitalization rates (Abrahamson, Mueller, Davila, & Arling, 2014; Bogaisky & Dezieck, 2015; Giuliano, Danesh, & Funk, 2016; Hovey et al., 2015; Mileski et al., 2017; Nuckols, 2015). Hovey et al. (2015) studied the implementation of training to reduce readmissions among SNF patients and found no significant effect on readmissions. Graverholt et al. (2014) conducted a systemic review of the literature to determine interventions associated with a reduction of readmissions from the nursing home. Intervention consisted of advanced care planning, staff training, use of critical pathways, palliative care, community follow-ups, and

immunizations (Graverholt et al., 2014). Readmission outcomes varied among studies (Graverholt et al., 2014).

Some researchers examined facility processes and procedures as potential contributors to readmissions from the SNF. Researchers examined how the SNFs performance (documented through either quality indicators or survey results) impacted readmission rates (Konetzka, Polsky, & Werne, 2013; Lage, Rusinak, Carr, Grabowski, & Ackerly, 2015; Rahman, Mor, Grabowski, & Norto, 2016; Wang et al., 2016). Li, Cai, Yin, Glance, and Mukamel (2012) studied the effects high volume SNFs have on readmission rates and found that facilities with higher-volume SNFs tend to have lower rehospitalization rates among 30-day and 90-day readmissions. Morley (2016) examined the causes of readmissions from the SNF back to the acute setting and identified "under-recognition of early symptoms" or "over-recognition of acuity of residents" to be a major factor in hospitalizations (p. 186). Resident acuities have increased in the SNF settings, yet resources have not improved to match the need (Carnahan et al., 2016). Findings may suggest that a substantial portion of readmissions can be blamed on insufficient SNF staffing available to recognize changes in resident's conditions or lack of time to care for higher acuity residents. Many strategies were outlined in research to improve readmission, but Ouslander et al. (2010) indicated these would not be possible without an increasing in staff, training, and level of expertise. To add to the extensive research already conducted on readmissions, SNF nurse staffing levels should be considered a potential contributor of readmissions to the hospital.

Inconstant findings and notable gaps were identified in the literature while reviewing studies on readmissions. The definition of a hospitalization varied across studies making it difficult to compare findings. Researchers combined short stay (SNF) and long-stay (nursing home) residents into one grouping or did not specify resident types, which confuses results when attempting to focus on specific goals of treatment and discharge. Reasons for readmissions were often categorized by researchers based on overarching themes, which can leave out concrete reasoning and introduce bias. Researchers indicated hospital readmission of SNF residents is associated with individual resident characteristics and facility characteristics, but the defined characteristics varied significantly across studies. Most researchers studied only one contributor of resident readmissions, which further lends to speculations of the causes for readmissions in the SNF resident. Gaps in the research evidenced the need to further evaluate the impact the nurse staffing variable may have on readmissions.

**Staffing and Readmissions**

Researchers have analyzed the nurse staffing and readmission variables from different perspectives. Nurse staff play a key role in the decision to hospitalize a resident (Spector, et al., 2013). Multiple factors were found throughout research to influence the staff's decisions to transfer SNF residents to the hospital. Staffing capacity and access to multidisciplinary support were commonly identified as potential contributors (Laging et al., 2015). Several researchers identified a need to increase staffing in efforts to reduce readmissions from the SNF. Abrahamson et al. (2014) examined nurses' experiences when attempting to reduce rehospitalizations and noted that workload, staffing

challenges, and time were all contributors of residents returning to the hospital. Spector et al. (2013) identified the need for more skilled staff to provide better preventative care causing fewer resident hospitalizations, but the researchers focus was limited to RN and Aide staffing. McGregor et al. (2104) found that several facility characteristics, including mean RN HPRD and mean total direct nursing (LPN and aide) HPRD, had a positive impact on hospital utilization (less usage) when hours were equal to or greater than 0.64 RN HPRD and 3.2 LPN/Aide HPRD. M.D. Neuman et al. (2014) measured the association between SNF performance measures and rehospitalizations and concluded mortality rates were lower in SNFs with higher staffing and better facility inspection ratings. Researcher focus varied greatly among the different studies that examined staffing and readmissions. With little focus placed on SNF total nurse staffing levels and how they correlate to possible readmission rates, there was a need to study these specific variables to determine if a relationship existed.

Several gaps were identified while conducting the literature review on nurse staffing levels and readmissions. Researchers addressed readmissions from nursing homes, long-term care, or SNFs and potential causes, but focused little on the impact of the collective nursing staff (Ågotnes et al., 2016; Laging et al., 2015; M.D. Neuman et al., 2014). Few researchers have included the role of the LPN in relationship to readmissions in the SNF setting. The positions or disciplines counted in direct care staff varied across studies, some leaving complete roles out of the equation. In addition, how staff were measured varied from one study to another making it difficult to compare findings. Some researchers used the CMS five-star rating system to measure time in the

direct care position and others used HPRD. Several studies only studied provider level staff in isolation of facility level staffing. Findings warrant the need to study total nurse staffing levels in the SNF and how staffing related to readmission.

Limitations identified throughout the literature varied. Many researchers discussed facility characteristics as a contributor to rehospitalizations, but failed to expand on staffing (Yoo et al., 2015). Some researchers examined the effects of staffing on the quality of care leaving readmissions out of the equation (Haizhen, 2014; Lee et al., 2014). The majority of researchers analyzed by Burke et al., (2016), contributed the complexity of the resident's care needs (invasive devices, advance care services, and complex medication regimens) to the reason for readmission. An increasing number of quality improvement activities have been designed by researchers to reduce rehospitalizations as a result of exploration on the topic, but few researchers provided staffing level correlations to readmissions.

Several researchers used similar secondary data sets to provide findings on the nurse staffing variables or readmission variables studied. The data sets selected for this study were consistent with those used throughout much of the prior research to include CASPER files and OSCAR staffing data (see Foster & Lee, 2015; Lee et al., 2014), all publicly reported and available on the Medicare.gov site.

**Definitions of Key Terms**

Key terms within this proposal are defined below in the context that they were used throughout this study in respect to their relationship to the research.

*Rehospitalizations or readmissions*: A return hospitalization to an acute care hospital that follows a prior acute care admission within a specified time interval (Mileski, Topinka, Lee, Brooks, McNeil, & Jackson, 2017; Norbert, 2008).

*Skilled Nursing Facility*: A facility or any part therein providing "skilled nursing care and rehabilitation services, such as physical and occupational therapy and speech-language pathology services" (MedPAC, 2018, p. 209). SNFs can range from encompassing an "entire facility or only distinct parts of a rehabilitation center; a distinct part of a hospital; or a religious nonmedical health care institution listed and certified by the First Church of Christ, Scientist, Boston, Massachusetts" (CMS, 2016c, p.18).

*Unnecessary or potentially avoidable hospitalizations*: Admissions to a hospital for specific acute illnesses (e.g., dehydration, urinary tract infection, pneumonia) or worsening chronic conditions (e.g., diabetes, heart failure, chronic obstructive pulmonary disease) that might not have required hospitalization had these conditions been managed successfully by primary care providers in post-acute setting. (Abrahamson et al., 2014; CDC, 2013; Spector, et al., 2013).

## Assumptions

In this study, I have made several assumptions in relation to the secondary database sets on Nursing Home Compare, as well as previous research on the variables. The following assumptions were made in this study:

1. Publicly reported SNF data available through the Nursing Home Compare database sets is accurate and reliable.

2. Hours per resident day calculations are accurate.

3. Individuals collecting and submitting the data followed guidelines.

4. Nursing care is delivered to SNF residents every day.

5. The primary service provider in the SNFs is nursing care services.

6. Nursing assistants are the caregivers providing most of the care at SNFs.

7. If staffing is an issue, then lack of timely treatment may cause an increase in rehospitalizations.

## Scope

For this study, the scope was limited to analyzing the SNF nurse staffing levels of (RN HPRD, LPN HPRD, CNA HPRD, and total HPRD) and determining if there was a relationship to the SNF RM quality measure (30-day readmission rates). The study was limited to understanding the relationship and did not include the cause or effect of 30-day readmissions. The sample for this study included SNF facilities within the state of Georgia whom are required to report data based on CMS guidelines. The sample was large, it captured different nurse staffing levels and demographics found within the SNF. As a result, inferences from the study were generalizable to SNFs that have similar characteristics represented in this study.

## Delimitations

Delimitations are described as the choices the researcher makes for the study that control the boundaries set for the study. Elements of delimitations in a study consist of intentionally excluding or including decisions regarding the sample population, the theoretical viewpoints, and the variables (Creswell, 2014).

In this study, I purposely focused on the SNF RM measure. There are other readmission measures, but the SNF RM calculates facility-level all-cause, unplanned hospital readmission rates among Medicare FFS beneficiaries utilizing a SNF within 30 days of discharge from an acute hospital discharge (CMS, 2015b). Inclusions consisted of including literature reviews for nursing homes, SNFs, and long-term care facilities. Other literature reviews for post-acute care settings such as home health and long-term acute hospitals were excluded. The reasoning for this was based on the difference in staffing levels, as well as levels of resident acuity.

## Significance

This study builds upon current research by focusing on the relationship SNF nurse staffing levels have on the readmission rates of SNF residents using Donabedian's SPO framework to guide the study. Understanding the relationship between nurse staffing levels and 30-day readmission rates could decrease health care expenditures and prevent poor resident outcomes (M.D. Neuman et al., 2014). Without understanding the relationship between nurse staffing levels and 30-day readmission rates, it is unclear if current minimum staffing rates will be sufficient to prevent SNFs from being penalized when value-based purchase models are fully operational. Understanding the relationship can enable SNF leaders to make informed decisions about the need to increase or decrease staffing levels related to outcomes. From the perspective of federal and state government and policymakers, excessive spending on SNF rehospitalizations is unnecessary (Mileski et al., 2016). Government agencies need evidence-based research on the relationship nurse staffing levels have with 30-day readmission rates in order to

make informed changes. This study provides information SNF leaders can use to make informed decisions about staffing levels and potentially prevent poor quality outcomes.

**Summary**

Rehospitalizations from SNF facilities have a negative impact financially on the SNF as well as poor resident outcomes (Ouslander et al., 2016). Reducing SNF rehospitalizations is a national goal as evidenced by the ACA reform and the push from CMS for value base programs that link payments to SNFs outcomes (readmissions rates) (Mileski et al., 2017; Ouslander et al., 2016). Understanding the relationship between nurse staffing levels and 30-day readmission rates has the potential to prevent SNFs from receiving financial penalties for poor quality of care.

There was limited knowledge regarding nurse staffing levels and 30-day readmission rates. This retrospective correlational study contributed to understanding the relationship between nurse staffing levels and 30-day readmission rates. The knowledge gained from this study can promote positive social change by providing necessary resources for facility administrators to make staffing decisions, industry leaders the data needed to change policies as it relates to mandating staffing ratios, and leaders with a clear picture of how staffing ratios can affect readmission costs based on incentive pay for low percentages of returns to hospitals within their resident populations.

In the following Section, I provided an overview of the research design, data collection, and methodology that guided this study. Section 3 is a presentation of the results and findings, followed by the application to professional practice and implications for social change in Section 4.

Section 2: Research Design and Data Collection

The purpose of this quantitative correlational study was to examine the relationship between SNF nurse staffing levels and 30-day readmission rates of Georgia SNF residents using the CMS Nursing Home Compare data sets. Donabedian's theory was used to identify whether structure (staffing levels) and processes (HPRD) were related to quality outcomes (rehospitalization rates). The use of the quantitative approach was appropriate for this study because this approach was used in previous studies to address relationships between similar variables (see Giuliano et al., 2016; Hyer et al., 2011).

Georgia's nurse staffing level requirement is one of the lowest staffing standards among all states (Harrington, 2008). No studies were found in which researchers studied the association between nurse staffing levels and readmission rates in Georgia SNFs within the last 5 years. In addition, researchers reported mixed findings such as no relationships or both positive or negative results between nurse staffing levels and readmission rates or other quality indicators studied (Ågotnes et al., 2015; Giuliano et al., 2016; Spilsbury et al., 2011). I evaluated the relationship between each of the nurse staffing disciplines (RN, LPN, CNA, and total nurse staffing levels) and readmission rates in Georgia SNFs.

Section 2 provides information on the research design and data collection. The section begins with the research design and rationale. The methodology is outlined including the population, sampling, procedures to collect data, the instruments and

operationalization of constructs, and threats to validity. Ethical procedures and a summary conclude the Section.

## Research Design and Rationale

The independent or predictable variable in this study was nurse staffing levels. The dependent variable was readmission rates. The facility characteristics served as exploratory variables. The correlational design was used to answer the research questions using a correlation coefficient to determine strength of the relationship and an alpha level to determine significance. There are no identified time or resource constraints consistent with this design choice. The design was appropriate to advance knowledge in this discipline because it provided readers with information on whether staffing has a positive, negative, or no correlation to readmission rates. This information may be helpful when reviewing factors that affect readmission.

## Methodology

This study was a secondary data analysis of 2015 CMS staffing files and 2017 SNF VBP program data providing a retrospective review of 2015 data. The CMS staffing report provides facility information that is obtained during the Medicare and Medicaid survey. For this study, the following data were used from the 2015 CMS staffing files: CMS certification numbers (CNN) and staffing levels (RN HPRD, LPN HPRD, CNA HPRD, and total HPRD) (CMS, 2015a). CMS staffing data are retrieved during the facilities annual Medicare and Medicaid certification survey (CMS, 2016a). Data pulled from the SNF VBP program files included the CNN and calendar year SNF 30-day all-cause risk-standardized readmission rates (CMS, 2018b).

This study involved a correlation analysis using Pearson's correlation coefficient to determine whether SNF nurse staffing levels were related to readmission rates from the SNF. A correlation coefficient is a numerical index used to determine the strength and direction of the relationship between two variables (Christensen et al., 2015). Pearson's design was appropriate for this study because I sought to determine whether a relationship existed between two interval variables. I used the IBM SPSS Statistical software to answer the research questions and address the hypotheses for this study. A lower $p$ level would indicate a more significant relationship between the SNF nurse staffing levels and SNF RM variable (see Albright & Winston, 2015). I used the strength and significance to determine whether a relationship existed between SNF nurse staffing levels and the SNF RM variable.

## Population

Data for this study were collected from the time period between January 1, 2015, and December 31, 2015. The data were obtained from all nursing home facilities certified for Medicare and Medicaid services in Georgia who participated in the SNF VBP program.

## Sampling

The target population consisted of 374 SNFs across the state of Georgia. I merged the CASPER staffing data set with the 2015 SNF VBP data set using the unique provider numbers to ensure accuracy when merging. I excluded all SNF data outside of 2015. Once I completed the merge, all states except Georgia were removed from the data set.

The data sets provided SNF structure, process, and outcome measures. Information from these datasets had the following strengths:

1. The datasets provided staffing information that is also used to contribute to CMS's five-star quality rating system.

2. Various researchers have used these data sets in previous studies.

3. The public uses the data sets to guide consumer purchases.

4. State legislators use the data sets to evaluate the status of their state.

5. Attorneys use the data sets when attempting to prove deficient practices.

6. There are no restrictions for use of these data sets, and they are available to the public.

I selected all SNFs in Georgia that met the criteria. Choosing the state of Georgia's entire population of SNFs provided a comprehensive indication of the quality of care delivered in the facilities in Georgia. Several researchers have studied single or a limited number of states and have concluded that their findings could be generalized to larger populations (Bogaisky & Dezieck, 2015; Hovey et al., 2015; Ouslander et al., 2010; Tappen, Elkins, Worch, & Weglinski, 2016).

**Instrumentation and Operationalization of Constructs**

Donabedian's model was used to determine whether structure (staffing levels) and processes (HPRD) were related to quality outcomes (rehospitalization rates). The software used to analyze the data was IBM SPSS Statistics version 25. The CMS data files were uploaded into the software and the output files expected to provide statistical

analysis were displayed in tables, graphs, or charts (see Wagner, 2017). The output files were analyzed to determine whether there was a relationship between the variables.

The construct for this study was quality. Quality can be defined in many ways. Moss and Pence (1994) define quality as an experience an individual has and how well the experience met the individual's goals or objectives; a good service that entices and satisfies the customer. Quality is not something that can be directly observed; therefore, an attempt was made to measure quality by operationalizing the two variables: SNF nurse staffing levels and rehospitalization rates. The variables were numeric and did not have to be changed into measurable factors except for the facility characteristics. The following variables were analyzed: nurse staffing levels, readmission rates, and facility characteristics.

**Staffing**

I used the staffing data from the CMS Nursing Home Compare data sets from the 2015 Staffing archived data sets. The nurse staffing level data were derived from the annual state surveys. SNFs can be surveyed anytime during a 9- to 15-month period from the previous survey (Hyer et al., 2011). The surveyors ask the facility to provide the staffing levels for the two weeks prior to the dates of the survey, providing a snapshot of a facility's typical staffing levels. The staffing measure depicts the hours that the nursing staff (RN, LPN, or CNA) spent providing direct care to the resident within a 24-hour period. I used staffing HPRD to measure nurse staffing levels. I excluded all facilities that did not have a survey within one of the quarters in 2015 because there were not available staffing data. If more than one survey was present, I used the staffing hours from the

latest survey conducted during the 2015 calendar year. Observations were deleted if any of the following criteria were met: total RN HPRD is zero, total LPN HPRD is zero, total CNA HPRD is zero, or total HPRD is zero.

**Readmissions**

Readmission rates are derived from claims-based data submitted when a patient has had a readmission to an acute care setting within 30 days of a SNF stay. The SNF RM was the measure used in this study. This measure has been risk adjusted considering sex, age, medical comorbidities, and medical complexity (CMS, 2015b). Proxy indicators are used to represent medical complexity and consist of number of acute care hospitalizations in 365 days, time spent in the intensive care unit, disability status, specific surgical procedures, and length of hospital stay (CMS, 2015b). A logistic regression model was used to calculate the standardized risk ratio (CMS, 2015b). Ratios that are greater than 1 represent higher-than-expected readmissions, whereas those less than 1 depict better-than-expected performance (CMS, 2015b). The risk-standardized readmission rate is calculated by multiplying the ratio by the national raw readmission rate (CMS, 2015b). I excluded all facilities that did not have a readmission rate or if SNF RM rates were zero. I included all SNFs located in Georgia, excluding those that were not a Medicare and Medicaid participant.

**Facility Characteristics**

The structural factors served as the control variable. These consisted of the size of the facility, ownership, and provider type. This variable can potentially be associated with process and outcome measures. Ownership served as a dummy variable and was

coded with the number 1 (for-profit) and 0 (nonprofit). I also coded the ownership and provider type with numeric values.

## Data Analysis Plan

Quantitative research requires the researcher to formulate a theory or hypothesis in a way that relates to the statistical testing that will take place (Frankfort-Nachmias & Leon-Guerrero, 2015). This is referred to as the research hypothesis, which is presented in relation to the population parameter (Frankfort-Nachmias & Leon-Guerrero, 2015). It is not enough to provide data that confirms or disconfirms a research hypothesis; a null hypothesis must be considered, which disputes the research hypothesis or shows no real difference in the population mean and the other value being examined (Frankfort-Nachmias & Leon-Guerrero, 2015). The research questions and hypotheses for this study were as follows:

RQ1: What is the relationship between nurse staffing levels and rehospitalization percentages for SNFs?

$H_o1$: There is no statistically significant relationship between nurse staffing levels and rehospitalization percentages for SNFs.

$H_a1$: There is a statistically significant relationship between nurse staffing levels and rehospitalization percentages.

RQ2: What is the relationship between RN staffing HPRD and rehospitalization percentages for SNFs?

$H_o2$: There is no statistically significant relationship between RN staffing HPRD and rehospitalization percentages for SNFs.

$H_a2$: There is a statistically significant relationship between RN staffing HPRD and rehospitalization percentages for SNFs.

The statistical test used to test the hypotheses for this study was the Pearson method of computing correlation. The correlational design is used to determine whether and to what extent a relationship exists between two or more variables (L. Neuman, 2011). The relationship is determined by a level of significance. The output for this study was analyzed to determine a level of significance based on the *p* value. If the *p* value is below the conventional threshold of .05, the relationship is deemed significant (Laureate Education, 2016). According to Warner (2012), alpha levels or *p* values set at .05, .01, or .001 are common and help to reduce the probability of falsely rejecting the null hypothesis.

## Threats to Validity

Validity refers to the accuracy of interpretation of data (Christensen et al., 2015). A retrospective study can pose a threat to validity due to incomplete or missing data. Additionally, a retrospective study does not allow for definitive causation to be established, which may introduce selection bias (Stranges et al., 2015). In most instances, publicly reported secondary data have been validated. The SNF RM was developed by CMS and tested for validity by evaluating the measure against other nursing home outcome and process performance measures (CMS, 2015b). Other threats to validity may relate to the design. A correlational design may include variation in subject characteristics, differences in location, instrument decay, mortality, testing, history, data collector characteristics, and data collector bias (Creswell, 2014). Many of these threats

did not pertain to this study because experimental variables were not used, only

secondary data. I attempted to reduce threats to validity in the following ways:

1. I selected all Georgia SNFs that met the inclusion criteria.

2. I ensured the sample was large enough to account for any facilities that did not

   meet the inclusion criteria.

3. I clearly defined the quality construct, using 30-day readmission metrics, and

   using only variables that represent exactly what is being measured (see

   Christensen et al., 2015).

Causation was another potential threat to this study. Because two variables are

related does not mean that one variable will cause the other (Christensen et al., 2015).

Introduction of a third extraneous variable (facility characteristics) helped show whether

nurse staffing levels were causally related or if they were correlated to 30-day

readmissions (see Christensen et al., 2015). The reliability coefficient was used to

determine whether there was a relationship between the variables and the strength of that

relationship (see Christensen et al., 2015).

Statistical decision tests are used to help the researcher determine if the null

hypothesis is rejected or not rejected. Unfortunately, errors can be made by the researcher

in determining whether to reject or not reject the null hypothesis. According to Warner

(2012) a Type I error is one that actually rejects the null hypothesis even when the value

of the population mean is specified. I used an alpha level to help determine the likelihood

that the null hypothesis would be rejected (see Frankfort-Nachmias & Leon-Guerrero,

2015; Warner, 2012). Using alpha levels set at .05, .01, or .001 are common and help to

reduce the probability of Type I errors (Warner, 2012). Reducing the alpha will increase the risk of a Type II error occurring (the null hypothesis was false, but the was not rejected accurately) (Frankfort-Nachmias & Leon-Guerrero, 2015). For the purpose of this study, I set my alpha at .05 for this study. Considering the potential threats early helped reduce the likelihood and improve reliability and validity of the study.

### Ethical Procedures

Researchers are challenged to meet ethical requirements when conducting research due to the varying considerations that should be taking into account. In quantitative research using secondary data, the following ethical concerns should be considered: process in which data was gathered originally, accuracy of data, confidentiality of participants, privacy, consent, and integrity (Christensen et al., 2015; L. Neuman, 2011). I took several measures when I collected and analyzed data:

1. I obtained institutional review board (IRB) approval.

2. I voided deception by ensuring all results were included in the study to avoid projecting bias,

3. I protected data by way of gathering, storage, and sorting, and

4. I remained trustworthy by way of reporting accurate and comprehensive results. There were no human subjects involved in this study and there was no need to request the use of the data needed for this study because it was secondary publicly reported information.

**Walden IRB Process**

The IRB is responsible for ensuring all Walden University research complies with the university's ethical standards and U.S. federal regulations (Walden, 2018). Walden University has strict guidelines regarding the collection of data before to IRB approval has been granted. No data pulled prior to the IRB approval will be accepted by Walden University because of failure to comply with the policies and procedures related to ethical standards in research (Walden, 2018). Prior to pulling the data, I sought permission from my committee chair and member and submitted a request to the Walden University Institutional Review (IRB) for approval to move forward with the collect of data for this study.

All students who are conducting research projects of any scope involving collection or analysis of data must complete the IRB application (Walden, 2018). Every researcher must submit a copy of a Human Research Protections training completion certificate with the IRB application (Walden, 2018). For the purpose of this study, there was not any research participants involved, community partnerships, or protected health information used. All data was secondary publicly reported information and did not include any patient specific details.

Data integrity and confidentiality practices must be considered prior to data collection. Data for this study was stored electronically on my personal computer with back-up files loaded to a flash drive. The files are not confidential as they can be obtained publicly from the Medicare.gov website. In efforts to ensure accuracy of the data, several checks were implemented:

1. Files were verified to ensure correct data ranges have been pulled.

2. Files were merged using unique facility ID numbers.

3. Only data that met the exclusion criteria was removed.

4. Raw data will be stored in original form for five years on a flash drive that will be locked in a security box.

5. Data files were merged into IBM SPSS Statistical software and statistical testing was performed.

No participants were involved in the data collected for this study. The data for this study is public and has already been aggregated by CMS using MDS submissions. The aggregated data was sorted, cleaned, and uploaded into IMB SPSS software and appropriate statistical analysis was performed. Once IRB approval was obtained (approval number 10-09-18-0673611), I proceeded with data collection.

**Summary**

In Section II, I discussed the quantitative processes required to move forward in this study. The research design and reason for selection was outlined in this section. Literature background reviews, cited views of authors, and researcher findings from similar studies provided the basis for this study. In this section, I explained the purpose of a quantitative study and how it could provide meaningful data to leaders in the industry. The current study will advance the understanding of the relationship, if any, between SNF nurse staffing levels and 30-day readmissions because I was able to analyze a range of rehospitalization rates newly implemented as a result of the ACA.

The research questions were restated, and the purpose was included with a section defining the sample selection and instrumental constructs. Quantitative terms were defined, and possible ethical concerns were outlined. The requirements of the Walden University IRB were detailed as a pre-requisite to complete this study. In Section III, I present the results of the research study, describing the details of the variables, the process of data collection and analysis and the rationale leading to interpretations and recommendations of Section IV.

Section 3: Presentation of the Results and Findings

Admission of SNF residents back to the hospital within 30 days of discharge is a growing concern for SNF administrators. The purpose of this study was to examine the relationship between nurse staff levels and rehospitalization rates. The aim of the study was to evaluate a possible correlation between SNF nurse staff levels and readmission rates. Findings from the study may help SNF owners and operators make staffing decisions that impact quality outcomes.

I used a correlational design to determine whether a statistically significant relationship between nurse staff levels and rehospitalization rates existed. A correlation coefficient was used to determine the strength of the relationship and an alpha level was used to determine the level of significance. In Section 3, I describe the data collection process, explain the results, and provide a summary of the answers to the research questions. Application of the results to professional practice and implications for social change are addressed in Section 4.

**Data Collection of Secondary Data Set**

Data collection involved downloading SNF VBP public reporting data files from October 2017, which provided SNF RM rates and CMS staffing files from the calendar year 2015. The provider report from the CMS downloadable database allowed me to examine explanatory variables such as ownership type, bed size, and provider type.

Data collection began after institutional review board (IRB) approval was received. All files were downloaded and merged using Excel software and the SNF's unique CNN identifiers for exact alignment. All states were removed from the files

except Georgia. Once the data were compiled into one spreadsheet, the evaluation

process and removal of incomplete data began. Twenty facilities did not line up to a SNF

CNN identifier and were removed because they were identified as acute care facilities

based the absence of a CNN and the word *hospital* in the agency name. Ten facilities did

not have complete staffing data for 2015. An additional three facilities did not have a bed

count, ownership type, or payor type because they were no longer in business. There

were no facilities missing SNF RM rates. A total of 33 facilities did not meet the

requirements of the study due to incomplete staffing or the SNF having gone out of

business. Of the 374 Georgia SNFs, only 341 facilities provided all elements required for

data analysis.

**Measures and Variables**

Prior to running the correlation analysis, I identified predictor, dependent, and

explanatory variables. The explanatory variables included the following facility

characteristics: (a) ownership (nonprofit, for-profit, and government), (b) size (number of

operational beds), and (c) provider type (Medicare or Medicaid). No discrepancies in the

use of the secondary data set from the plan presented in Section 2 was identified other

than the reduction in the total number of Georgia SNFs. Baseline descriptive and

demographic characteristics were identified from the data sample as displayed in Table 2.

**Predictor Variable**

The key independent or predictor variables for this study were staffing

characteristics: RN HPRD, LPN HPRD, CNA HPRD, and Total HPRD. Donabedian's

conceptual framework supported the foundation for the selection of these variables

through the SPO model: structure (nurse staffing), process (HPRD), and outcomes (SNF RM).

## Dependent Variable

The SNF RM rate was the dependent variable in this study. The SNF RM outcomes measure assesses the risk-standardized rate of unplanned readmission within 30 days of an any cause or condition hospital stay.

## Facility Level Characteristics

The following facility level characteristics were evaluated as part of the study: ownership, facility size, and provider type. These facility characteristics are common when evaluating staffing or quality outcomes of SNFs.

**Ownership.** SNF ownership was categorically coded in SPSS: For-profit = 1; Nonprofit = 2; Government = 3.

**Facility size.** Facility size was categorically coded based on cut points from prior studies: $\leq 50 = 1$; 51-100 = 2; 101-150 = 3; $\geq 151 = 4$.

**Provider type.** Provider type was categorically coded: Medicare = 1; Medicare and Medicaid = 2.

Table 2

*Descriptive and Demographic Characteristics*

| Facility characteristics | All Georgia SNFs ($N = 341$) | |
| --- | --- | --- |
| | Frequency | Percent |
| Ownership | | |
|     For-profit | 239 | 70.1% |
|     Nonprofit | 90 | 26.4% |
|     Government | 12 | 3.5% |
| Facility size | | |
|     $\leq 50$ | 19 | 5.6% |
|     51-100 | 152 | 44.6% |
|     101-150 | 113 | 33.1% |
|     $\geq 151$ | 57 | 16.7% |
|     Average number of beds | 111 | – |
| Provider type | | |
|     Medicare | 11 | 3.2% |
|     Medicare and Medicaid | 330 | 96.8% |

**Results**

All data were analyzed using IBM SPSS software. Several tests were performed to provide a comprehensive analysis of the data: means, $t$ test, correlation, multiple regression, and ANOVA.

**Means**

A one-sample $t$ test allows researchers to determine whether the mean of a variable differs from a specified value (Wagner, 2017). A one-sample $t$ test was performed to evaluate total nurse staffing against the CMS recommended rate of 4.1 and is shown in Table 3 and Table 4.

Table 3

*Total HPRD Against Recommended Staffing HPRD of 4.1 Mean Data*

| | One-sample statistics | | | |
| --- | --- | --- | --- | --- |
| | *N* | Mean | Standard deviation | Standard error mean |
| Total HPRD | 341 | 3.7702396 | .74141867 | .04015007 |

*Note.* The mean Total HPRD across the 341 SNFs analyzed was 3.77.

Table 4

*Total HPRD Against Recommended Staffing HPRD of 4.1*

| | One-Sample test | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Test value = 4.1 | | 95% Confidence interval of the difference | |
| | *t* | *df* | Sig (2-tailed) | Mean difference | Lower | Upper |
| Total HPRD | -8.213 | 340 | .000 | -.32976038 | -.4087342 | -.2507866 |

*Note.* The one-sample test was statistically significant by evidence of the 2-tailed sig at .000. The mean difference between the recommended staffing rate of 4.1 is -.3297 indicating the mean is .3297 less than 4.1.

Comparing means allows researchers to identify differences between two means (Wagner, 2017). Means were compared between ownership type and nurse staff levels Total HPRD as shown in Table 5. Means were also compared between ownership type and SNF RM rates as shown in Table 6, as well as total HPRD and facility size as shown in Table 7.

Table 5

*Comparison of Ownership Type and Nurse Staff Levels*

| Total HPRD | | | | | |
| --- | --- | --- | --- | --- | --- |
| Ownership type | Mean | *N* | Standard deviation | Minimum | Maximum |
| 1 | 3.6750705 | 239 | .63775756 | 2.50523 | 8.07001 |
| 2 | 3.9732006 | 90 | .91029764 | 2.01719 | 7.65000 |
| 3 | 4.1434850 | 12 | .89456879 | 3.06494 | 6.55145 |
| Total | 3.7702396 | 341 | .74141867 | 2.01719 | 8.07001 |

*Note.* Government (3) owned SNFs run higher mean staffing (4.14). For-profit (1) owned SNFs run the lowest mean staffing (3.68).

Table 6

*Comparison of Ownership Type and SNF RM Rates*

| SNF RM | | | | | |
| --- | --- | --- | --- | --- | --- |
| Ownership type | Mean | *N* | Standard deviation | Minimum | Maximum |
| 1 | 19.50466 | 239 | 1.860087 | 15.326 | 26.096 |
| 2 | 18.87482 | 90 | 1.817053 | 14.562 | 25.241 |
| 3 | 19.52667 | 12 | 1.693295 | 17.268 | 23.134 |
| Total | 19.33920 | 341 | 1.859177 | 14.562 | 26.096 |

*Note.* Government (3) owned SNFs have the highest mean SNF RM rates (19.52%). For-profit (1) owned SNFs have the second highest mean SNF RM rates (19.50). Non-profit SNFs (2) have the lowest mean SNF RM rates (18.9).

Table 7

*Comparison of Facility Size and Total HPRD*

| Total HPRD | | | |
|---|---|---|---|
| Facility size | Mean | *N* | Std. deviation |
| 1 | 4.4816474 | 19 | 1.25230454 |
| 2 | 3.6735307 | 152 | 0.66358170 |
| 3 | 3.6992425 | 113 | 0.68074353 |
| 4 | 3.9317430 | 57 | 0.69670582 |
| Total | 3.7702396 | 341 | 0.74141867 |

*Note.* Facilities (1) with fewer than 50 beds have the highest HPRD. Facilities between 51 beds and 150 beds have similar total HPRD (2, 3). Facilities (4) that have the highest number of beds (above 150) have the lowest total HPRD.

## Correlation

Information about correlation tells researchers the extent to which variables are related (Wagner, 2017). The strength of the relationship and the statistical significance can be determined using Pearson's correlation. Pearson correlation outputs range from +1 to –1 (McCormick, Salcedo, & Poh, 2015). The further away from 0, the stronger the relationship. The two-tailed significance level indicates a statistical implication when the *p* value is less than 0.05 (McCormick et al., 2015). The following predictable variables were used in the correlation input: RN HPRD, LPN HPRD, CNA HPRD, and Total HPRD. The dependent variable was SNF RM rates. In this study, there was only a slightly positive correlation noted with CNA HPRD (.045), RN HPRD (.006), and Total HPRD (.024). These findings were closer to zero, which indicated there was not a strong relationship among these variables. LPN HPRD was–.015 indicating a negative relationship between the SNF RM and LPN HPRD. The two-tailed significance level for all of the variables was insignificant. These findings allow me to accept the null

hypothesis and conclude that there was no statistically significant relationship between nurse staff levels and rehospitalization percentages for SNFs as shown in Table 8. In addition, there was no statistically significant relationship between RN staffing HPRD and rehospitalization percentages for SNFs.

**Multiple Regression**

Multiple regression allows researchers to include more than one independent variable in a bivariate regression analysis (Wagner, 2017). Nurse staffing levels (RN HPRD, LPN HPRD, CNA HPRD, and Total HPRD) were the independent variables used in this study. The dependent variable was SNF RM rates. Provider type was used as a dummy variable for analysis. The outputs shown in Table 9 indicate that the adjusted R and R square were not that far off in measure (.008 to -.003); therefore, there were not too many predictors in relation to sample size (see McCormick et al., 2017). Findings in Table 9 show that R was .092 and R square was .008, neither of which was noteworthy (see McCormick et al., 2017). Because R square was .008, only 0.8% of the variation in SNF RM rates was explained be the variation in Total HPRD, RN HPRD, and LPN HPRD. There was no correlation indicated when the nurse staff levels and the SNF RM variables were analyzed using multiple regression.

**ANOVA**

The model summary provides information on how well the researcher can expect to predict the dependent variable, but it does not indicate whether there is a relationship between the depended variable and the independent variables (McCormick et al., 2017). An ANOVA can be used to determine whether there is a relationship between the

variables. Table 10 shows the sig was .583, which indicates that there was no statistically significant relationship between nurse staffing levels and rehospitalization percentages for SNFs.

Table 11 provides a representation of the coefficients. The $X_1$ coefficient (LPN, RN, Total HPRD) can be interpreted to mean that each additional movement in HPRD provides a prediction increase or decrease in the SNF RM rates (Wagner, 2017). Each additional incremental increase in HPRD for LPNs provided a .78 decrease in the SNF RM rate, and each additional incremental increase in HPRD for RNs provided a .18 increase in the SNF RM rate. Including all disciplines in the Total HPRD indicated that with each incremental increase in Total HPRD, the SNF RM rates increased by .8. There was not a level of statistical significance. Further analysis was not warranted because the ANOVA provided evidence that there was no significant relationship between the dependent variable and the predictor variables.

Table 8

*Pearson Correlation Between SNF Nurse Staff Levels and SNF RM*

| Correlations | | | | | | |
|---|---|---|---|---|---|---|
| | | SNF RM | LPN | CNA | RN | Total HPRD |
| SNF RM | Pearson Correlation | 1 | -0.015 | 0.045 | 0.006 | 0.024 |
| | Sig. (2-tailed) | | 0.780 | 0.403 | 0.909 | 0.658 |
| | N | 341 | 341 | 341 | 341 | 341 |
| LPN | Pearson Correlation | -0.015 | 1 | .117[*] | .361[**] | .658[**] |
| | Sig. (2-tailed) | 0.780 | | 0.031 | 0.000 | 0.000 |
| | N | 341 | 341 | 341 | 341 | 341 |
| CNA | Pearson Correlation | 0.045 | .117[*] | 1 | .155[**] | .738[**] |
| | Sig. (2-tailed) | 0.403 | 0.031 | | 0.004 | 0.000 |
| | N | 341 | 341 | 341 | 341 | 341 |
| RN | Pearson Correlation | 0.006 | .361[**] | .155[**] | 1 | .639[**] |
| | Sig. (2-tailed) | 0.909 | 0.000 | 0.004 | | 0.000 |
| | N | 341 | 341 | 341 | 341 | 341 |
| Total HPRD | Pearson Correlation | 0.024 | .658[**] | .738[**] | .639[**] | 1 |
| | Sig. (2-tailed) | 0.658 | 0.000 | 0.000 | 0.000 | |
| | N | 341 | 341 | 341 | 341 | 341 |
| *. Correlation is significant at the 0.05 level (2-tailed). | | | | | | |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | |

*Note.* No statistically significant relationship identified between SNF nurse staffing levels and the SNF RM.

Table 9

*Model Summary Output From Multiple Regression Analysis*

| Model Summary | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .092[a] | 0.008 | -0.003 | 1.862313 |
| a. Predictors: (Constant), Provider Type, CNA, LPN, RN | | | | |
| b. Dependent Variable: SNF RM | | | | |

*Note.* Std.=Standard. R and R Square are not noteworthy. There is no correlation identified between nurse staff levels and the SNF RM variables.

Table 10

*ANOVA to Determine Relationship Between Variables*

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 9.906 | 4 | 2.476 | 0.714 | .583[b] |
| | Residual | 1165.318 | 336 | 3.468 | | |
| | Total | 1175.224 | 340 | | | |
| a. Dependent Variable: SNF RM | | | | | | |
| b. Predictors: (Constant), Provider Type, NA, LPN, RN | | | | | | |

*Note.* Sig.= Significance. There is no statistically significant relationship between nurse staffing levels and the SNF RM. There is not linear relationship between the variables.

Table 11

*Representation of Coefficients*

| Coefficients | | | | | | | |
|---|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | |
| | | B | Std. Error | Beta | | | |
| 1 | (Constant) | 17.109 | 1.474 | | 11.608 | 0.000 | |
| | NA | 0.237 | 0.223 | 0.059 | 1.063 | 0.289 | |
| | LPN | -0.078 | 0.329 | -0.014 | -0.236 | 0.813 | |
| | RN | 0.177 | 0.398 | 0.027 | 0.444 | 0.657 | |
| | Provider Type | 0.863 | 0.611 | 0.082 | 1.413 | 0.159 | |
| a. Dependent Variable: RTH % | | | | | | | |

*Note.* There is not a level of statistical significance as evidence by *p* values higher than $\leq .05$.

## Summary

The primary aim of this study was to identify if a relationship existed between SNF nurse staff levels and readmission rates. SNF readmission rates are at the forefront of concern because SNFs are being penalized for high SNF RM rates. High readmission rates are thought to be a sign of poor quality. Poor quality has been linked to lower staffing levels. Identifying whether there was a relationship between SNF nurse staff level and the SNF RM will assist owners and operators in determining where to put focus in efforts to reduce rates.

The results of this study evidenced that there was no statistically significant relationship between SNF nurse staff levels and readmission rates. Several different tests were performed to ensure findings were consistent. All findings revealed that the null hypothesis for both research questions was accepted: 1. There was no statistically significant relationship between nurse staff levels and rehospitalization percentages for

SNFs, and 2. There was no statistically significant relationship between RN staffing HPRD and rehospitalization percentages for SNFs.

In Section 4, I further interpreted the findings and discussed limitations and recommendations for future research in this area. I addressed implications for professional practice and social change as indicated by the purpose of this study.

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

The purpose of this study was to examine the relationship between SNF nurse staffing levels and return to hospital (rehospitalization) percentages using the SNF FM rates. The need to determine whether nurse staff levels was a possible factor impacting 30-day readmission rates was a gap identified in the literature review. The study was conducting to provide health care leaders and administrators with information that could prove to be financially beneficial and to advance the research on readmissions from the SNF. Key findings from the data analysis indicated that there was no statistically significant relationship between SNF nurse staff levels and the SNF RM rates. These finding contributed to the knowledge on staffing and quality in SNFs.

**Interpretation of Findings**

Findings from this study confirmed some of the existing knowledge available from staffing and quality research. Yoo et al. (2015) indicated that readmissions to the hospital are associated with facility characteristics. Several researchers used similar facility characteristics in their studies when evaluating staffing or quality outcomes of SNFs (Lee et al., 2014; Spector et al., 2013). Researchers have argued that nonprofit SNFs may feel less pressure to maximize profit compared to for-profit SNFs, and nonprofit SNFs typically deliver higher quality of care (Comondore et al., 2009). Nonprofit homes have also been identified throughout research to have better overall resident quality outcomes (Lee et al., 2014). In addition, nonprofit SNFs have higher staffing levels (Comondore et al., 2009), possibly due to the differences in tax regulations and personal values. The findings from this study indicated Georgia government and for-

profit facilities have higher rates of readmission than nonprofit SNFs. The findings also showed that government and nonprofit homes have higher nurse staffing levels than for-profit facilities.

Facility size may impact the resident-to-staff ratios, thereby reducing the likelihood of quality care. Researchers have indicated that smaller facilities have a higher likelihood of better-quality outcomes (Lee et al., 2014). Finding from the current study supported this claim because smaller facilities (50 or fewer beds) had the highest Total HPRD and the largest facilities (over 150 beds) had the lowest Total HPRD.

Studies related to staffing and quality varied in findings. Some researchers found that increased staffing correlated with improved quality (Giuliano et al., 2016; Lee et al., 2014; M. D. Neuman et al., 2014); other researchers found no statistically significant relationship between staffing and quality (Backhaus et al. 2014; Spilsbury et al., 2011). Giuliano et al. (2016) found that decreased nurse staffing indexes caused a significantly increased readmission rate. Haizhen (2014) showed that an increase in RN staffing was related to an increase in quality, but an increase in CNA staffing had no significant impact. Finding in the current study were similar to those from other studies that supported no statistical correlation between SNF nurse staff levels and increases or decreases in the SNF RM.

Donabedian's SPO model was the theoretical foundation for this study. In the study, I focused on the following: structure (nurse staffing), process (HPRD), and outcomes (rehospitalizations). Donabedian viewed the outcomes factor as a way of confirming quality (Donabedian, 1997). Findings in the current study did not provide

evidence of positive outcomes or decreased readmission rates based on increased nurse staffing levels or HPRD; however, findings provided evidence that the structure and process variables did not impact the outcome variable. Therefore, outcomes did not indicate that nurse staffing HPRD improved quality (readmission rates). For the purpose of this study, the outcome variable (SNF RM) was used as a quality indicator. Quality may be impacted by several factors making it difficult to analyze by evaluating only a few variables. Donabedian's model provides a better understanding of quality in the sense that not all structure and processes will yield positive outcomes, but leaders can identify which ones do and use those to improve quality.

## Limitations of the Study

Several limitations were identified in this study. First, the study only applied to one state and staffing levels varied greatly across the state of Georgia. Findings should be applied with caution across other states because staffing mandates vary across states. The data used for this study were pulled from the calendar year 2015, and the way staffing data are collected has changed since this time. Using staffing data for Georgia over time may indicate relationships that were not found with the single year analyzed.

Second, this study focused on one quality measure, the SNF RM. The study was limited because data on other quality measures (e.g., different staffing disciplines and other facility factors) were not part of the study. Also, I did not address resident characteristics that could contribute to readmissions in the current study.

Lastly, I used secondary data, which may have contained errors. Even though the staffing and SNF RM data were reviewed and facilities that did not meet the inclusion

criteria were removed, there may have been undetectable mistakes. The study relied heavily on the assumption that data were submitted and reported accurately.

## Recommendations

Further research to confirm findings from the current study may be necessary using the current staffing collection methods, as well as current staffing and SNF RM rates. Additional research is needed to determine what SNF variables impact the SNF RM rates in efforts to reduce these measures. High readmission rates remain an ongoing concern for administrators due to the financial burdens these cause for SNFs. Researchers should examine contributing factors and ways to reduce the financial burden and negative care concerns as a result of high readmission rates. The findings from this study suggested the need to study other quality measures in relationship to staffing levels. Researchers should consider exploring competency and skill levels of nursing staff and how they may impact readmission rates.

## Implications for Professional Practice and Social Change

Nurses have the ability to affect resident outcomes, and nurses play a role in the decision-making process when residents are sent to the hospital. In this study, data were analyzed to determine whether there was a relationship between nurse staffing levels and the SNF RM. Even though no statistically significant correlation was found, findings did not indicate that nurses cannot impact readmission rates. These findings suggested that administrators should not put all of their resources into increasing nurse staffing levels to drive quality as it relates to readmission rates. Administrators should evaluate their SNF RM measure against other areas within their SNF. Understanding that a relationship does

not exist is as important as understanding that one does when considering how money is allocated. The findings from this study may clarify the misconception that staffing alone impacts quality. SNF administrators can rest assured that staffing according to state and federally mandates will not impact their readmission rates. High SNF RM rates will cost SNFs money but spending extra money on unnecessary staff could potentially cost them more money with no positive outcomes. These findings promoted positive social change by providing SNF leaders with the information needed to make decisions about staffing needs when considering staffing above the state averages. Findings also contributed to positive social change by informing lawmakers' about how staffing impacts quality so informed decisions can be made regarding state and federal mandates.

**Conclusion**

Readmission rates of residents from the SNF to the hospital are high. SNF resident readmissions are a quality-of-care concern and a financial concern for policymakers, health care leaders, and SNF administrators. Researchers have studied this topic from a variety of perspectives yielding different results. Whether staffing has an impact on readmission rates continues to be debated. Value-based purchasing will force leaders and administrators to identify ways to reduce resident readmissions to meet the expectations of lower health care costs and improved quality of care. Knowing that nurse staffing levels are not significantly related to readmission rates of SNF residents allows administrators to focus their resources and efforts on other interventions that may drive this rate down. Further research is needed to better understand the mechanisms behind the high readmission rates of SNF patients.

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Appendix: Literature Review Matrix

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| Stranges, Marshall, Walker, Hall, Griffith, & Remington (2015)<br><br>A multidisciplinary intervention for reducing readmissions among older adults in a patient-centered medical home | Retrospective cohort study<br><br>19,169 patients, creating a total sample of 1144 index hospitalization | Implementing a Transition of care intervention using staff: physicians, social workers, specialists, pharmacy, to help with care coordination with hopes of ↓ readmission rates from the community. |
| Wang, Pandolfi, Fine, Metersky, Wang, Ho, & ... Krumholz (2016)<br><br>Community-level association between home health and nursing home performance on quality and hospital 30-day readmissions for Medicare patients | Quantitative<br><br>2,855 health care communities (hospitals, Home health agencies and nursing homes) | The unadjusted mixed model showed that ↑ performance in NH and HH was statistically significantly associated with ↓ a readmission rate. |
| Bogaisky, & Dezieck (2015)<br><br>Early hospital readmission of nursing home residents and community-dwelling elderly adults discharged from the geriatrics service of an urban teaching hospital: Patterns and risk factors | Retrospective cohort study<br><br>625 nursing home residents, 413 community dwelling individuals<br><br>1,706 hospital admissions within the 1-year study period involving 1,038 individuals | 30-day readmission rate was ↑ for subjects discharged to a NH than those discharged to the community (34.4% vs 22.6%, P < .001). CKD and PU were associated with ↑ risk of readmission in both. COPD was a risk factor for readmission only in community-dwelling individuals. CHF and dementia were associated with ↑ risk of readmission in NH. |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| Zhang, Unruh, & Wan (2013)<br><br>Gaps in nurse staffing and nursing home resident needs | Descriptive<br><br>584 Facilities were selected based on inclusion criteria. Nursing Staff: RN, LPN, NA's measuring by HPPD from 1997-2009. | Trends in nurse staffing level in NHs vary across categories. Medicare facilities levels of all types of nurse staffing ↓. RN and RN skill mix ↓ the most, followed by LPN and NA. Private the only type of staff that ↓ was RN. In Medicaid homes, staff either stayed stable or ↑. In all homes combined, RN ↓ slightly, LPN and NA ↑ because of the ↓ in the skill mix. |
| Yoo, Jabeen, Bajwa, Kim, Leander, Hasan, Punke, Soryal, & Khan (2015)<br><br>Hospital readmission of skilled nursing facility residents: A systematic review | Systemic review of 689 articles of which 15 articles met all inclusion criteria. | Existing literature shows that hospital readmission of SNF residents is associated with individual residents and facility characteristics. |
| Hovey, Kim, & Dyck (2015)<br><br>Hospital readmission rates following skills training for nurses employed in long-term care facilities | Quantitative pre-intervention data collected on 29 facilities and post-intervention data collected on 32 facilities | Findings revealed that training did not significantly affect hospital readmissions. Organization saw a significant in hospital readmissions after 24 months of data collection. The analysis showed no ↓ in rates when 50% or more of staff were trained. |
| Foster & Lee (2015) | Empirical research design | Wage pass-through led to ↑ staffing in NH with a ↓ |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| Staffing subsidies and the quality of care in nursing homes | nursing homes within the 48 states | share of Medicaid patients. Little effect on staffing on NH with a ↑ share of Medicaid patients. Wage pass-through led to ↑ in the quality of care in NH with a ↑ share of Medicaid patients. |
| Giuliano, Danesh, & Funk (2016)<br><br>The relationship between nurse staffing and 30-day readmission for adults with heart failure | Quantitative retrospective observational study using secondary data<br><br>661 hospitals converted into two groups: low nurse staffing (358), high nurse staffing (303). | A significant difference (P = .021) was found between the ↓ nurse staffing group (n = 358) and the ↑ nurse staffing group (n = 303). Hospitals with a ↓ nurse staffing index had a significantly ↑ excess readmission rate. |
| Schnelle, Schroyer, Saraf, & Simmons (2016)<br><br>Determining nurse aide staffing requirements to provide care based on resident workload: A discrete event simulation model | Simulation design<br><br>Data were retrieved for 211,424 MDS quarters from 13,533 NHs nationwide | Most NHs do not currently use acuity-based methods based on ADL care needs to determine CNA staffing levels. ↓ correlation between CNA staffing and resident ADL workloads and ↓ range of staffing reported for NHs during quarters when their workloads ranged from the 5th to the 95th percentiles (2.3-2.5 HPRD). |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
| --- | --- | --- |
| Spilsbury, Hewitt, Stirk, & Bowmanc (2011)<br><br>The relationship between nurse staffing and quality of care in nursing homes: A systematic review | A systematic literature mapping review of 50 articles | Studies present a wide range and varied mass of findings that use disparate methods for defining and measuring quality (42 measures of quality identified) and (52 ways of measuring staffing identified). Majority of research showed no association between RN staffing and quality (24 studies). No positive or negative findings (10 studies). LPN staffing studies showed ↑ # of studies with no association to quality indicators. Mixed evidence for NA's. |
| Lee, Blegen, & Harrington (2014)<br><br>The effects of RN staffing hours on nursing home quality: A two-stage model | Quantitative regression model focused on RN staffing in relation to NH quality<br><br>195 NH in Colorado | ↑ RN staffing hours were associated with an 11% ↓ prevalence of PUs. A robust relationship exists between RN staffing hours and PU care even for facilities in a small rural state. RN staffing levels were not associated with UTIs, weight loss, antipsychotic drug use, and catheter use. |
| Haizhen (2014)<br><br>Revisiting the relationship between nurse staffing and quality of caring nursing homes: An instrumental variables approach | Quantitative instrumental variables approach<br><br>Reviewed staffing requirements and levels for 8 states (3275 NHs) | ↑ RN staffing by 0.3 HPRD ↑quality by more than 16%, which is = to ↓ the # of deficiencies from the average of 7.4–6.2. CNA staffing does not have a significant impact on quality of care. RN staffing does ↑ quality in |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| | | the dimensions of quality of care and quality of life. one-standard-deviation ↑in RN staffing is associated with a 17% ↓ in the fraction of residents with PU and 10% ↓ in the fraction of residents with contractures. No evidence that an ↑ in CNA staffing leads to ↑ quality. |
| Li, Cai, Yin, Glance, & Mukamel (2012)<br><br>s higher volume of post-acute care patients associated with a lower rehospitalization rate in skilled nursing facilities | Quantitative multivariable analyses based on Cox proportional hazards models<br><br>1,023,771 Medicare admissions to 14,857 SNFs | Patients admitted to ↑-volume SNFs showed an approx. 15% ↓ risk for 30-day rehospitalization and an approx. 25% ↓risk for 90-day rehospitalization, compared with patients admitted to ↓-volume SNFs. |
| Ågotnes, Jacobsen, Harrington, & Petersen (2016)<br><br>A critical review of research on hospitalization from nursing homes; what is missing | Literature Review<br><br>Articles from 1993-2014 | The study provides summarized research on rehospitalizations from NHs to include Patient characteristics, institutional characteristics, and practices and processes. |
| Neuman, Wirtalla, & Werner (2014)<br><br>Association between skilled nursing facility quality indicators and hospital readmission | Quantitative analysis and review of Medicare beneficiary files<br><br>1,530,824 discharges from 3,537 hospitals to 14,251 SNFs | 23.3% were readmitted/ died within 30 days; 4.7% died within 30 days, and 21.0% were readmitted. Unadjusted risk of readmission or death was ↓ at SNFs with ↑ staffing and ↑ facility inspection ratings. The risk of readmission or death within 30 days was ↓ for discharges from SNFs with ↑ staffing ratings. |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| Laging, Ford, Bauer, & Nay (2015)<br><br>A meta-synthesis of factors influencing nursing home staff decisions to transfer residents to hospital | Qualitative literature review<br><br>17 studies | NH staff members play a key role in decision-making at the time of a resident's deterioration. Multiple factors influence decisions to transfer to hospital: unclear expectation of the nursing home role; limited staffing capacity; fear of working outside their scope of practice; poor access to multidisciplinary support and difficulties communicating with other decisionmakers. |
| Krüger, Jansen, Grimsmo, Eide, & Geitung (2011)<br><br>Hospital admissions from nursing homes: Rates and reasons | Qualitative-linear regression analysis<br><br>32 NH in the city of Bergen, Norway | Incidence of hospitalizations from NH was 570 per 1000 NH beds per year. Admissions from nursing homes made up 6.1% of the total # of admissions to medical wards while for surgical wards they made up 3.8%. Infections accounted for 25.0% of admissions, including 51.0% pneumonias. Fx were the cause in 10.2%. Hip fx represented 71.7%, of fx's. Admission rate ↑ as the proportion of short-term beds, and at NH with short-term beds, admissions ↑ with ↑ physician coverage. |
| McGregor, et al (2014) | Quantitative retrospective observational cohort study | ↑ proportion of publicly owned facilities employed a clinical nurse specialist and other allied health staff and had ↑ mean # |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| Nursing home characteristics associated with resident transfers to emergency departments | NH residents in the Vancouver Coastal Health region (n = 13,140). | of total direct-care nursing (RN, LPN, and NA) HPRD. Facility characteristics associated with significantly ↓ rates of ED transfers in univariate cross-sectional analysis were (a) larger facility size; (b) facility employment allied health staff; (c) ↑ mean RN HPRD; (d) ↑ mean total direct-care nursing (RN, LPN, and NA) HPRD; (e) ↓ # of physicians per 10 residents; (f) timely attendance by physician or nurse practitioner. Public owned had sig ↓ ED transfer rates. |
| Mileski, Topinka, Lee, Brooks, McNeil, & Jackson (2017)  An investigation of quality improvement initiatives in decreasing the rate of avoidable 30-day, skilled nursing facility-to-hospital readmissions: a systematic review. | Qualitative, using preferred reporting items for systematic review (PRISMA) guidelines  10 studies | Most common facilitator was the incorporation of specialized staff. The most common cited barriers were quality improvement tracking and implementation. Staffing is a natural barrier in that additional staffing hours were needed to satisfy QI initiatives and SNFs didn't have ample and qualified staff. Other barriers: need for ↑ staffing and specialized personnel to carry out initiatives due to a general lack of staff. |
| Harden & Burger (2015) | Qualitative literature review | Regulation used from studies to show a need to change/improve nursing |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
| --- | --- | --- |
| They are called nursing homes for a reason: RN staffing in long-term care facilities | | home staffing. Provided leaders, consumers, patients, and families with concerns related to staffing and nursing homes to drive change |
| Harrington, Schnelle, McGregor, & Simmons (2016)<br><br>The need for higher minimum staffing standards in US nursing homes | Qualitative literature review<br><br>150 studies over 25 years | Evidence supports the need for ↑ U.S. minimum nurse staffing standards, adjusted for resident acuity, to ensure adequate quality of NH care as a necessary precondition for making other quality improvements. |
| Gaugler (2016)<br><br>Understanding quality of care in nursing homes and other residential settings | Informative | Information summarized on the gaps in quality care (gaps in processes and outcomes) as identified from previous studies. Interviews with DON's identified staffing as a contributor to quality. |
| Griffiths, Ball, Drennan, Dall'Ora, Jones, Maruotti, Pope, Saucedo, & Simon (2016) | Review of quantitative studies<br><br>Articles that considered skill mix or controlled for contribution of the entire ward of nursing team | Clear association between nurse staffing and mortality measures. No studies showed significant association between nurse staffing levels and nurse outcomes. No evidence for an association between ↑ levels of staffing by assistive personnel and ↑ patient safety or nurse outcomes. Some evidence of harm and a strong indication for an association between a skill mix that is ↑ in RNs and ↑ outcomes. |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| Ouslander et al. (2016)<br><br>Hospital Transfers of Skilled Nursing Facility (SNF) Patients within 48 Hours and 30 Days after SNF Admission | Quantitative secondary data analysis<br><br>64 out of 88 SNFs from across US randomized to the intervention group | Few differences between the characteristics of transfers that occurred < 48 hours after SNF admission vs. 3 – 29 days after SNF admission. Few differences between the characteristics of transfers that occurred < one week after SNF admission vs. 7 – 29 days after SNF admission. Opportunity for improvement was that staff more frequently recognized that the condition could have been managed in the SNF with available resources among transfers that occurred 30 days or longer after SNF admission 41%, compared to 31% among those transferred < 30 days after SNF admission, and 25% among those transferred within 48 hours of SNF admission. |
| Burke et al. (2016)<br><br>Hospital readmission from post-acute care facilities: risk factors, timing, and outcomes | Quantitative retrospective analysis<br><br>3246 acute hospitalizations among 2921 unique patients | (22.8%) of hospitalizations from SNFs included at least 1 hospital readmission. The strongest risk factors for readmission: impaired functional status (HR 4.78) increased acuity (1.63) and for-profit PAC ownership (1.43). Readmitted patients had a higher mortality rate at both 30 days and 100 days even after risk adjustment |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
| --- | --- | --- |
| Tappen, Elkins, Worch, & Weglinski (2016)<br><br>Modes of decision making used by nursing home residents and their families when confronted with potential hospital readmission | Quantitative cognitive task analysis<br><br>96 residents and 75 family members from 19 NHs | Fifty-one residents (53%) and 61 family members (81%) used a deliberative mode characterized by seeking information and weighing risks and benefits. Ten residents (10%) and five family members (7%) used a predominantly emotion-based mode characterized by references to feelings and prior experiences in these facilities. Thirty-six residents (38%) and nine family members (12%) delegated the decision to a family member or provider. |
| Vasilevskis et al. (2017)<br><br>Potentially avoidable readmissions of patients discharged to post-acute care: perspectives of hospital and skilled nursing facility staff | Qualitative prospective cohort study<br><br>1 hospital and 23 SNFs | 30-day unplanned readmission rate to the index hospital from SNFs was 14.5%. 120 readmissions had RCA from both the hospital and SNF. Potentially avoidable = 30.0% and 13.3% according to hospital and SNF staff, respectively. Hospital and SNF ratings of potential avoidable returns was 73.3%. Diagnostic problems and improved management of changes in conditions were the most common avoidable readmission factors by hospitals and SNFs. |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
| --- | --- | --- |
| Backhaus, Verbeek, van Rossum, Capezuti, & Hamers (2014)<br><br>Nurse staffing impact on quality of care in nursing homes: a systematic review of longitudinal studies | Literature Review of quantitative longitudinal studies<br><br>20 studies | No relationship found between nurse staffing and QoC. ↑ staffing levels were associated with ↑ as well as ↓ QoC indicators. Restraint use both + (i.e., ↓ restraint use) and - outcomes (i.e., ↑ restraint use) were found. For PUs ↑ staff led to ↓ PU and better results, no matter who (RN, LPN, or CNA) delivered care. |
| Burke, Rooks, Levy, Schwartz, & Ginde (2015)<br><br>Identifying potentially preventable emergency department visits by nursing home residents in the United States | Quantitative retrospective analysis<br><br>Older (age ≥65 years) nursing home residents with an ED visit from 2005-2010 | Older NH residents accounted for 3,857 of 208,956 ED visits (1.8%). 53.5% did not lead to hospital admission. Injuries were 1.78 x's more likely to be discharged than admitted (44.8% versus 25.3%, respectively, p<0.001), while infections were 2.06 times as likely to be admitted as discharged (22.9% versus 11.1%, respectively). |
| Ouslander, Schnelle, & Han (2015)<br><br>Is this really an emergency? Reducing potentially preventable emergency department visits among nursing home residents | Literature review<br><br>NH residents sent to the ED | 23% of NH transfers were rated as potentially preventable in retrospect by NH staff; 19% resulted in an ED visit without hospitalization; and 11% occurred within 2 days of NH admission from the hospital, and another 11% occurred between 3 and 6 days of NH admission. |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| Morley (2016)<br><br>Opening Pandora's Box: The reasons why reducing nursing home transfers to hospital are so difficult | Qualitative research review | Studies supported the ↑ cost associated with RTH, RTH being unavoidable in half the cases, and the frequent rates of returns. |
| Spector, Limcangco, Williams, Rhodes, & Hurd (2013)<br><br>Potentially avoidable hospitalizations for elderly long-stay residents in nursing homes | Quantitative multilevel logistic regression approach with a fixed follow-up period<br><br>NH Stay file, a sample of residents in 10% of certified NHs in the US | 3/5 of hospitalizations were potentially avoidable. The majority was for infections, injuries, and CHF. Clinical risk factors include RD, DM, and an ↑ # of medication. Staffing, quality, and re-imbursement affect avoidable, but not unavoidable hospitalizations |
| Kuo, Raji, & Goodwin (2013)<br><br>Association between proportion of provider clinical effort in nursing homes and potentially avoidable hospitalizations and medical costs of nursing home residents | Quantitative A retrospective cohort study<br><br>NHs in Texas | The proportion of NH patients with an MD, APN or PA as their major PCP were 70%, 25%, and 5%, respectively. MD PCPs who derived <20% of their Medicare billings from NH patients cared for 36% of all NH patients. Patients with PCPs who provided <5% NH care was at 52% ↑ risk for potential avoidable hospitalization (1.52, 95% Confidence Interval: 1.25–1.83) and had $2,179 higher annual Medicare spending, controlling for PCP discipline. |

| Author(s)/Title | Overview (Design, Sample, Analysis) | Results/Conclusions |
|---|---|---|
| Shin & Hyun (2015)<br><br>Nurse staffing and quality of care of nursing home residents in Korea | Quantitative cross-sectional design<br><br>15 quality of care outcomes and HPRD | The effects of RN HPRD were supported in fall prevention, ↓ TF, ↓ #'s of residents with deteriorated ROM, and ↓ aggressive behavior. ↑ turnover of RNs related to ↑ residents with dehydration, bed rest, and use of antipsychotic medication. |
| Ouslander, Lamb, Perloe, Givens, Kluge, Rutland, Atherly, and Saliba (2010)<br><br>Potentially avoidable hospitalizations of nursing home residents: frequency, causes and costs | Quantitative medical record review of patients discharged to the hospital.<br><br>In 10 NHs with high and 10 with low hospitalization rates in the state of Georgia | Of the 200 hospitalizations, 134 (67.0%) were rated as potentially avoidable. Lack of on-site availability of primary care clinicians, inability to obtain timely laboratory tests and IV fluids, problems with QoC in assessing acute changes, and uncertain benefits of hospitalization as causes |
| Hyer, Thomas, Branch, Harman, & Johnson (2011)<br><br>The influence of nurse staffing levels on quality of care in nursing homes | Quantitative using generalized estimating equation approach<br><br>2,493 observations from 663 FL freestanding NHs | Significant relationship (p = .06) between CNA HPRD & total deficiency score. Every additional hour of CNAs HPRD was associated with a 10% ↓ in the total deficiency score. CNA HPRD in FL NHs was significantly associated with the incidence rate of QoC deficiencies (p < .05). Staffing 1 hour ↓ CNAs per resident day have a 33% ↑ in QoC deficiencies. |