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Competition and Services Offered Among General Hospitals in the Deep South

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Walden University
2020

Abstract

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by

Vanessa Stone

M.S., Belhaven University, 2017

BS, William Carey University, 2015

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration

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Abstract

Hospitals, along with other health care providers, are a central part of every health care system and responsible for a great share of healthcare expenditure. In the United States, the cost of health care is much higher than it is anywhere else. High expenditures for hospital services could reduce the resources available for primary care and other services that could do more for population health. The purpose of this study was to explore the competition among general medical and surgical hospitals in the Deep Southern states of Mississippi, Alabama, Georgia, South Carolina, and Louisiana to determine if increasing the level of competition was associated with more services being offered. The design of the study was a correlational analysis of cross-sectional data, employing multiple regression guided by the Medical Arms Race (MAR) theory. The dependent variable was the total number of services offered, and the primary independent variable was market concentration, as measured by the Herfindahl-Hirschman Index. The covariates were age, poverty level, and urban/rural location. The number of services in each general medical and surgical hospital in Mississippi, Alabama, Georgia, South Carolina, and Louisiana were measured to determine whether increasing levels of competition resulted in more services being offered. The findings of this study strongly support the MAR theory showing that the dependent variable and the primary independent variable were significantly correlated with higher market concentration being associated with fewer services being offered. The results suggest that reducing competition could decrease duplication of hospital services.

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Dedication

This dissertation is dedicated to my late grandmother, Doris Grant. You have encouraged me to work hard to establish a foundation of independence to better myself and to be able to take advantage of every opportunity that God blesses me with. I would not be where I am today without your sacrifices, your example of grit and grace and the unconditional imprint of your love in my life. “O.G.”, your legacy of great faith, endurance and strong will, will forever be a part of me. I will carry your words of wisdom in my heart, exemplify it through my work ethic and carry it with me in my success. You believed in me when I never knew what I was capable of. You were always my first and number one supporter, no matter how many times I went back to school to find my way. For those small, unforgettable moments, I thank you. Thank you for instilling values in me that I will carry for the rest of my life. Most importantly, thank you for being one of the greatest examples of God’s love for me.

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Section 1: Foundation of the Study and Literature Review

Introduction

Within the health care industry, competition affects several outlooks as they relate to the impact of increased competition. For example, some studies have explored the relationship between competition and performance (Lyszczarz & Blazej, 2014; Roj & Justyna, 2016) as well as between competition and health care costs (Dranove, Shanley, & Simon, 1992). These studies showed how competition is capable of affecting the health care market to improve quality as well as efficiency. In this study, I explored whether hospital competition had an impact on the number of hospital services that were offered.

According to Laugesen and Glied (2011), the increase in health care prices in the United States is the reason for higher health spending than in other countries. Additionally, higher fees serve as a main driver of higher spending in the United States, especially in orthopedics (Laugesen & Glied, 2011). This is significant because higher expenditures for hospital services could potentially reduce the resources available for primary care and other health care services offered to the population, which would result in competition being the force for the increase in hospital costs. Focusing on general medical and surgical hospitals in the states of Mississippi, Alabama, Georgia, South Carolina, and Louisiana, I explored the number of services offered to distinguish competition within these types of hospitals. The Medical Arms Race (MAR) theory implies that hospitals compete by providing too many costly medical services (Dranove et al., 1992). In this study, the findings proved the association between hospital

competition and the number of services offered between general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana, which has implications for positive social change in that hospital policies could be changed to promote a decrease in hospital costs.

Problem Statement

Theories of the hospital market industry often view hospitals as competing for patients (Rivers & Glover, 2008). Hospitals within the United States are often challenged in finding ways to compete and remain successful in a heavily competitive industry. Competitive strategies are commonly used by hospitals to generate quality health care to remain viable in increasingly competitive environments (Rivers & Glover, 2008). The different roles of health care organizations are often debated; however, the most intense debate is on the appropriate role of competition as it relates to the health care markets. According to Farhad et al., (2014), being aware of hospital performance is a major concern for policy makers. Laugesen and Giled (2011) explained that higher health care prices in the United States are a key reason that the nation's health spending is much higher than that of other countries. Berk and Moneit (2001) supported this finding, reporting that there is a social problem as a result of high expenditures for hospital services that reduces the resources available for primary care and other services that do more for population health. For this reason, I used the total number of services being offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana as a dependent variable in this study. Robinson and Luft (1985) explained that the unnecessary duplication of services increases the cost of health

care. The gap in knowledge addressed in this study was that it was not known if hospital competition (used as the independent variable in this study) was the driving force for the increase in number of hospital services. Data from the American Hospital Association (AHA) 2017 Guide and statistics from the U.S. Census Bureau was used to understand the association between competition and performance on services offered among general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana while controlling for covariates such as age, poverty level, and urban/rural location.

Purpose of the Study

The purpose of this study was to explore the competition among general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana to determine if increasing the levels of competition were associated with more services being offered. The knowledge gap clarified the impact that hospital competition had on the total number of services being offered. Hospital competition was the independent variable used in this study. According to Rivers and Glover (2008), competition ensures the provision of better products and services to satisfy the needs of customers, while the external environment serves as a catalyst for increased competition in the health care industry.

I computed and compared the total number of services offered by the general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana to determine how many services were offered at each one. The number of services offered was used as dependent variables to further distinguish competition

between hospitals. When hospitals are competing to get more patients, the number of services is much higher for select hospitals. Because hospitals are the larger consumers of health care resources, special attention is paid to them by policy makers when reforming the health care system; therefore, it is important to use the resources efficiently. The MAR theory implies that hospitals compete for physicians and that quality is over- or underprovided in competitive markets (Dranove et al., 1992). Researchers, using more recent data, have generally found that competition among hospitals leads to reductions in excess capacity, costs, and prices (Gruber, 1994; Melnick et al., 1992; White, 1993; Wooley, 1989; Zwanziger & Melnick 1988). According to Spence (1975), factors such as the marginal and average value of quality perceived by consumers determine whether quality is over- or underprovided. Some services are needed and not obtained, and others are utilized but not clearly indicated, or are indicated only after other protocols are followed (Kale et al., 2013; Kressin & Groeneveld, 2015; Lyu et al., 2017). Dranove et al. (1992) explained that hospitals potentially raise their quality to attract patients through their primary care physicians, while physicians are quality sensitive with their services being a substitute for their time. In the current study, I measured competition at the county level, basing measurements on the number of hospitals in the county and their market shares.

Research Question and Hypotheses

RQ: Is the total number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana related

to the level of competition when controlling for age, poverty level, and urban/rural location?

H_0: Competition is not associated with the number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana when controlling for age, poverty level, and urban/rural location.

H_A: Competition is associated with the number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana when controlling for age, poverty level, and urban/rural location.

Theoretical Framework

The MAR theory was used as the theoretical framework for this study. According to Dranove et al. (1992), the MAR theory suggested that quality is overproduced in competitive markets. I recognized that one market would not be accurate for all markets; however, in this study, I investigated the characteristics of the hospital market in Mississippi, Alabama, Georgia, South Carolina, and Louisiana while controlling for demographic variables and comparing a variety of county-level general medical and surgical hospitals. The Herfindahl–Hirschman Index (HHI) was used in this study to measure market concentration between hospitals. Market concentration is the inverse of competition, whereas a negative result of correlation in this study would mean increased market concentration (i.e., lower competition) is associated with more services being offered in general medical and surgical hospitals.

Significance

The findings of this study provided an analytical explanation for whether the total number of services being offered was potentially influenced by the competition among general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana. This study also focused on county-level demographics, such as age, poverty level, and urban/rural location, which were used as covariates that might potentially influence the independent variable of hospital competition. The results of this study were significant for health administration when determining whether the government should regulate hospitals to increase competition. In the field of health economics, supplier-induced demand can be used as the mechanism by which MAR leads to higher utilization of services (Luft & Arno, 1986). According to Ginsburg and Koretz (1983), Roemer's Law is the notion that an increase in the number of hospital beds per capita increases hospital utilization rates. Roemer's Law may be expressed as "a built bed is a filled bed" (Delamater, Messina & et. al., 2013). Although all beds may not be filled these days, supply-induced demand is still operating. Miller (1980) explained that the federal government, which finances most health care costs, decreed that regulation shall govern the supply of institutional health services, whereas a certificate of need (CON) is required from a state agency in order to make capital expenditures. The U.S. Department of Justice (2007) explained that CON laws were adopted due to excessive capital investments driving up the costs of health care. Since patients were not price sensitive, the MAR theory was adopted by providers to unnecessarily expand their services to offer higher-quality services (U.S. Department of Justice, 2007). For this reason, the CON laws

appeared to have failed concerning their intended purpose of containing health care costs. Positive social change may come from the results of this study, which could potentially be used by policy makers to improve the performance of the health care system.

Nature of the Study

The nature of this study was a secondary quantitative analysis with a cross-sectional correlational design because it related to the impact of services provided among general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana. Data of each general medical and surgical hospital in Mississippi, Alabama, Georgia, South Carolina, and Louisiana were examined. I used a regression analysis to estimate the association between the independent variable (i.e., hospital competition) and the dependent variables (i.e., total number of services offered) while controlling for covariates, such as age, poverty level, and urban/rural location. Conducting a regression analysis allowed me to establish the relationship between the dependent variable and the independent variables by utilizing a multivariable linear regression.

Definition of Terms

The following list contains defined terms used throughout the course of this study:

Age: An individual's development measured in terms of the years requisite for like development of an average individual (Merriam-Webster.com, 2017).

Herfindahl-Hirschman Index (HHI): A commonly accepted measure of market concentration that is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers (U.S. Department of Justice, 2018).

Medical Arms Race (MAR): A popular term for escalating health care costs due to proliferation of expensive medical technology and devices (Segen's Medical Dictionary, 2011).

Race: Groups of people who have differences and similarities in biological traits deemed by society to be socially significant, meaning that people treat other people differently because of them (Merriam-Webster.com, 2017).

Rural location: Relating to the country, country people or life, or agriculture (Merriam-Webster.com, 2017).

Sex: The state of being male or female (Merriam-Webster.com, 2017).

Supplier-induced demand: The notion that doctors, in acting as agents for their patients, can use their discretionary power to engage in demand-shifting or inducement activities such that their recommended care differs from that which an informed patient would deem appropriate. The induced demand may take the form of an increase in the number of services or a change in the service mix provided to patients. It can relate to two broad types of medical service: consultations and referrals (Bickerdyke, Dolamore, Monday, & Preston, 2002).

Urban location: of, relating to or being a city of urban life (Merriam-Webster.com, 2017).

Assumptions

This study was contingent on identifying current data displaying variations among competition and the total number of services offered in general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana. The

utilization of data from the AHA 2017 Guide in conjunction with the HHI further provided clarification of competition derived from the number of services offered in general medical and surgical hospitals. Calculating the HHI by summing market shares of the hospitals in the county helped to determine the level of competition. Significantly, local population and covariates, such as age, poverty level, and urban/rural location, were powerful predictors of the extent of the hospital market and were vital factors in the increase of competition leading to an increase in supply of specialized services (see Dranove et al., 1992).

Scope and Delimitations

I sought to examine the competition among general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana to determine if increasing the levels of competition were associated with more services being offered. This study incorporated a secondary data set of all general medical and surgical hospitals in the state of Mississippi, Alabama, Georgia, South Carolina, and Louisiana from the AHA 2017 Guide. I analyzed data for the year of 2017 for the U.S. population. The study outcomes have the potential to generate an association between competition and performance on services offered among general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana while controlling for covariates, such as age, poverty level, and urban/rural location.

In the section thus far, I provided an overview of implications of hospital competition and the possible association of number of services offered. The purpose of conducting this study was also presented. Definitions of medical terminology used

throughout this research study were provided for clarity. I also discussed the research questions and nature of this study to describe the foundation of the research. In the forthcoming subsections, I provide an analysis of the research questions and a literature review section that addresses the gap in literature. The literature review includes a discussion of the theoretical framework for the study to prove the need for additional research on hospital competition and number of services offered by sampling segments of previous research studies on topics related. In the literature review, I also identify gaps in the research from previous studies, providing justification for further research.

Strategies Used for Literature Review

The intention of this study was to ascertain plausible association between hospital competition and the number of services offered between general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana. To locate relevant literature for this study, I reviewed peer-reviewed articles found on Google Scholar, government reports, and online journals. Additional relevant resources utilized were statistics from the U.S. Census Bureau and the AHA 2017 Guide. Several relevant research articles published greater than 5 years ago were used as seminal research on the topic. The following keyword search terms were used to locate literature: *chemotherapy services, orthopedic services, Medical Arms Race, Herfindahl-Hirschman Index, age,* and *urban/rural location.*

Literature Review

The purpose of this literature review was to highlight historical as well as more recent research that addresses the levels of hospital competition for general medical and

surgical hospitals while addressing the gap in literature that focused on adding to the investigation of elements, such as more services being offered as it impacted hospital competition. With this study, I aimed to bridge the gap in literature through an empirical study focusing on the general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana and calculating the number of services they provided to find a clear picture of how strong the competition was among these specific hospitals. Moreover, these results were put within the context of health reforms, which may be of interest to future policy makers.

The findings from previous research studies pertaining to changes in the health care market indicated that there is a clear association with the level of hospital competition (Roj, 2016). Hospitals are among other health care providers that are a central part of every health care system and are responsible for a great share of health care expenditure (Roj, 2016). In the state of Mississippi, there are 95 general medical and surgical hospitals, 61 in the state of South Carolina, 103 in Louisiana, 133 in Georgia, and 89 in Alabama, totaling 481 hospitals (AHA, 2017). Hospitals are considered to be the largest consumers of scarce health care resources (Scheunemann & White, 2011); therefore, it is important for them to be as efficient and effective as possible with the resources available.

According to the MAR theory, hospitals compete by offering too many high-tech medical services (Dranove et al., 1992). Frequent use of advanced technology in hospitals is associated with significant costs even while providing benefits (Zelman, McCue, Millikan, & Glick, 2004). While hospitals could compete for physicians by offering more

trained staff and better equipment, they are more likely to compete for their patients by offering more services (Rivers & Glover, 2008). For health care marketing and policy purposes, an analysis of hospital competition was highly important. According to Dranove et al. (1992), increased competition does in fact lead to a small increase in the supply of specialized services.

General Medical and Surgical Hospitals

According to Roj (2016), general hospitals are characterized by multiprofile activity, where patients usually stay no longer than 30 days when they are the main and dominant form of impatient healthcare. Roj studied the measurement of competition of general hospitals in Poland with the use of the HHI to understand how the market of general hospitals had been marketed as a proxy of competition. The researcher focused on 16 general hospitals in Poland during the years 2005 and 2013 while measuring the levels of market share concentration. The results from the study supported that change in the health care market affects the level of concentration as well as competition. Dranove and White (1994) explained that hospital rates are lower when there are fewer hospitals in an area.

High-Cost Services

Ideally, health care utilization should correlate with need for services; however, some services are needed and not necessarily obtained, while others are utilized without being clearly indicated or are indicated but only after other protocols are followed (Figueroa et al., 2017; Kale et al., 2013; Kressin & Groeneveld, 2015; Lyu et al., 2017). Higher health care costs for services within the United States is one of the main reasons

for the increase in the nation's health spending being much higher than that of other countries (Laugesen & Giled, 2011). Competition in health care is perceived as a mechanism that is used to increase value for patients (Rivers & Glover, 2008). Roj (2016) explained that competition eliminates inefficiencies that would yield the high costs of producing and delivering services from the high costs of health services and delivery being transferred to patients or insurers. While competition does provide a mechanism to reduce health care costs, it also ensures better services, satisfying patient needs (Rivers & Glover, 2008). In this study, the term *cost* referred to the health care expenditures allocated to a patient's health care encounter.

Wodchis, Austin, and Henry (2016) conducted a retrospective analysis of residents living in Ontario, Canada who were eligible for public health care funding between the years of 2009 and 2011, estimating the total government health care spending for every resident in all health care sectors. The data used for their study were taken from the Institute for Clinical Evaluative Sciences. The authors reported that more than $30 billion in health expenditures was attributed to individual costs, which represented 75% of the total government health care spending. They found the most common reasons for hospital admissions among high-cost users included chronic diseases and infections. These statistics prove that health care services to provide treatment for chronic illnesses can be costly.

For this reason and in regards to the MAR theory, hospitals may add services that could appeal to a large number of patients, allowing for higher billings to determine the association between hospital competition and services offered for this study.

Medical Arms Race (MAR)

Over time, waste in health care has been recognized as a cause of patient harm and excess costs. In 2010, the Institute of Medicine first called attention to this problem, suggesting that "unnecessary services" are the largest contributors to waste in U.S. health care accounting for $210 billion of $750 billion in excess spending each year (McGinnis, Stuckhardt, & Smith, 2013). Dranove et al. (1992) discussed the MAR theory as a costly duplication of specialized services and explained hospital competition as being wasteful and resulting in higher costs rather than being beneficial. The authors tested the MAR theory against the economic proposition emphasizing the importance of the specification of the extent of the hospital market rather than overestimating the importance of competition. The authors found that increased competition did lead to a small increase in the supply of specialized services, making it an important determinant of resource supply (Dranove et al., 1992).

Herfindahl-Hirschman Index (HHI)

The HHI was developed by Hirschman and Herfindahl to measure the number or hospitals in a market and first used as a statistical measure to determine the concentration level of the general hospital sector in Poland. This index is the sum of the squared market share of each hospital or hospital system within the market (multiplied by 10, 000; Roj, 2016). A market share is considered highly concentrated if they have an HHI between 1,500 and 2,500, unconcentrated with a range between 100 and 1,500, and highly competitive if the HHI is below 100 (Cutler, 2013). Roj (2016) explained that the lower the number of hospitals and concentration of market share in fewer hospitals, the higher

the HHI, while Lyszczarz (2014) suggested that higher concentration in the hospital market correlates with an increase in the cost of services.

Age and Poverty Level

Aging was associated with an increase in functional limitation and in the prevalence of chronic conditions where there was an increase in hospital services as well as prescription medications (National Center for Biotechnology Information, 2018). In 1999, people over the age of 65 years old experienced nearly 3 times as many hospital days per 1,000 than the general population (Bernstein, Hing, & Moss, 2003). In the United States, the average retirement age in 2013 for men was 64 years old and 62 years old for women (Munnell, 2015). In this study, I focused on the age group of 65 years old and older to emphasize the demand for high-cost orthopedic and chemotherapy services in the counties. Outside of needs being one of the major determinants of health care utilization, other factors, such as having access to care, being timely, convenience, and affordability, have an effect as well (National Academies of Sciences, Engineering, & Medicine, 2018). Health status is strongly affected by personal and family income as well as health care access and use and health-related behaviors (Meit et al., 2014). According to the National Academies of Sciences, Engineering, and Medicine (2018), health care utilization is determined by the need for care, by whether people know that they need care, by whether they want to obtain care, and by whether care can be accessed. Income and poverty level have a large effect on risk factors for chronic health diseases as well as access to material goods and services, including health care services (National Center for Biotechnology Information, 2018). For example, lower income families have higher rates

of heart disease, stroke, diabetes or hypertension, and have four or more common chronic conditions (National Center for Health and Statistics, 2017).

Poverty level has an effect on health care utilization, which also affects the demand for health care services. Zhao, You, Guthridge, and Lee (2011) examined poverty and socioeconomic disadvantage related to an indigenous health gap in hospital morbidity in Australia. For this study, they used a cross-sectional and ecological design and Northern Territory public hospitalization data from July 2004 to June 2008 as well as socioeconomic indexes for areas from the 2006 census report. To estimate the odds ratios and confidence intervals, multilevel logistic regression models were used. Their results indicated that lifting the socioeconomic index scores for family income and education/occupation by two quintile categories for low socioeconomic indigenous groups was sufficient to overcome excess hospital utilization among the population. Their study emphasized the importance of addressing social inequality to closing the health gap between indigenous and nonindigenous populations as well as the impact of small changes in socioeconomic circumstances, which can significantly influence health outcomes.

Glazier, Creatore, Cortinois, Agha, & Moineddin (2004) used a regression analysis to explore the risk in hospitalization in areas with high, recent immigration rates in Toronto, Canada in comparison to other Toronto neighborhoods with the use of 1996 hospitalization and census data. The results from their study showed the importance in health care planning, delivery, and policy because income was significantly associated with higher rates of admission as the proportion of immigrants increased (Glazier et al.,

n.d.). According to Glazier, Badley, Gilbert, and Rothman (2000), poor urban neighborhoods may require more resources relating to higher hospital admission and readmission rates. These authors conducted a study exploring the relationship between neighborhood income and the various aspects of hospital utilization.

Urban/Rural Location

There is a significant difference in the residents of rural areas versus residents of urban areas. One of the differences is the characteristics that correlate with health care utilization. Mueller, Lundblad, Mackinney, McBride, and Watson (2014) found that residents from rural area residents had lower incomes; 17% of rural workers earned less than the poverty level while 14.6% of urban workers earned less than the poverty level.

Location is an important factor in health care when services cannot always be delivered remotely. Location is equally important for hospitals because a large portion of their market shares come from area of proximity (Robinson & Luft, 1985). Douthit et al. (2015) conducted a review concerning the provision of health care and access in rural areas of the United States. The findings from their study indicated a reluctance to seek health care as a result of cultural and financial constraints, which could be related to scarcity of services, insufficient public transportation, and poor availability of Internet services. Residents in the rural areas were found to have poorer health than those living in urban areas (Douthit et al.,2015).

Predicting that there was an association between the level of competition and number of services offered using urban/rural location as a covariate could have an effect on hospital performance. Goldstein, Ward, Leong, and Butler (2002) investigated hospital

strategies to determine advantages and disadvantages relating to urban and rural location that explained how hospital location had a direct effect on hospital performance but a hospital's choice of strategy can moderate the effect of the location. This study consisted of a hierarchical regression analysis to determine the significance of the incremental contribution of urban/rural location, strategy and number of technologies. This study included 43 urban hospitals and 22 rural hospitals. Their results indicated a disadvantage for rural hospitals due to recent closings of rural hospitals in the past as well as being commonly purchased by hospital chains because they are inexpensive and they reduce risks to investors due to no competition. Additionally, marketing-oriented strategies in rural locations were not effective; however, they were effective in urban locations. This study also identified that urban and rural hospitals use their investment in technology as a response to improve their performance. Goldstein, Ward, Leong & Butler explained that location and proximity to markets were important factors to consider for hospitals and other service organizations (2002). Having urban or rural locations for hospitals are more important for survival purposes. In recent years, rural hospitals have struggled with survival due to having to develop strategies that are necessary for their location (Goldstein, Ward, et.al, 2002).

The location of the hospital was extremely important because the success of the hospital was determined from the market share that comes from the area of proximity to the hospital. Narci, Ozcan, Sahin, et. al, studied a total of 1,103 public and private hospitals in Turkey to analyze the effect of competition on technical efficiency for the hospital industry (2015). The objective competition was measured using the HHI while

the subjective competition was measured by the perceptions of hospital managers. A cross-sectional design with the use of primary and secondary data was used to investigate the relationship between competition and efficiency using the effects of demand and supply characteristics of the market and hospital traits as covariates. With this design, a total of 1,103 general hospitals were targeted that were operated in 2010.

This study supported that there was a significant relation between hospital location and performance resulting in a disadvantage for hospitals located in rural locations. Hospital location had an effect on hospital utilization. Since hospital utilization was affected by location, then this results in effects determining hospital volume. According to Hosseini, Rozen, Saleh, Vaid, et.al (2017), hospital volume is a significant predictor of in-hospital complications. These authors did a study investigating the utilization of in-hospital complications in patients undergoing catheter ablation in the United States from 2000 to 2013 by using the Inpatient Sample and Nationwide Inpatient Sample. To conduct this study, they used patients at least 18 years of ages who underwent the catheter ablation between 2000 and 2013 with at least 1 primary diagnosis of atrial fibrillation, atrial flutter, supraventricular tachycardia or ventricular tachycardia.

The results from this study indicated that the annual number of catheter ablations increased over the 14-year period. By changing the patient demographics (aging and greater burden of comorbidities), led to the increase of the in-hospital complication rate (Hosseini, Rozen, Saleh, Vaid, et.al, 2017). The results showed increasing trends during the study in annual volume of ablations, number of hospitals performing ablations, mean age and comorbidity index of patients, rate of complication and length of stay. Low-

volume centers had a higher rate of complications rather than high-volume centers. Jemielita, Gerton, Neidell, and Chillrud examined the association between hospital utilization by zip code between the year 2007 and 2011 and how unconventional gas and oil drilling wells were associated with the increase in inpatient prevalence rates within specific medical categories in Pennsylvania (2015). In relation to orthopedic and chemotherapy services, these services also had an impact on inpatient rates. Their data supported an association between well density and inpatient prevalence rates for the medical categories of dermatology, neurology, oncology and urology (Jemielita, Gerton, Neidell & Chillrud, 2015).

Khan et.al, (2017) used a multi-level logistic regression to identify the sociodemographic predictors of caesarean section in a cross-sectional analysis of the 2014 Bangladesh Demographic and Health Survey data. This study monitored the rate of change to calculate the average annual rate of increase in caesarean section from 2004 to 2014 by sociodemographic categories. In result, the caesarean section rates increased from 3.5% in 2004 to 23% in 2014 (Khan et al., 2017). The increase in caesarean section rates was higher among women of at least 35 years of age, in urban area, with higher education, with a higher socioeconomical status who regularly accessed antenatal services. The results also concluded that service providers should better regulate to ensure that caesarean sections are only performed when necessary instead of for financial gains (Khan et al., 2017).

Vanasse, Courteau, and Niyonsenga (2015) used a secondary analysis of administrative data using a retrospective cohort of 111,556 patients to explore how

immigrant composition of neighborhoods related to health outcomes and health care utilization of individuals that are living with diabetes. This study focused on the Montreal Metropolitan area in Canada controlling for patient-level variables such as age, sex, comorbidities as well as neighborhood attributes like material and social deprivation or living within the urban core (Vanasse, Courteau & Niyonsenga, 2015). The dependent variables were all-cause death, all-cause hospitalization, cardiovascular disease event (death or hospitalization), frequent use of specialist care and the purchase of at least one antidiabetic drug. The patients living with diabetes with higher immigration scores resulted in different health outcomes and health utilizations in comparison to those who lived with lower immigration scores.

Gap Addressed

A review of previous related literature exploring hospital competition suggested a need for additional research to be conducted to test whether the level of competition has an effect on the costs of hospital services. The literature review based on the relevant key variables such as total number of services offered, and the HHI as the primary independent variable which was used to measure market concentration relating to hospital competition of surgical and general medical hospitals. The literature review did not highlight the number of services offered or high-cost services. The existing literature for previous studies did not explore the key variables together which included number of services offered.

Summary

In summary, the quantitative research study explored to determine if there was a correlation between hospital competition and services offered in general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana. The AHA (2017) guide was used as a secondary source for data. The secondary data source was converted to Statistical Package for Social Sciences (SPSS) which assisted in analyzation for independent, dependent variables and covariates associated with the research for this study. The literature review highlighted both historical and recent research addressing the associations between hospital competition and other variables such as hospital performance, location, and costs of services.

Section 2: Research Design and Data Collection

Introduction

The purpose of this study was to explore the competition among general medical and surgical hospitals in the states of Mississippi, Alabama, Georgia, South Carolina, and Louisiana to determine if increasing the level of competition was associated with more services being offered. Hospital competition was measured with the use of the HHI. The design of the study was a correlational analysis of cross-sectional data, employing multiple regressions guided by the MAR theory. The dependent variable was the total number of services offered, while the primary independent variable was the market concentration. The covariates were focused on age, poverty level, and urban/rural location. In this section, I discuss the research methodology, setting and sample, size, region, and target population. I reviewed multiple previous studies that had comparable results when controlling for similar covariates and used the HHI and the MAR theory.

Research Design and Rationale

In this study, I employed a secondary quantitative methodology utilizing linear regression analysis. The linear regression design was used to address the research question concerning the total number of services because it was a continuous dependent variable. The research design was likewise used to determine whether increasing the levels of competition was associated with more services being offered in general medical and surgical hospitals in the state of Mississippi, Alabama, Georgia, South Carolina, and Louisiana. In an attempt to create a positive social change within the targeted population, I explored applicable results for utilization.

I used G*Power to compute effect sizes and graphically display the results of the power analyses. SPSS was also used to simplify the processing of the complex statistical data presented in this study. The design assisted in determining the trends of hospital competition and services offered in general medical and surgical hospitals in the Deep Southern states as well as to quantify data from the target population, measuring multiple aspects within the samples while potentially exploring additional findings. I used the quantitative approach to determine variations in hospital competition in each general medical and surgical hospital in the states of Mississippi, Alabama, Georgia, South Carolina, and Louisiana that offers multiple services.

Methodology

Target Population

According to the AHA 2017 Guide, the state of Mississippi had 93 general medical and surgical hospitals, Alabama had 89, Georgia had 133, Louisiana had 103, and South Carolina had 61, totaling 481 general medical and surgical hospitals. Data were gathered from all 481 general medical and surgical hospitals for the year of 2017. In this study, I focused on patients over the age of 65 years old. I did not exclude data based upon location, age, sex, urban/rural location, and poverty level but rather utilized the covariates (i.e., age, poverty level, and urban/rural location) to further determine additional factors that may exhibit association in the level of hospital competition and services offered.

Setting and Sample

In this study, I analyzed data from the AHA 2017 Guide that consisted of the 481 general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana for the year of 2017. The data included specific information on inputs and outputs of the general medical and surgical hospitals that were examined in this study, including number of services offered. These 481 hospitals were used to determine the level of hospital competition. In conjunction with the secondary data set supplied by the AHA 2017 Guide, I examined the services offered at each general medical and surgical hospital with the use of the HHI to explore the relationship between hospital characteristics and hospital market competition. Market share was assumed to be counties for the purpose of this study. The power analysis was calculated with G*Power, Version 3.1.9.4. The power analysis calculation yielded a minimum sample size of 481 general medical and surgical hospitals for the research study, given a beta of 80%, which provided a sufficient effect volume for determining the effect of hospital competition on services offered. The effect size, power, and number of predictors were calculated to assist in determining an effective sample size for the research study.

By comparing the number of services provided at general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana, I assessed whether the dynamics of competition had a direct effect on the number of services offered. Conclusions from this study were helpful in directly establishing policy changes that suggest a need to reduce the increase of general medical and surgical hospital costs.

I used secondary data sources to answer the research question pertaining to the potential associations between select variables and hospital competition. Live participants were not used; therefore, obtaining signed consent forms was not necessary. The information provided in the AHA 2017 Guide is publicly available and permission to use this data was not required. I took ethical precautions to ensure that the data used came specifically from the AHA 2017 Guide, which is available to the public. Data collection did not begin until I received approval from Walden University's Institutional Review Board (IRB Approval No. 02-03-200-0763078).

Instruments and Materials

I used the AHA 2017 Guide as a secondary data set for this study because it provided data for every hospital in the United States for the year of 2017. The secondary data set encompassed general medical and surgical hospitals as the unit of analysis and provided data for the total number of services offered as well as the HHI as the primary independent variable, which was used to measure market concentration for analyzation. SPSS was used to conduct the linear and multiple logistic regression analysis. After the calculations for the linear regression analysis were made using SPSS, I interpreted the results to determine whether to reject the null hypothesis.

The dependent variable was the total number of services offered by a general medical and surgical hospital. The covariates were age, sex, urban/rural location, and poverty level. The study focused on the Deep Southern states of Mississippi, Alabama, Georgia, South Carolina, and Louisiana. The research only included data from the year of

2017 and was aimed at exploring the current and past findings pertaining to hospital competition.

RQ: Is the total number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana related to the level of competition when controlling for age, poverty level, and urban/rural location?

H_0: Competition is not associated with the number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana when controlling for age, poverty level, and urban/rural location.

H_A: Competition is associated with the number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana when controlling for age, poverty level, and urban/rural location.

Data Analysis

In this study, I used a linear regression to analyze the data to determine the level of competition between the general medical and surgical hospitals in the states of Mississippi, Alabama, Georgia, South Carolina, and Louisiana. A multiple linear regression was conducted to address the research question concerning the continuous dependent variable. Categorical variables (i.e., age, sex, and urban/rural location) were analyzed to determine the percentage in each category. Urban or Rural categories were marked either 1 for Urban or 0 for Rural. The covariates were included to analyze the

independent effect of competition on the dependent variable of total number of services. The covariates included were adjusted for possible cofounding.

According to Hoffman (1993), linear regression is used to model the relationship between two variables by fitting a linear equation to observed data when one variable is an explanatory variable that is not an independent variable and the other is considered a dependent variable. Hoffman also explained that the formula for a linear regression line is $Y = a + bX$, where X is the explanatory variable and Y is the dependent variable. The slope of the line is b, and a is the intercept (i.e., the value of y when $x = 0$). I used the adjusted odd ratio as the measure of effect in the logistic regression analysis.

I used SPSS to simplify the processing of the complex statistical data presented in this study. The software assisted in determining the trends of hospital competition and services offered in general medical and surgical hospitals in the Deep Southern states as well as to quantify data from the target population measuring multiple aspects within the samples while potentially exploring additional findings. To test the assumptions of the linear regression in SPSS, I checked the assumptions of normality, linearity, homoscedasticity, and absence of multicollinearity. First, to ensure valid inferences can be made from the regression, I checked that the residuals of the regression followed a normal distribution. Residuals were considered the error terms that represented the difference between the dependent variable, the observed value, and the predicted value. To check for homoscedasticity, I determined if the residuals were evenly distributed or if they were bunched together at certain values. If the predictor variables in the regression had a straight-line relationship with the outcome variable, then this would show linearity.

If the predictor variables showed high correlation between one another, then this would represent multicollinearity that would have meant that the regression model would have not been able to accurately associate variance between the outcome and correct predictor variable and would have resulted in false inferences.

Threats to Validity

A critical threat to validity of this study was selection biases because this study strictly focused on general medical and surgical hospitals in rural/urban locations in Mississippi, Alabama, Georgia, South Carolina, and Louisiana. The samples used were collected from multiple states to reduce the effect of selection bias in this study and to display a much broader selection. In order to reduce the chance of internal validity, I accounted for differences within samples throughout the research study to refrain from affecting the results of the study.

Summary

In summary, I conducted this quantitative study to determine if there was a direct correlation between competition and the services offered at general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana. The AHA 2017 Guide was utilized as the secondary source of data; the AHA 2017 guide contains information on all services provided for each hospital in the United States. The HHI was used to determine the level of competition between the 481 general medical and surgical hospitals selected. The sample size of 481 for the year of 2017 was calculated as sufficient to ensure an effective population size per G*Power. In this section, I discussed the research design and rationale, the target population, power analysis, data analysis

plan, methodology, sampling procedures, and threats to validity. In Section 3, I will provide the findings and results of the study.

Section 3: Presentation of the Results and Findings

Introduction

The objective of this study was to determine whether there was a correlation between the total number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana and competition when controlling for age, poverty level, and urban/rural location. The research question and hypotheses guiding the study were:

RQ: Is the total number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana related to the level of competition when controlling for age, poverty level, and urban/rural location?

H_0: Competition is not associated with the number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana when controlling for age, poverty level, and urban/rural location.

H_A: Competition is associated with the number of services offered by general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana when controlling for age, poverty level, and urban/rural location.

Data Cleaning and Preprocessing

The initial sample size for the secondary data set was composed of 481 general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and

Louisiana. The data were filtered due to missing information that was not provided for the year of 2017 from a variety of hospitals in the five states. Of the 481 general medical and surgical hospitals, adequate information was only provided by 295 of them. The exclusion of the 186 hospitals may have been a result of not having provided hospital information within a certain time frame to provide accurate hospital statistics. I recoded all variables to formulate data with numeric measures for precise analysis.

Descriptive Statistics

Table 1 represents the descriptive statistical data output for the study, using the results for 295 general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana. The analysis encompassed the dependent variable of the total number of services offered and the independent variable of the HHI, that was used to measure market concentration, which is the inverse of market competition. The covariates consisted of age, poverty level, and urban/rural location. I divided the hospitals into categories of state and whether they were in a rural or urban area. The population of the study encompassed individuals over the age of 65 years old.

The descriptive table shown in Table 1 reflects the results of descriptive statistics for the continuous variables used (i.e., number of services, percentage of population over 65 years old, poverty rate, HHI, urban and rural location) in the linear regression. I ran the linear regression twice: The first time having HHI as a continuous variable and the second time using HHI as a series of dummy variables because the distribution of HHI was not normal. Table 1 shows the statistics in which the number of cases are as a whole. The rural variable has been coded as 1 if the hospital is rural and 0 if the hospital is in an

urban area. The minimum statistic column represents the sample minimum, where number of services had a zero minimum, while percentage of population over 65 years old (6.3%), poverty rate (5.0%), HHI (.006), and rural location (0). The maximum statistic column represents the sample maximum where number of services had 127, while percentage of population over 65 years old (52.6%), poverty rate (37.6%), HHI (1.0), and rural location (1). In the mean statistic column, the table shows number of services having 43.3% as the mean, while percentage of population over 65 years old (17.2%), poverty rate (19.8%), HHI (.818), and rural location (.363). Table 1 also shows standard deviation where the values of the variables were spread out. For standard deviation, number of services shows 23.3%, percentage of population over 65 years old (4.2%), poverty rate (5.8%), HHI (.272), and rural location (.482). The skewness column measures the asymmetry of the variables, whereas the standard error of skewness column shows the ratio of skewness to its standard error to test normality. Number of services shows a skewness of .531 and a standard error of skewness of .142, percentage of population over 65 years old shows a skewness of 3.8% and a standard error of skewness of .142%, poverty rate had a skewness of .700% and a standard error of skewness of .700%, HHI shows a skewness of -1.3 and a standard error of skewness at .142, and rural location shows a skewness of .142 with a standard error of skewness at -1.7. The variables show skewness being less than −1 or greater than +1, which proves the distribution to be highly skewed.

The kurtosis column shows the measure of the extent to which observations cluster around a central point, whereas the standard error of kurtosis shows the ratio of

kurtosis to its standard error to test normality. If the kurtosis is close to 0, then a normal distribution is often assumed. If the kurtosis is less than zero, then the distribution has light tails and is a platykurtic distribution. If the kurtosis is greater than zero, then the distribution has heavier tails and is a leptokurtic distribution. Number of services had a kurtosis of -.240 and a standard error of kurtosis at .283, percentage of population over 65 years old had a kurtosis of 29.0% and a standard error of kurtosis of .283, poverty rate had a kurtosis of .465% and a standard error of kurtosis at .283, HHI had a kurtosis at .659 and a standard error of kurtosis at .283, and rural location had a kurtosis of -1.7 and a standard error of kurtosis at .283. The results suggest that number of services and rural location can be assumed as light tailed and as a platykurtic distribution. HHI had a normal distribution, while percentage of population over 65 years old and poverty rate are heavier tailed meaning and have are a leptokurtic distribution.

Table 1

Descriptive Statistics Summary of Number of Services, Percent over 65, Poverty Rate, HHI and Rural

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
							Std. Error	Statistic	Std. Error
Number of Services	295	0	127	43.3	23.3	.531	.142	-.240	.283
PctOver65	295	6.3%	52.6%	17.2%	4.2%	3.8%	.142%	29.0%	.283
Poverty Rate	295	5.0%	37.6%	19.8%	5.8%	.700%	.142%	.465%	.283
HHI	295	.006	1.0	.818	.272	-1.3	.142	.659	.283

Rural	295	0	1	.363	.482	.574	.142	-1.7	.283
Valid N (listwise)	295								

Note: The data output for descriptive statistical analysis utilizing a sample size of 295 general medical and surgical hospitals and all variables.

The categorical variables used in this study were state, rural, and HHI. Table 2 shows how many general medical and surgical hospitals there were in each state. The percent column represents the percentage of all cases, including the missing cases constituted by each category, while the valid percent category represents the percentage of only the nonmissing cases falling into each category. According to Table 2, the state of Alabama shows a frequency of 71 with a percent of 24.1%, valid percent of 24.1%, and cumulative percent of 24.1%; Georgia showed a frequency of 65 with a percent of22.0%, valid percent of 22.0%, and a cumulative percent of 46.1%; Louisiana showed a frequency of 41 with a percent of 13.9, valid percent of 13.9%, and cumulative percent of 60.0%; Mississippi showed a frequency of 75 with a percent of 25.4%, valid percent of 25.4%, and cumulative percent of 85.4%; and South Carolina showed a frequency of 43 with a percent of 14.6%, valid percent of 14.6%, and a cumulative percent of 100.0%.

Table 2

Percentages by State

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alabama	71	24.1%	24.1%	24.1%
	Georgia	65	22.0%	22.0%	46.1%
	Louisiana	41	13.9%	13.9%	60.0%
	Mississippi	75	25.4%	25.4%	85.4%
	South Carolina	43	14.6%	14.6%	100.0%

	Total	295	100.0%	100.0%	

Table 3 shows the number of general medical and surgical hospitals that were either in urban or rural locations in the states of Alabama, Georgia, Louisiana, Mississippi, and South Carolina. The percent column represents the percentage of all cases, including the missing cases constituted by each category, while the valid percent category represents the percentage of only the nonmissing cases falling into each category. Table 3 shows that there were 188 urban hospitals and 107 rural hospitals, totaling 295 hospitals. The percent, valid percent, and cumulative percent for the urban hospitals was 63.7%. For rural hospitals, the percent and valid percent were 36.3% and the cumulative percent was 100.0%.

Table 3

Rural and Urban General Medical and Surgical Hospitals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban	188	63.7%	63.7%	63.7%
	Rural	107	36.3%	36.3%	100.0%
	Total	295	100.0%	100.0%	

Figure 1 shows the histogram of the categorical variables representing which hospitals were rural. Of the 295 general medical and surgical hospitals, 36.3% were rural, while there was a mean of .36 and a standard deviation of .482.

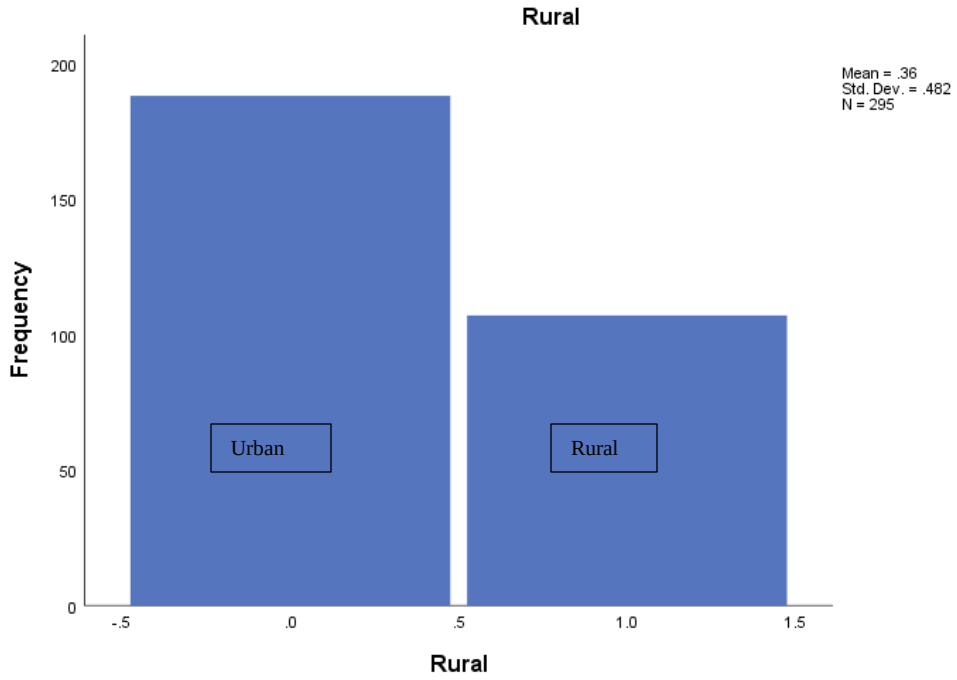

Figure 1. Rural hospitals.

Figure 2 is a histogram showing the results of frequency for HHI as a continuous variable. Almost 200 cases had a HHI of 1.0, while the rest of the cases were scattered with smaller numbers, causing an abnormal distribution for HHI. This figure shows why the regression analysis was repeated using dummy categories for low HHI (i.e., a HHI below .6), medium HHI (i.e., a HHI of .6 to .999), and high HHI (i.e., a HHI of 1.0) instead of leaving it as a continuous variable. Repeating the regression analysis allowed for slightly improved results where I was able to compare the two different regression results of using HHI as a continuous variable and then as a categorical variable.

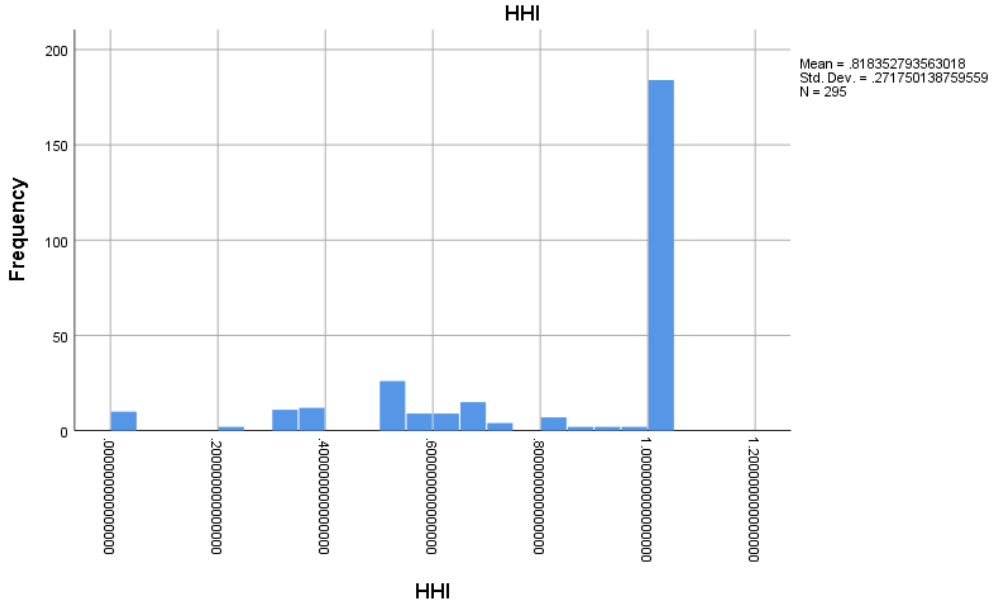

Figure 2. HHI as continuous variable.

Table 4 shows the mean of the low HHI (.23), medium HHI (.13), and high HHI (.62) categorical variables. The standard deviations for the categorical variables are low HHI (.43), medium HHI (.34), and high HHI (.48). The frequency of low HHI is 70 with a percent of 23.7%, the frequency of medium HHI is 41 with a percent of 13.9%, and high HHI is 184 with a percent of 62.4%. The *p* value is .000.

Table 4

HHI Means, Frequency and Percent

	Mean	Std. Deviation	N	Frequency	Percent
HHILow	.23	.43	295	70	23.7%
HHIMedium	.13	.34	295	41	13.9%
HHIHigh	.62	.48	295	184	62.4%

Table 5 shows the mean HHI for the states of Alabama, Georgia, Louisiana, Mississippi, and South Carolina. The mean for Georgia (.954) was slightly higher than that of Alabama (.766), Louisiana (.715), Mississippi (.811) and South Carolina (.807). The *p* value is .000.

Table 5

HHI Means by State

HHI			
State	*M*	*N*	*SD*
Alabama	.766	71	.246
Georgia	.954	65	.149
Louisiana	.715	41	.260
Mississippi	.811	75	.350
South Carolina	.807	43	.237
Total	.818	295	.271

Table 6 shows the coefficients in the linear regression analysis showing the results for the unstandardized B, Beta and the significance for the variables. Based on the table, PctOver65, HHI, Alabama, South Carolina, and Mississippi were all significant. The unstandardized B for HHI (-20.14) explained that for every 1-point increase in HHI, the number of services goes down by an average of -20.14. With HHI measuring the inverse of competition, it is measuring concentration. The negative sign indicates that the more concentration there is, the less the number of services being offered. The concentration is

the reverse of competition which means more competition means significantly more services and average of 20 more services.

The state of Louisiana was left out of the linear regression because it was used as a reference category and had the least HHI; therefore, the results for each state will be compared to Louisiana. Alabama had -8.55 fewer services than Louisiana. South Carolina had 9.67 more services than Louisiana. Georgia had 1.67 more services than Louisiana. Mississippi has -13.55 fewer services than Louisiana. The *p* value in the column of significance is .000 which is highly significant. A *p* value less than 0.05 (typically ≤ 0.05) is statistically significant. Based on the chart below, Rural, Poverty Rate and Georgia were not significant while leaving HHI, PctOver65, Alabama, South Carolina, and Mississippi being significant. It indicates strong evidence against the null hypothesis, as there is less than a 5% probability the null is correct (and the results are random). The *p* value is .000; therefore, I rejected the null hypothesis, and accepted the alternative hypothesis.

Table 6

Regression Analysis with HHI

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	85.09	7.86		10.82	.000	69.61	100.57		
	Rural	.375	2.68	.008	.139	.889	-4.91	5.66	.907	1.10
	Urban	1.0								
	PctOver65	-.972	.311	-.176	-3.12	.002	-1.58	-.361	.886	1.12
	Poverty Rate	-.253	.235	-.063	-1.07	.282	-.714	.209	.806	1.24
	HHI	-20.14	4.89	-.235	-4.11	.000	-29.77	-10.51	.858	1.16
	Alabama	-8.55	4.33	-.157	-1.97	.049	-17.09	-.024	.440	2.27
	South Carolina	9.67	4.81	.147	2.00	.045	.198	19.14	.524	1.90
	Georgia	1.67	4.46	.030	.374	.709	-7.12	10.46	.441	2.26
	Mississippi	-13.55	4.13	-.253	-3.27	.001	-21.68	-5.41	.467	2.14
	Louisiana	1.0								

a. Dependent Variable: Number of Services (N=295, P value =.000 and Adjusted R square=.177)

In comparison to Table 6, Table 7 shows the variation in results when HHI was used as a categorical variable of HHILow, HHIMedium and HHIHigh. Based on the results in Table 7, the unstandardized B for HHIMedium is -8.56 and HHIHigh: -13.53. The categorical variables measure concentration. Of the independent variables, in the coefficients B column in table 7, HHIHigh (-13.53) was the strongest predictor of the

number of services showing the biggest effect. In comparison to HHILow hospitals, the HHIHigh hospitals had 13.53 fewer services which was the most powerful predictor.

The Adjusted R square was .117 based on the number of independent variables in the model. Alabama now had -9.42 fewer services than Louisiana. South Carolina had 9.85 more services than Louisiana. Georgia had 1.80 more services than Louisiana. Mississippi had -12.37 fewer services than Louisiana. Table 7 shows a slight difference in the results of the analysis in comparison to Table 6 whereas PctOver65, Alabama, South Carolina, Mississippi, HHIMedium and HHIHigh are significant. Again, the *p* value was .000; therefore, I rejected the null hypothesis, and accepted the alternative hypothesis.

Table 7

Results of Regression Analysis with HHI Dummy Variables

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	78.34	7.74		10.12	.000	63.10	93.57		
	Rural	.611	2.69	.013	.226	.821	-4.69	5.91	.901	1.11
	Urban	1.0								
	PctOver65	-.959	.313	-.173	-3.06	.002	-1.57	-.343	.878	1.13
	Poverty Rate	-.282	.234	-.071	-1.20	.230	-.743	.179	.810	1.23
	Alabama	-9.42	4.34	-.173	-2.17	.031	-17.98	-.878	.439	2.27
	SouthCarolina	9.85	4.83	.149	2.04	.042	.345	19.37	.521	1.92
	Georgia	1.80	4.53	.032	.398	.691	-7.12	10.73	.428	2.33
	Mississippi	-12.37	4.20	-.231	-2.94	.004	-20.65	-4.09	.451	2.21
	Louisiana	1.0								
	HHIMedium	-8.56	4.27	-.127	-2.00	.046	-16.98	-.146	.692	1.44
	HHIHigh	-13.53	3.24	-.281	-4.17	.000	-19.90	-7.15	.614	1.62
	HHILow	1.0								

a. Dependent Variable: Number of Services *(N=295, P value=.000 and Adjusted R square=.177)*

Summary

The purpose of the descriptive study analysis was to summarize the variables and measurements within the research study with the use of quantitative analysis. The linear regression analysis was conducted to determine the linear relationship between the

dependent and the independent variable. The object of the multiple linear regression analysis was to establish whether or not HHI coded as a categorical dummy variable instead of a continuous variable would impact the number of services offered and to determine the unstandardized b, 95% confidence interval and statistical significance for each variable. The results from both the linear and multiple linear regression yielded significance at a *p* value of .000. In the linear regression analysis, PctOver65, HHI, Alabama, South Carolina, and Mississippi were all significant. In the multiple linear regression analysis, PctOver65, Alabama, South Carolina, Mississippi, HHIMedium and HHIHigh are significant. Of the independent variables, in the coefficients B column in Table 9, HHIHigh (-13.53) was the strongest predictor of the number of services showing the biggest effect. In comparison to HHILow hospitals, the HHIHigh hospitals had 13.53 fewer services which was the most powerful predictor.

The research question's direct variables HHI, PctOver65, Alabama, South Carolina and Mississippi were significant; therefore, the null hypothesis was rejected and the alternative hypothesis was accepted. The (*p* value = .000) presented significance between the competition and the number of services offered by general medical and surgical hospitals for the year 2017 in Mississippi, Alabama, Georgia, South Carolina and Louisiana when controlling for age, poverty level and urban/rural location.

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

Overview

The purpose of this study was to explore the competition among general medical and surgical hospitals in Mississippi, Alabama, Georgia, South Carolina, and Louisiana to determine if increasing the levels of competition was associated with more services being offered. The objective was to clarify the impact that hospital competition had on the total number of services being offered. The study involved further examination and application of the MAR theory, which implied that hospitals compete for physicians and that quality is over- or underprovided in competitive markets (Dranove, Shanley & Simon,1992). Hospital competition was measured with the use of the HHI to determine market concentration. This section concludes the study, and in it I provide interpretations of the findings and describe the limitations that were experienced during the research. This section also includes a discussion of recommendations as well as implications for professional practice and social change.

Interpretation and Findings

The quantitative outcomes of this study revealed that the statistically significant variables were HHI, percentage of population over the age of 65 years old, Alabama, South Carolina, and Mississippi. The results from both the linear and multiple linear regression yielded significance with a *p* value of .000, suggesting that the null hypothesis be rejected and that competition is associated with the number of services offered by general medical and surgical hospitals for the year of 2017 in Mississippi, Alabama,

Georgia, South Carolina, and Louisiana when controlling for age, poverty level, and urban/rural location.

In the linear regression analysis, the variables of percentage of population over the age of 65 years old, HHI, Alabama, South Carolina, and Mississippi were all significant. In the multiple linear regression analysis, the variables of percentage of population over the age of 65 years old, Alabama, South Carolina, Mississippi, medium HHI, and high HHI were significant. There was significance between the linear and multiple linear regression analysis where HHI was run twice: Once as a continuous variable and lastly as a categorical variable with low HHI (i.e., a HHI below .6), medium HHI (i.e., a HHI of .6 to .999), and high HHI (i.e., a HHI of 1.0).

Of the independent variables, high HHI (-13.53) is the strongest predictor of the number of services showing the biggest effect. HHI is strongly and negatively related to the number of services being offered, which indicates that competition is strongly and positively related to services offered. In comparison to low HHI hospitals, the high HHI hospitals have 13.53 fewer services, which is the most powerful predictor.

Limitations of the Study

Wardhani et al. (2019) discussed the limitations of using secondary data analyses, stating that often times data are not completed, though it could still be managed using appropriate missing data analysis and imputation methods, and calling for the need to improve hospital report compliance by providing feedback and relating the report with positive consequences. The main limitation of this study was the omission of some counties within certain states that did not provide the necessary statistical information for

analysis. Goldstein et al. (2002) explained that hospital size may be associated to some of the variables studied and may be a useful predictor of technology investment.

There were incomplete hospital statistics in the AHA 2017 Guide, which suggested the omission of statistical data from certain counties. This exclusion did not impact the validity of the analysis. There were still a sufficient number of general medical and surgical hospitals in various counties of the states of Mississippi, Alabama, South Carolina, Georgia, and Louisiana to conduct the analysis. Additionally, previous research has demonstrated that in some time periods, competition leads to more services being offered and in other time periods it does not (Dranove et al., 1992). The findings of this study only pertained to the time period studied (i.e., 2017).

Recommendations for Further Research

The health care industry faces many challenging issues, and for this reason, the impact of increased competition on the quality of health care and system costs is still unclear (Rivers et al., 2008). Dranove et al. (1992) defined the MAR theory as a costly duplication of specialized services, explaining hospital competition as being wasteful and resulting in higher costs rather than being beneficial. The authors tested the MAR theory against an economic proposition emphasizing the importance of the specification of the extent of the hospital market rather than overestimating the importance of competition. The authors found that increased competition did lead to a small increase in the supply of specialized services, making it an important determinant of resource supply (Dranove et al., 1992). The results of the current study showed strong support for the MAR theory. Dranove et al. explained that there was a pattern of coefficients that suggested increased

competition led to a small increase in the supply of specialized services. In the current study, the results suggested that there is association between competition and the number of services offered. Further research could encompass more states with complete hospital statistical data providing more specific results pertaining to hospital competition between general medical and surgical hospitals.

Implication for Social Change

The results of this study strongly support the importance of the MAR Theory. HHI measures concentration, which is the inverse of competition; therefore, the results show that competition was positively associated with the number of services offered. The public policy ramifications of this analysis are substantial. The findings of this study may deliver a foundation for positive social change in which hospital policies would be developed to promote a decrease in hospital costs. The results of this study may also be significant for social change because they could be used to provide further insight into the MAR theory while simultaneously assisting in determining variations in current hospital costs and payment policies. The findings have the capability to be meaningful due to their potential to reveal the rationale for hospital costs and how they could be decreased. Decreasing hospital costs can potentially remove financial strain on patients and their families.

Conclusion

In summation, in this study I provided insights on the market concentration of general medical and surgical hospitals in the states of Mississippi, Louisiana, Georgia, South Carolina, and Alabama. Before this study, it was unclear how hospital competition

affected the number of services being offered at general medical and surgical hospitals. The correlation between the dependent variable of number of services and the primary independent variable of the HHI showed negative results after the dummy variables and covariates were applied during a two-way test and multiple regression analysis. The results of this study may promote social change through the application of equivalent and lower hospital costs across all regions of the United States.

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