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Impact of Advanced Access Scheduling on Missed Appointment Rates in Primary Care

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
2020

Abstract

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by

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MHA, Penn State University, 2005

BS, Drexel University, 1999

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Healthcare Administration

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Abstract

A major problem encountered within outpatient physician offices are missed appointments. Missed appointment research revealed how no-show rates remain a focus for healthcare administrators as decreasing no-show rates may reverse harmful health consequences. The purpose of this study, which also addressed the research gap, was to determine if there was an association between advanced access scheduling and no-show rates for patients scheduled with preferred primary care physicians versus nonpreferred primary care physicians. The health belief model was the conceptual framework as missing a prescheduled appointment is a health behavior. The 1st and 2nd research questions examined whether there was a statistically significant mean proportion difference between the national no-show rate and the study no-show rates. The 3rd research question examined the association between the preferred and nonpreferred primary care physicians and no-show visit status. Historic primary care prescheduled visit data were electronically obtained for patients over the age of 18. Utilizing SPSS software, 4,815 visits were analyzed using z test of proportion and Chi Square test for association. Study results demonstrated a statistically significant difference between the national no-show rate and this study and a significant association between physician type and visit status. Results indicated the potential for improved appointment compliance if patients are scheduled with their preferred primary care physician. This study may promote positive social change by providing healthcare administrators with an understanding of the significance surrounding advanced access scheduling and patient no-show behaviors, thus decreasing missed appointment rates in primary care.

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Dedication

This study is dedicated to my four children Jay, Jaclyn, Grayson, and Gillian. Countless, yet worthwhile, hours that turned from days, into weeks, months, and years were spent working to complete this doctorate degree. Thank you for continuously encouraging me and motivating me toward completion. This work is a true testament to the sacrifice, understanding, and help each one of you has endured, demonstrated, and provided to me during my personal growth within this academic journey; I am so very fortunate to have you in my life and proud to say that I am your mother.

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Section 1: Foundation of the Study and Literature Review

Introduction

A patient that fails to show up at the physician's office for a prescheduled primary care appointment is, unfortunately, not a new worry for healthcare administrators. Missed appointments have been a constant research focus for healthcare administrators over many decades with minimal impact to reducing the missed appointment rates that remain constant and range between 5 to 55% (Anisi, Zarei, Sabzi,, & Chehrazi, 2018; Boos, Bittner, & Kramer, 2016; Drewek, Mirea, & Adelson, 2017; Goffman et al., 2017; Liu, 2016). Previous missed appointment research has provided healthcare administrators with tools and resources dedicated to decreasing missed appointment rates. Ongoing researcher approaches exploring predictive methods, classification models, exploratory explanations, impacts surrounding missed appointments, and the development of countless administrative strategies used to reduce missed appointment rates continues to reveal to healthcare administrators that the complex, multifaceted origins surrounding missed appointments are vast and solid solutions are slim (Anisi et al., 2018; Samuels et al., 2015; Torres et al., 2015; Williamson, Ellis, Wilson, McQueenie, & McConnachie, 2017). Regardless of all the efforts and energy dedicated to the missed appointment dilemma it has been and continues to be a major concern that healthcare administrators need to fully examine and strategically scrutinize in order to achieve specific, sustainable, and noticeable results in decreasing missed appointment rates.

Problem Statement

Patients that fail to attend prescheduled primary care appointments with a preferred primary care physician or a nonpreferred primary care physician set off a series of damaging events that can impact a host of elements. Primary care physicians provide medical expertise in general medicine and are board certified in family practice and/or internal medicine. Missing prescheduled primary care appointments can have serious consequences related to a patient's health and wellness (Aggarwal, Davies, & Sullivan, 2015; AlRowaili, Ahmed, & Areabi, 2016; Hwang et al., 2015). In addition, missed prescheduled primary care appointments can contribute to overall financial impediments to patients, physicians, and health care spending in the United States (Kheirkhan, Feng, Travis, Tavakoli-Tabasi, & Sharafkhaneh, 2016; Liu, 2016; Liu & Ziya, 2014; McGough, Norris, Scott, & Burner, 2017; Ostermeyer, Baweja, Schanzer, Han, & Shah, 2018; Peck III, Roberts III, & O'Grady, 2019; Weisz, Gusmano, Wong, & Trombley, 2015). Furthermore, missed prescheduled primary care appointments increase the potential of weakening the physician-patient relationship (Bodenheimer & Sinsky, 2014; Dang, Westbrook, Njue, & Giordano, 2017).

Missed prescheduled primary care appointments have serious negative health and wellness impacts. The patient who misses his or her appointment creates disorder and self-inflicted interference with his or her care and the potential delivery of timely treatment. Patients that miss appointments put themselves at risk for worsening current chronic medical conditions because chronic illnesses require regular visits to the physician for monitoring, medication, and care plan management (Aggarwal et al., 2015;

AlRowaili et al., 2016; Hwang et al., 2015). Failing to attend a prescheduled primary care appointment jeopardizes a patients' wellness opportunity for the prevention and possible identification of new, preventable medical conditions (Aggarwal et al., 2015; AlRowaili, 2016; Hwang et al., 2015).

Patients missing prescheduled appointments also impact other patients who are seeking appointments with a primary care physician (Boos et al., 2016). Patients that are no-shows to prescheduled appointments prevent other patients from receiving timely medical care. When a missed appointment happens there is not a sufficient time frame to rebook the appointment, therefore negatively impacting other patients calling into the office for appointments.

Missed prescheduled primary care appointments have serious overall financial implications that can have substantial economic consequences for patients, the physician office, and the U.S. national health care system. Physician office enforcement of missed appointment fees and no-show policies result in financial penalties and potential dismissal procedures that the patients will endure for failing to attend appointments (Huang & Zuniga, 2014; Liu, 2016; Liu & Ziya, 2014). Missed appointment fees are expenses that insurance companies will not cover and are the patient's financial responsibility (Peck III et al., 2019). No-show policies inform the patient of his or her risk of being dismissed from the physician office for excessive missed appointments. Dismissals from primary care physician offices often result in the patient seeking medical attention in the emergency room that can result in higher copays and additional out of pocket financial patient responsibilities (McGough et al., 2017; Ostermeyer et al., 2018,

Weisz et al., 2015). These preventable emergency room visits are a major financial burden on the U.S. healthcare system, thus generating billions of dollars in U.S. national healthcare expenses annually (Kheirkhan et al., 2016; Norris et al., 2014; Ostermeyer et al., 2018).

Physician offices also experience financial setbacks from missed appointments, such as an inability to capture budgeted profits from expected visits, waste of scheduled resources, and increased operational expenses related to numerous tactical implementations designed specifically to decrease missed appointments (Aggarwal et al., 2016; Kheirkhan et al, 2016; Norris et al., 2014; Saeed, Somani, Sharif, & Kazi, 2018). The physician office cannot capture expected revenues when patients miss prescheduled appointments. The average cost associated with a missed primary care appointment averages close to $200.00 per patient visit, which can add up to hundreds of thousands of dollars in lost revenue for the physician office (Kheirkhan et al., 2016; Peck III et al., 2019).

Missed patient appointments negatively impact the physician office operational budgeted expenses related to staffing resources. The number of physicians and staff scheduled daily to care for patient needs are planned based on a specific number of prescheduled patients and availability in clinic schedules, therefore when patients miss appointments it creates physician idle time, decreases physician productivity, and generates over-staffing expenses (Xiao, Dong, Li, & Sun, 2016). Physician offices can also incur fluctuating operational expenses driven by daily patient volumes for prescheduled appointments, such as direct mailings, auto reminder phone calls, advanced

texting programs, and email. These proactive strategies to address missed appointments contribute to additional operational expenses (McLean, Booth, & Nancarrow, 2016; Palacios-Barahona et al., 2018; Saeed et al., 2018)

Missed presecheduled appointments have serious negative impacts on the physician-patient relationship. In primary care, being able to have scheduled appointments with a preferred primary care physician encourages the growth of the physician-patient relationship, which promotes positive patient behaviors and healthy outcomes (Bodenheimer & Sinsky, 2014; Dang et al., 2017) Physician-patient relationships involve trust, respect, and engagement, all of which is developed over time (Chipidza, Wallwork & Stern, 2015; Dang et al., 2017). Research has provided healthcare administrators with the understanding that positive, continuous physician-patient relationships can positively impact health outcomes of patients (Chipidza et al., 2015; Dang et al., 2017; Kelley, Kraft-Todd, Schapira, Kossowsky, & Riess, 2014). Patients repeatedly scheduled with nonpreferred primary care physicians impact continuity of care because a long-term patient-physician relationship is unable to develop (Balasubramanian, Biehl, Dai & Muriel, 2014).

In this study, I addressed the research gap of missed appointments in relation to advanced access scheduling focused on preferred primary care physicians versus nonpreferred primary care physicians. I contributed to existing research that independently examines both missed appointment rates and advanced access scheduling. I added knowledge to the missed appointment challenges, specifically related to advanced access scheduling of patients with preferred primary care physicians and nonpreferred

primary care physicians. This study contributes to the identification of advanced access scheduling guidelines, best practices, and corroboration of newly identified advanced access scheduling system constructs and constraints.

Purpose of the Study

The purpose of this nonexperimental quantitative, correlation study was to determine if there was an association between advanced access scheduling and missed appointment rates, specifically focusing on no-shows with preferred primary care physicians and nonpreferred primary care physicians. Advanced access scheduling, which is also known as open access or same day scheduling, offers patients appointments with a preferred primary care physician on the day the patient calls regardless of medical urgency (Kiran & O'Brien, 2015). Given the multiple dimensions that occur as a result of missed prescheduled primary care appointments, the findings may be used to ensure patients and physician offices appreciate the complexity of the missed appointment challenges and partner for solutions. The results of this study may improve healthcare administrators understanding of the dynamics surrounding advanced access scheduling. In addition, the results of this study may lead healthcare administrators to establish an advanced access scheduling standards of care for primary care, thus creating a systematic approach to reducing missed appointment rates. Reducing missed appointment rates will have a positive impact on patients, the physician offices, and the national health care system.

The dependent variables of the study were missed appointment rates with preferred primary care physicians and missed appointment rates with nonpreferred

primary care physicians. The independent variable of the study was advanced access scheduling model.

Significance of the Study

The study is significant for healthcare administrators because the findings may contribute to the identification of advanced access scheduling guideline best practices that can positively impact missed appointment rates. Healthcare administrators could gain knowledge targeted to achieve improved access, patient experiences, and patient health outcomes, while decreasing missed appointment rates and operation inefficiencies. The study promotes positive social change because it may allow healthcare administrators to better evaluate the current operational environment. The knowledge gained from the findings of this study may strengthen healthcare administrators' decision making and strategic deployment of action plans aimed to improve missed appointment rates in physician offices. Reducing missed appointments rates will contribute to better healthcare access, better health care outcomes, and controllable healthcare finances.

Research Question(s) and Hypotheses

For this quantitative correlational study, the research questions are as follows:

RQ1: Is there a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample?

$H_0$1: There is no statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample.

$H_1$1: There is a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample.

RQ2: Is there a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample?

$H_0$2: There is no statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample.

$H_1$2: There is a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample.

RQ3: Is there an association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show?

$H_0$3: There is no statistically significant association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show.

$H_1$3: There is a statistically significant association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show.

Theoretical Foundation for the Study

The primary conceptual framework for this study was the health belief model. The health belief model is used to explain and predict health behaviors of individuals (Jones, Smith, & Llewellyn, 2014; Montanaro & Bryan, 2014). Missing a prescheduled primary care appointment is a health behavior that can evolve into identifiable patterns of undesirable patient health behaviors (Williams et al., 2017). Healthcare administrators face multifaceted challenges when executing processes and procedures intended to optimize patient access with advanced access scheduling, which becomes increasingly more complex when faced with missed appointments. The health belief model is used to illustrate that people will take the best course of action for healthy behaviors if they feel that it is possible to address a negative health issue, that there is a positive expectation that doing a certain action will be effective in addressing their issue, and that there is a belief that they are able to act on the proposed action (Jones et al., 2015; Jones et al., 2014).

The health belief model is used to theorize that people will act to prevent illness if they perceive they are susceptible to the illness, perceive existing illness is severe, perceive there is a benefit in taking action, perceive there are minimal barriers that avert taking action, and believe in themselves to take action (Jones et al., 2014). The patient's existing missed appointment behavior may alter if the patient believes that there is a benefit in going to the appointment, which may result in the patient attending his or her prescheduled primary care appointment (Cronin et al., 2018; Montanaro & Bryan, 2014).

Nature of the Study

This study was a nonexperimental quantitative, correlational research study that I designed to examine if there was an association between advanced access scheduling on missed appointment rates for preferred primary care physicians and nonpreferred primary care physicians. A nonexperimental quantitative, correlational research study is guided by a research question and hypotheses that are built on existing knowledge proposing an association between variables (Creswell, 2014), therefore the research design was appropriate for this study. Additionally, the study can be further classified as cross-sectional study. Zheng (2015) states that when a study examines data within a population at one specific point in time it is classified as a cross-sectional study. I obtained the secondary data for the study, with approval, from a multispecialty and primary care medical office that is a part of a large medical group. For this study, I used descriptive statistics, *z*-test of proportions, and chi-square test of independence. Creswell (2014) states that descriptive analysis entails conducting tests to obtain the frequency, percentage, mean, standard deviation, and determine if the distribution of the data is normally distributed so correct statistical tests can be done for proper analysis. Miller (2016) states that the *z*-test of proportions determines whether two population means are different when the variances are known and the sample size is large. Albright & Winston (2015) explain that chi-square test of association tests the strength of the association between two categorical variables measured at an ordinal or nominal level by determining if observed counts are different enough for the test to be significant. I used

logistic regression as some of the variables needed to be classified with dummy codes such as gender and scheduling with or not with a primary care physician.

Literature Search Strategy

The following Walden University library databases were utilized to locate scholarly journal articles related to the research questions: PubMed, CINAHL Plus with Full Text, MEDLINE with Full Text, Dissertations & Theses, Dissertations & Theses at Walden University, and ProQuest Central. In addition, other research engines that were utilized to locate scholarly journal articles related to the research questions included Google, Google Scholar, Centers for Medicare & Medicaid Services (CMS), National Institute of Health (NIH), World Health Organization (WHO), and Centers for Disease Control and Prevention (CDC). The key words in the search engines to locate information were access, advanced access scheduling, continuity of care, missed appointments, missed appointment rates, no-show, no-show rates, physician-patient relationship, and primary care. All materials were peer-reviewed publications from a 5 year parameter (2014–2019) and a few doctoral capstones from the Walden University Library were referenced for format.

Literature Review Related to Key Variables and/or Concepts

The U.S. health care reform policy known as the Affordable Care Act was reviewed. The Affordable Care Act highlights delivery system reform implemented to support primary care transformation and improve primary care access (McGough et al., 2017). The delivery system reform recommends primary care physician offices implement advanced access scheduling models to meet the demands of reform

expectations (McGough et al., 2017). In addition, I obtained and extensively reviewed scholarly journal articles related to key variables and concepts focused on the advanced access scheduling model, the physician-patient relationship, and missed appointments as I aimed to determine if there was an association between advanced access scheduling with preferred primary care physicians and nonpreferred primary care physicians and missed appointment rates of patients that fail to attend prescheduled appointments.

The Affordable Care Act

The Affordable Care Act was written into law to promote the promise of increased and improved access to primary care, emphasize the importance of preventative care and uphold improving the health of patients through a value based patient centeredness approach (Blumenthal, Abrams, & Nuzum, 2015; Donahue et al., 2017; Dresden et al., 2017; McGough et al., 2017; Rhodes et al., 2017; Tipirneni, Rhodes, Hayward, Lichtenstein, & Reamer, 2015). The Affordable Care Act was created to expand health insurance benefits, improve expectations surrounding changes in the organization of the delivery of health care, and outline new payment models such as accountable care organizations (Blumenthal et al., 2015; McGough et al., 2017). Because of the Affordable Care Act, healthcare administrators contemplated new strategic efforts to supply patients with primary care medical services that meet the demands of new patients needing to establish with a primary care physician, while continuing to provide primary care medical services to established patients at the physician office (Blumenthal et al., 2015; McGough et al., 2017). A starting point to value based, patient centered care in primary care is for healthcare administrators to

identify what the medical needs of the patients are and what are the challenges in providing patients those medical needs (Rathert, Mittler, Banerjee, & McDaniel, 2017; Tsai & Teng, 2014). The medical needs of patients encompass many different types of care and services, including effective methods for patients to access care (Rathert et al., 2017). One access strategy, among many, that healthcare administrators in primary care physician offices have implemented to tackle providing patients with timely access is implementation of the advanced access scheduling model (Ansell, Crispo, Simard, & Bjerre, 2017; McGough et al., 2017; Tsai & Teng, 2014).

Advanced Access Scheduling Model

The advanced access scheduling model is a scheduling strategy to improve access to primary care by providing patients with appointments on the day that they call or at the time of the patient's choice, usually within 24 hours, with their preferred primary care physician regardless of urgency (Ansell et al., 2017; Kiran & O'Brien, 2015; Malham et al., 2017; Norris et al., 2014; Riedl, Kehrer, Werner, Schneider, & Linde, 2018; Samorani & LaGanga, 2015; Tsai & Teng, 2014). This unique scheduling model is used to promote patient-centered scheduling, which provides opportunity for decreased appointment delays and increased patient satisfaction (Ansell et al., 2017; Kiran & O'Brien, 2015; Tsai & Teng, 2014). The advanced access scheduling models are implemented to create a sense of self-authority for the patient when deciding to seek medical services. This scheduling model allow patients to request and receive care from the preferred primary care physician of choice at the time the patient chooses (McGough et al., 2017). Advanced access scheduling models are used to commonly provide patients

with appointments on the same day that the patient calls to inquire about needed medical services (Riedl et al., 2018; Samorani & LaGanga, 2015). The implementation of this scheduling intervention is utilized by many primary care physician offices to improve patient attendance with prescheduled appointments because there is an assumption that same-day appointments have a little to no missed appointment rates (Liu, 2016; Malham et al., 2017; Norris et al., 2014; Samorani & LaGanga, 2015; Tsai & Teng, 2014). The goal of advanced access scheduling is to encourage the continuity of the physician-patient relationship and reduce wait times for appointments, which is anticipated to decrease missed appointment rates (Kiran & O'Brien, 2015).

Lead Time

Advanced access scheduling models are used to drastically decrease lead time to the scheduled appointment. The lead time to an appointment is defined as the number of days between the request for an appointment and the actual appointment date (Drewek et al., 2017). Many researchers have reported a strong relationship between appointments that are made far in advance that generate an excessive wait time to the actual appointment, referred to as lead time, and high missed appointment rates (Liu, 2016; Malham et al., 2017; Norris et al., 2014; Samuels et al., 2015; Tsai & Teng, 2014). Previous researchers have expounded that when patients have a long wait time to his or her appointment there is the possibility that the patient will seek a sooner appointment elsewhere, that the patient's reason for the appointment resolves on its own and there is no longer a need for the appointment, or the patient forgets about the appointment (Drewek et al., 2017; Tsai & Teng, 2014).

Timely Access

The aim of advanced access scheduling is to provide patients timely access to any type of appointment with a preferred primary care physician on the same day that the patient calls the physician office (Kiran & O'Brien, 2015; Tsai & Teng, 2014). Research shows that supply of available appointments and demand of patient medical needs do not always balance, which forces physician offices to establish scheduling guidelines that may or may not be able to provide patients with all of their specific requests. Different scheduling algorithms will provide requested day and time, but may or may not be able to schedule the patient with his or her primary care physician. Appointments with trusted partners or other care team members, also known as first available physician, create challenges with continuity of care (Kiran & O'Brien, 2015).

Continuity of Care with the Advanced Access Model

Continuity of care with advanced access scheduling refers to a patient being able to have an appointment with his or her preferred primary care physician (McGough et al., 2017; Malham et al., 2017). Continuity of care positively influences the physician-patient relationship, which research suggests contributes to patient behaviors that favor increased preventative care, decreased emergency room visits, and overall positive clinical outcomes (Bodenheimer et al., 2014). Research surrounding advanced access scheduling has raised concerns that same day appointments or appointments requesting a specific day and time cannot always ensure continuity of care, as expected in the full parameters of the advanced access scheduling model, which has the potential to

negatively impact the physician-patient relationship (Kiran & O'Brien, 2015; Tsai & Teng, 2014).

Physician-Patient Relationship – Preferred vs Nonpreferred Primary Care Physicians

Research indicates the physician-patient relationship has positive impacts on a patient's health outcomes and overall well-being (Chipidza et al., 2015; Fuertes, Toporovsky, Reyes, & Osborne, 2017; Kelley et al., 2014; Razzaghi & Afshar, 2016). The physician-patient relationship begins at the very first encounter and builds, develops, and strengthens with every additional, subsequent visit (Dang et al., 2017). Every time a patient is scheduled with a new physician, they have the draining task of re-reviewing their medical history along with current medical complaints. Research shows that patients scheduled with physicians they have not seen before are more likely to miss initial appointments, subsequent appointments, and not seek care at all (Dang et al., 2017). Missed appointments undermine the physician-patient relationship and contribute to poor health outcomes (Liu, 2016; Norris et al., 2014).

Missed Appointments

Outpatient physician offices. Missed appointments are a major problem faced within outpatient physician offices. A missed appointment happens when a patient fails to attend his or her prescheduled appointment without notice to the physician office (Goffman et al., 2017). A selection of no-show research completed by various researchers have examined the types of patients that fail to attend appointments at outpatient physician offices. Patient demographics, socioeconomic status, geographical

locations, transportation challenges, types of health insurance, classification of diagnosis, and appointment type to include time and day of the week the appointments were scheduled have been a focus in no-show studies (Boos et al., 2016; Drewek et al., 2017; Ellis, McQueenie, McConnachie, Wilson, & Williamson, 2017; Kheirkhah et al., 2016; Liu, 2016; Samuels et al., 2015; Shimotsu et al., 2015). Health care administrators that oversee outpatient physician offices are plagued with the abundance of these studies surrounding the no-show predicament. These studies are used to create standardized, systematic models to decrease missed appointment rates, which may or may not be the best strategic approach for outpatient physician offices.

Negative financial implications. There are also no-show studies that report the increasing, negative financial consequences for patients, the national health care system overall, and physician practices that have high missed appointment rates (Goffman et al., 2017; Kheirkhah et al., 2016; Liu & Ziya, 2014). Outpatient physician offices provide new patients with general office information and policies regarding privacy, financial responsibility and attendance. Offices that have established no-show policies will mail warning letters to patients that fail to attend appointments outlining the expectations of keeping appointments. Missed appointment fees may be billed at the time of the first miss appointment violation; however, this is unique to each physician office's policy (Liu, 2016; Liu & Ziya, 2014; Peck III et al., 2019). Patients that frequently fail to attend physician office appointments jeopardize being dismissed from the practice. Patients dismissed without a primary care physician commonly seek medical care at local emergency departments, which contributes to out of pocket expenses for the patient and

the overall, increasing national health care debt (McGough et al., 2017; Ostermeyer et al., 2018; Weisz et al., 2015).

Outpatient physician offices are hampered financially when patients fail to attend prescheduled appointments. Research reveals that lost revenue from missed appointments and unbudgeted operational expenses such as the implementation of tactics to decrease missed appointments are main contributors to financial burdens experienced at physician offices (Boos et al., 2016; Kheirkhah et al., 2016; Liu, 2016).

Continuity of care and missed appointments. In addition, there are previous missed appointment studies devised to show how patients that fail to show up for their scheduled appointments compromise continuity of care, which weakens the physician-patient relationship and negatively impacts their own health outcomes (Aggarwal et al., 2016; AlRowaili et al., 2016; Balasubramanian, et al., 2014; Goffman et al., 2017; Liu & Ziya, 2014; Norris et al., 2014; Torres et al., 2015). Continuity of care is the foundational belief of the physician-patient relationship that is measured in terms of frequency, consistency, comprehensible care management, which is primarily attributed to high-quality medical care over time (Ladapo & Chokshi, 2014). In primary care, continuity of care happens when patients have appointments with their own preferred primary care physician, which is critical in growing the physician-patient relationship (Balasubramanian, et al., 2014; Dang, et al, 2017). The physician-patient relationship is very important in influencing positive patient behaviors and promoting positive health outcomes and missing prescheduled appointments does not promote the physician-patient relationship (Dang et al., 2017; Kelley, et al., 2014).

Gap in Literature

Research formulated to examine the determinants of missed appointments, the impact of missed appointments, and strategic development of preventative measures to combat missed appointment rates have been a focal point with researchers (Ansell et al., 2017; Boos et al., 2016; Drewek et al., 2017; Ellis et al., 2017; Kheirkhah et al., 2016; Norris et al., 2014; Samuels et al., 2015; Tsai & Teng, 2014). Although there have been numerous missed appointment studies, this study differs from those as I examined missed appointment rates when patients are scheduled using advanced access scheduling parameters with preferred primary care physicians and nonpreferred primary care physicians. Knowledge may be gained by investigating missed appointments when patients are provided same day access to medical care that are scheduled with preferred primary care physicians versus nonpreferred primary care physicians.

Literature Review Summary

I comprehensively reviewed related literature exploring missed appointments that revealed missed appointment rates continue to be a major issue in outpatient physician offices despite extensive research and implementation of multiple operational interventions (Ansell et al., 2017; Balasubramanian et al., 2014; Drewek et al., 2017; Liu, 2016; Liu & Ziya, 2014; Malham et al., 2017; Palacios-Barahona et al., 2018; Saeed et al., 2018; Tsai & Teng, 2014). The advanced access scheduling model is one operational intervention implemented to decrease missed appointment rates. The advanced access scheduling model is used to provide patients with same day appointments with the patient's preferred primary care physician regardless of urgency (Ansell et al., 2017;

Kiran & O'Brien, 2015; Malham et al., 2017; Norris et al., 2014; Riedl et al., 2018; Samorani & LaGanga, 2015; Tsai & Teng, 2014). Primary care physicians have limited scheduling availability that averages of 24–28 slots a day. Therefore, depending on the appointment demand per primary care physician, the scheduling of same day appointments can result in a patient's appointments being made with nonpreferred primary care physicians. Unfortunately, this compromises continuity of care in order to provide patients with timely access to medical care (Kiran & O'Brien, 2015; Norris et al., 2014).

Continuity of care is intended to promote the building of a consistent physician-patient relationship between a patient and a preferred primary care physician (Balasubramanian et al., 2014). Hence, when a patient cannot be provided a timely appointment with a preferred primary care physician the physician-patient relationship becomes negatively impacted (Balasubramanian et al., 2014; Kiran & O'Brien, 2015). Researchers suggest that a strong physician-patient relationship increases the physicians' familiarity with a patient's medical conditions, which improves the quality and consistency of the care provided, and leads to better patient health outcomes and patient compliance (Poku, Behkami, & Bates, 2016). It is understood that the preferred primary care physician may not always be available; however, this study will research the effect this has on no show rates in order to determine how organizations can look for ways to overcome this component of the advanced access scheduling model, as well as possibly strengthening the healthcare team concept.

Definition of Terms

In this study, terms were defined as follows:

Advanced Access Scheduling Model: Scheduling strategy to improve access to primary care by providing patients with appointments on the day that they call or at the time of the patient's choice, usually within 24 hours, with their preferred primary care physician regardless of urgency (Ansell et al., 2017; Kiran & O'Brien, 2015; Malham et al., 2017; Norris et al., 2014; Riedl et al., 2018; Samorani & LaGanga, 2015; Tsai & Teng, 2014).

Continuity of Care: Promotion and building of a lasting physician-patient relationship between a patient and a preferred primary care physician that increases quality of care and promotes better patient health outcomes (Balasubramanian et al., 2014; Poku et al., 2016).

Lead Time: The number of days between the initial request by a patient for an office appointment and the actual appointment date the patient will be seen (Drewek et al., 2017; Liu, 2016).

Missed appointments: A missed appointment happens when a patient fails to attend his or her prescheduled appointment without notice to the physician office (Goffman et al., 2017; Kheirkhah et al., 2016).

Nonpreferred Primary Care Physician: Health care professional who practices general family medicine that the patient has not previously seen and has not developed a trusting medical relationship.

Preferred Primary Care Physician: Health care professional who practices general family medicine that the patient sees regularly and has developed a trusting medical relationship.

Traditional Model Scheduling: Scheduling strategy with appointment scheduling calculations based on individual physician availability within an office setting that utilizes upcoming dates and time slots that are typically many months into the future (Riedl et al., 2018; Tsai & Teng, 2014).

Assumptions

Marshall & Rossman (2016) state that assumptions are beliefs that are recognized to be true without any proof. There were several assumptions believed to be true that may impact this study. I assumed that the quantitative secondary data collected from the large primary care medical group is a valid and reliable data source. I assumed the data encompasses detailed scheduling information necessary to perform statistical data analysis. I assumed the quantitative secondary data collection strategy prevents the risks of personal bias that would potentially influence the results of the study. I assumed that the quantitative secondary data entry was conducted in a well-organized and effective manner with minimal errors providing research results. I assumed that the large primary care medical group satisfactorily represents the general population being examined in the study.

Limitations

Marshall & Rossman (2016) state that limitations are inadequacies of the study that could not be controlled by the researcher. The study had a number of acknowledged

limitations. The first limitation was the secondary data set was from one specific time period providing only a snapshot of conditions taking place at that specific time. The secondary data was from a nonconsecutive four-month time period within a 12 month calendar year that may restrict the population investigated and limit other possible variables. The second limitation was the variables that may have additional value to the study may not have been accounted for in the secondary data set. Therefore, any data missed in the secondary data set collection may have an effect on the interpretation of the data. The final limitation was secondary data retrieved could not be modified by the researcher.

Scope and Delimitations

Marshall & Rossman (2016) state that delimitations limit the scope and define the boundaries of the study and are controlled by the researcher. The first delimitations of the study was there was no primary data collection. The secondary data retrieved was historical scheduling data reflective of an office that is part of a large primary care medical group. The secondary data only included patients over the age of 18 seeing primary care physicians over a nonconsecutive four-month time period within a 12 month calendar year. The second delimitation was the study was a cross sectional retrospective study, which does not have control groups for comparison.

Potential for Positive Social Change

Patients that miss prescheduled primary care appointments put themselves and others at risk for negatively impacting health and wellness, straining overall finances, and compromising the physician-patient relationship. Healthcare administrators need to

accurately identify progressive operational opportunities and contribute to decreasing inefficiencies for the overall positive promotion of healthy medical and financial outcomes for the ever-changing healthcare landscape. This study was designed to promote positive social change because reducing missed appointments rates may contribute to better healthcare access, better healthcare outcomes, and controllable healthcare finances. The knowledge gained from the findings of this study may strengthen healthcare administrator's decision making that will allow for better operational environment evaluation techniques and strategic deployment of action plans created to improve missed appointment rates in physician offices.

Summary and Conclusion

In this section, literature was reviewed related to the research question surrounding the association, if any, between advanced access scheduling and missed appointment rates with preferred primary care physicians versus nonpreferred primary care physicians. Previous researchers demonstrated that missed appointments are a major problem across healthcare systems and have plagued healthcare administrators for decades (Boos et al., 2016; Ellis et al., 2017; Goffman et al., 2017; Kheirkhah et al., Norris et al., 2014; 2016; Samuels et al., 2015). These studies were used to focus on why patients miss appointments, the overall impact of those missed appointments, and continued efforts for interventions to prevent missed appointments. In addition, the purpose of the study, the nature of the study, the research questions and hypotheses, and theoretical framework of the health belief model were highlighted as it relates to advanced access scheduling and missed appointment rates with preferred primary care

physicians versus nonpreferred primary care physicians. Furthermore, a detailed literature review with an identifiable gap in the literature and emphasis on assumptions, limitations, scope and delimitations provided a justified need to conduct this study. Section 1 concluded with a realistic description of the impact of the study on potential social change.

The next section presents the methodology and design that will be used for this study. Section 2 focuses on the population, dataset management, to include explanation of ethical issues and threats to validity.

Section 2: Research Design and Data Collection

Introduction

The purpose of this nonexperimental quantitative, correlation study was to determine if there was an association between advanced access scheduling and missed appointment rates with preferred primary care physicians and nonpreferred primary care physicians. Missing a prescheduled primary care appointment is a health behavior based on the health belief model that can evolve into identifiable patterns of undesirable patient health behaviors (Williams et al., 2017). Patients who fail to attend prescheduled appointments demonstrate a health behavior that contributes to complications with personal health and wellness, personal and national health care expenditures, and physician-patient relationship building. I collected the data and information for the study from the electronic medical record appointment scheduling system as deidentified data, from a multispecialty and primary care medical office that is a part of a large medical group. In this section, I present how the study was conducted and specifically address the design, study population and sampling techniques, secondary data analysis and management process, threats to validity, and ethical consideration.

Research Design and Rationale

This study was a nonexperimental quantitative correlational research design approach interested in researching an association, if any, between advanced access scheduling and missed appointment rates with preferred primary care physicians versus nonpreferred primary care physicians. The research design was appropriate for this study because according to Creswell (2014), a nonexperimental quantitative, correlational

research study is guided by a research question and hypotheses that are built on existing knowledge proposing an association between variables. A nonexperimental quantitative correlational design is an important methodology to deploy when there is existing data to be analyzed and there are two or more variables among that data that can be examined for possible association (Curtis, Comiskey, & Dempsey, 2016). Correlation is the most common way of determining whether an association exists between variables (Curtis et al., 2016). The dependent variables of the study were missed appointment rates with preferred primary care physicians and missed appointment rates with nonpreferred primary care physicians. The independent variable of the study was the advanced access scheduling model. Analysis of the data was used to determine how much variance in the dependent variable was shared with the independent variables. This study was a cross-sectional study because according to Setia (2016), a cross-sectional study does not manipulate the environment and data collection is done at one specific point in time.

Research Questions and Hypotheses

For this nonexperimental quantitative correlational study the research questions were as follows:

RQ1: Is there a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample?

$H_0$1: There is no statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample.

$H_1$1: There is a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample.

RQ2: Is there a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample?

$H_0$2: There is no statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample.

$H_1$2: There is a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample.

RQ3: Is there an association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show?

$H_0$3: There is no statistically significant association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show.

$H_1$3: There is a statistically significant association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show.

Methodology

Multispecialty and Primary Care Medical Office

For this study, the target population encompassed patients that were prescheduled for primary care visits from a multispecialty and primary care office that is a part of a large medical group in Olympia Fields, Illinois. Olympia Fields is a village in Cook County, Illinois. The medical office provides outpatient medical care for patients ranging from birth to geriatrics. The physicians and resources available to patients at the office include primary care physicians that have board certification in family practice and/or internal medicine. There are also specialty physicians that have board certifications in pediatrics, cardiology and nephrology. The site provides supplementary medical resources to include nurse visits, chronic care management, outpatient lab, radiology, and immediate walk-in care.

Scheduling Process

The medical office healthcare administrator utilizes an electronic medical record and electronic appointment scheduling system. Scheduling guidelines utilized at the medical office follow a scheduling algorithm for assisting patients with scheduling a visit. When the patient calls to schedule an appointment, the call agent searches for available appointments based on the patient's request for day, time, and preferred primary care physician, specialist, or medical resource. The physicians at this medical office care for an average of 100,000 patient visits annually and have an overall missed appointment rate that ranges from 8% to 13%. In 2018, the multispecialty and primary care physicians

saw 106,472 total patient visits. Of those total visits there was 86,672 prescheduled appointments with primary care physicians in 2018.

Target Population

This study include a target population of patients who were prescheduled for primary care visits from a multispecialty and primary care office that is a part of a large medical group in Olympia Fields, Illinois. The target population for this study was patients, 18 years of age and older, who had been prescheduled with a primary care physician. Using inclusion and exclusion criteria, I classified the visit data for the patients prescheduled at the multispecialty and primary care medical office. Patino & Ferreira (2018) state that the establishment of inclusion and exclusion criteria is important because based on these inclusion and exclusion criteria a researcher can make a judgment regarding the impact on the external validity of the results.

Exclusions

As mentioned, visit data of patients that were seen by specialty physicians, pediatricians, nurse visits, chronic care management, outpatient lab, radiology, and immediate walk-in care visits at the multispecialty and primary care medical office were excluded. Prescheduled primary care appointments that were reserved 25 hours or more prior to the scheduled appointment were also excluded. For reasons surrounding the health belief model, which is used to focus on individual beliefs about health, this study did not include patients under the age of 18. Patients under the age of 18, also termed pediatric patients, are dependent upon a guardian or parent to accompany the patient to the appointment as required by law. I assumed that pediatric patients do not have

complete control over their ability to attend prescheduled appointments and execute individual beliefs about their health (Mohamed, Mustafa, Tahtamouni, Taha, & Hassan, 2016). Additionally, patients who were not prescheduled with thorough registration information that comprised the omission of an identified primary care physician, current insurance or self-pay section validated, and completed demographic section were excluded.

Inclusions

The eligibility criteria for this research study was patients who are prescheduled for a primary care appointment at the multispecialty and primary care medical office during March, April, September, and October 2018. The prescheduled primary care appointments for the study followed the parameters of the advanced access scheduling model, which are prescheduled appointments made 24 hours or less prior to the appointment. Additionally, I included only patients that had thorough and complete scheduling and registration information listed in the electronic appointment scheduling system.

Sampling and Sampling Procedures

It was unrealistic for 86,672 prescheduled primary care visits for 2018 to be examined for this study, therefore a probability sampling was conducted. I employed cluster sampling for this study. The total number of 2018 prescheduled primary care patient visits were grouped into each calendar month, January through December, and then combined into fiscal quarters, January – March, April – June, July – September, and October – December. Four months were randomly selected from each fiscal quarter in

2018 year using a rotating pattern from the groupings for this study. I randomly selected the last month of the first quarter (March 2018), first month of the second quarter (April 2018), last month of the third quarter (September 2018), and first month of the fourth quarter (October 2018). The total patient visits for these four months totals 35,574, after exclusions and inclusions the total patient visits for prescheduled primary care analysis totals 4,815. The steps I took to determine the sample size for the secondary data is depicted in Table 1.

Table 1

Steps Taken to Determine Sample Size for Secondary Data

Medical Group Information		
Non-Physicians	Physicians	Patients Seen
Nurses, chronic care management, outpatient lab, radiology, and immediate walk-in care	Family practice, internal medicine, pediatrics, cardiology and nephrology.	Average of 100,000 patient visits annually (missed appt rate from 9% to 13%). In 2018, 106,472 total patient visits.
Exclusion Criteria		
Physicians	Demographics	Scheduling
Pediatrics, cardiology and nephrology	Younger than 18 Missing information	Appointment is not prescheduled Appointment reserved < 25hours
Inclusion Criteria		
Physicians	Demographics	Scheduling
Primary Care Visits family practice, internal medicine	Older than 18 Complete information	Probability sampling of 2018 secondary data for prescheduled patients

Continued

Sampling of 2018 Secondary Data

Cluster Sampling	Before Exclusions - Estimated Visits	After Exclusions - Estimated Visits
First quarter (March) Second quarter (April) Third quarter (September) Fourth quarter (October)	Before exclusions, the total estimated patient visits and missed appointments for prescheduled primary care appointments = 35,574	After exclusions, the estimated patient visits within the advanced access scheduling model for prescheduled primary care appointments = 4,815

Notes. * The secondary data set utilized in this study was obtained from the electronic appointment scheduling system of a large medical group.

Power Analysis and Sample Size Estimation

As a quantitative correlational analysis study the objective was to reveal an association, if any, between numerical variables. Bujang & Bahrum (2016) state that it is important for correlational analysis studies to have a sufficient sample size. I determined the necessary minimum sample size for the study and performed a power analysis using G*Power v3.1.9.4 for Windows software. An a priori power analysis was done to determine the sample size before any data collection begins. Based on the power analysis the required sample size was 779 with power =.8000189, alpha = 0.05, effect size .1, as shown in Table 2.

Table 2

*Sample Size Calculation Using G*Power*

Input:	Tail (s)	Two
	Effect Size	0.1
	α err prob	0.05
	power (1-β err prob)	0.8
Output:	Df	777
	Total Sample Size	779
	Actual Power	0.8000189

The final secondary data sample size retrieved for this study was n=4,815 visits within the advanced access scheduling model for prescheduled primary care appointments and was far higher than the calculated sample size using the above power analysis parameters.

Data Collection and Management

The secondary data set I utilized in the research study was obtained from the electronic appointment scheduling system of the medical office described as a multispecialty and primary care office that is a part of a large medical group. I followed the medical group's internal Institutional Review Board (IRB) policy and procedure and the secondary data request for this research study was done by a formal application submission and request for determination via www.irbnet.org. I obtained an internal institutional review board identification number that was submitted on January 7, 2019. The internal IRB ID# was 1372958-1. Based on the health care organizations guidelines,

a formal IRB with the health care system was not necessary because this study does not entail human subject research. The health care system medical group categorized the study as only needing approval for determination by the organization's IRB, which was granted.

Walden University's required Form A, Form B, Data Use Agreement, Ethics Training certification and the determination letter from the organization where the secondary data was completed and submitted to Walden's Institutional Review Board (IRB). Walden's IRB confirmed that this study met Walden University's ethical standards and the IRB approval number for this study was 08-01-19-0364756. Once approval for determination was granted and Walden's IRB confirmed approval, I formally requested the secondary data using the required data management request process done through the health system's health information technology department. I received the 2018 raw data set via encrypted company email in an excel spreadsheet.

The secondary data set was acquired from historic patient data obtained from the physician office's electronic medical record appointment scheduling system from 2018. This data represents the best source of data for this study because it provides historic medical record appointment scheduling data that includes all relevant elements needed to answer the research questions, such as the name of the patient's primary care physician, the name of the physician the patient is scheduled with, date visit scheduled, and date of actual visit, visit status of arrived, cancelled, or no-show.

Data Analysis Plan

The acquired deidentified excel file data set was downloaded and stored on my personal hard drive. Once the IRB approval was received from Walden University, the deidentified data was analyzed using the IBM Statistical Package for the Social Sciences version 25 (SPSS). Descriptive analysis was performed on all variables to report the frequency and percentage, in addition *z*-test of proportion and chi-square test of association was conducted to address the research questions. Descriptive analysis was calculated on each variable, and data was examined to identify outliers or erroneous data. Deidentified data was reviewed for inconsistences and missing data to determine whether encounters could be retained. Patients seen more than once in the data collection period were treated as separate encounters.

Threats to Validity

Hagan (2014) states that if data is not able to be measured then it cannot be tested in the research study. Hagan (2014) and Heale & Twycross (2015) state that validity is a measure of quality in a quantitative research study. Creswell (2014) presents that the two types of threats to validity are internal threats and external threats. McLeod (2013) positions that threats to internal validity compromise our confidence in saying that a relationship exists between the independent and dependent variables. A possible threat to the internal validity for this study was alternative explanations for missed patient appointments. McLeod (2013) states that threats to external validity compromise confidence in stating whether the study's results are relevant to other groups, can be generalized to other settings, and can be repeated. A possible threat to the external

validity for this study was each patient's unique set of values regarding his or her own physician-patient relationship and his or her own emergent or non-emergent categorization of the reasons for the need to see the physician.

Ethical Considerations

All patient identifying information was protected and was deidentified before being sent by the health system's medical group health information technology department via encrypted email for analysis. Since the data was deidentified there was no risk for disclosure of confidential, private patient information in any of the data set received for analysis. The encrypted data set was stored on my personal computer and deleted upon completion to avoid any accidental data breach.

Summary

In this study, I examine whether there were statistical differences in advanced access scheduling for missed appointments for primary care physicians versus non-primary care physicians. I conducted a nonexperimental quantitative correlational study to determine whether there was an association between advanced access scheduling and missed appointment of patients that fail to attend prescheduled appointments with preferred versus nonpreferred primary care physicians. I utilized historical data from an electronic appointment scheduling system as the secondary source for data. The data was extracted from the electronic scheduling system as deidentified data. The secondary data source was examined with IBM SPSS version 25, which was used to analyze the dependent and independent variables, as well as applicable covariates associated with the research study.

As the researcher, I aimed to use the results of this study to provide further awareness to the missed appointment dilemma faced by primary care physician offices. As previously presented, patients that fail to attend prescheduled appointments contribute to complications with personal health and wellness, personal and national health care expenditures, and physician relationship building. Knowledge gained with this study may lead to effective standardization of advanced access scheduling, hence filling a gap in understanding if there is or is not a significant association between advanced access scheduling and missed appointment rates of patients that fail to attend prescheduled appointments with preferred primary care physicians versus nonpreferred primary care physicians.

This section described how the study was conducted, specifically the research design, target population and sampling techniques, secondary data analysis and management, threats to validity, and ethical consideration. In Section 3, the presentation of results and findings will be reviewed.

Section 3: Presentation of the Results and Findings

Introduction

The primary purpose of this quantitative correlational study was to determine an association, if any, between advanced access scheduling on missed appointment rates for preferred primary care physicians versus nonpreferred primary care physicians. Missing a prescheduled primary care appointment demonstrates a health behavior that can evolve into identifiable patterns of undesirable patient health behaviors that contribute to increased complications with personal health and wellness, personal and national health care expenditures, and physician-patient relationship building (Williams et al., 2017). The dependent variables of the study were missed appointment rates with preferred primary care physicians and missed appointment rates with nonpreferred primary care physicians. The independent variable of the study was the advanced access scheduling model. I included the covariates of gender, age, race, insurance type, and geographical location via zip code categorized into county and out of state in the study because these characteristics have been previously linked with missed appointment rates (Boos et al., 2016; Drewek et al., 2017; Ellis et al., 2017; Kheirkhah et al., 2016; Liu, 2016; Samuels et al., 2015; Shimotsu et al., 2015).

For this study, the research questions were as follows:

RQ1: Is there a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample?

$H_0$1: There is no statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample.

$H_1$1: There is a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample.

RQ2: Is there a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample?

$H_0$2: There is no statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample.

$H_1$2: There is a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample.

RQ3: Is there an association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show?

$H_0$3: There is no statistically significant association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show.

$H_1$3: There is a statistically significant association between primary care physician type, preferred and nonpreferred, and advanced access scheduling model visit status of arrived, cancelled, and no-show.

Data Collection of Secondary Data

In this section, I presented the process for the collection of the secondary data set. I include how the data was collected, time frame of the data, discrepancies, and include a descriptive and inferential analysis with a summary.

Obtaining Data, Time Frame, and Discrepancies of the Data Set

Obtaining data. After I received IRB approval (08-01-19-0364756) from Walden University, the deidentified data were analyzed using the IBM Statistical Package for the Social Sciences version 25 (SPSS). The secondary data obtained for this study were acquired from 2018 historical patient scheduling data retrieved from an electronic medical record appointment scheduling system from a multispecialty and primary care office that is a part of a large medical group. The initial sample size for the secondary data sets were comprised of 86,672 prescheduled primary care visits for the entire 2018 calendar year.

Data filters – exclusions. The data were received from the organizations health information technology departments as a deidentified data in an Excel spreadsheet. I first filtered the data sets by the specific four-month time period determined through a random cluster sampling strategy. I randomly selected the patient visits for the study by the last month of the first quarter (March 2018), first month of the second quarter (April 2018), last month of the third quarter (September 2018), and first month of the fourth quarter

(October 2018). The overall patient visits for these 4 months totaled 35,574. I filtered the data sets based on exclusion criteria of patients under 18 years of age, patients prescheduled visit with specialty providers and resource providers, such as nurse visits and immediate care, appointments reserved greater than 24 hours prior to the appointment, and all non-prescheduled visits. After exclusions, the patient visits within the advanced access scheduling model for prescheduled primary care appointments totaled 11,660.

Data filters – inclusions. I filtered the data sets by patients 18 years of age and older that were prescheduled with a primary care physicians that had an identifiable primary care physician and had verified, complete registration visit data. The secondary data set analyzed for this study totaled 4,815 which was much higher that the G*Power a priori power analysis required sample size of 779 with power =.8000189, alpha = 0.05, effect size .1. I imported the data set to IBM SPSS for statistical analysis. I recoded for non-numerical variables to ensure all data has numerical measures for better analysis. I noted no discrepancies.

Descriptive Statistics

The descriptive statistics Table 3 and Table 4 presents the advanced access scheduling model prescheduled visit and population characteristics of the 4,815 patient visits from March, April, September, and October 2018. Table 3 represents the direct variable information of the advanced access scheduling model prescheduled visits that account for appointments reserved 24 hours or less prior to the appointment.

Table 3

Descriptive Statistics – Advanced Access Scheduling Model - Visits Status (AASM-VS), Advanced Access Scheduling Model – Missed Appt Rates (AASM-MAR), Advanced Access Scheduling Model – Provider Type (AASM-P), and Advanced Access Scheduling Model – Time (AASM-T).

Data Element	Characteristic	Frequency	Valid Percentage
AASM-VS	Arrived	3,861	80.2%
	Patient Cancelled	690	14.3%
	No Show	264	5.5%
AASM-MAR	No Show with Preferred PCP	123	46.6%
	No Show with Nonpreferred PCP	141	53.4%
AASM-P	Scheduled with Preferred PCP	2,733	56.8%
	Scheduled with Nonpreferred PCP	2,082	43.2%
AASM-T	Prescheduled 24 hours before appt	2,304	47.9%
	Prescheduled same day of appt	2,511	52.1%

As shown in the above descriptive table, the data elements represent direct variable information of only the advanced access scheduling model visits (*n*=4,815) for the specific time frame of March, April, September, and October 2018. As previously stated, the advanced access scheduling model is a scheduling strategy to improve access to primary care by providing patients with appointments on the day that they call or at the time of the patient's choice, usually within 24 hours, with their preferred primary care physician regardless of urgency (Ansell et al., 2017; Kiran & O'Brien, 2015; Malham et al., 2017; Norris et al., 2014; Riedl et al., 2018; Samorani & LaGanga, 2015; Tsai & Teng, 2014).

Advanced access scheduling model, visits status (AASM-VS). The advanced access scheduling model for visit status describes all the appointments prescheduled 24 hours or less prior to the appointment as arrived appointments, patient cancelled appointments, and patient no show appointments for the specific time frame of March, April, September, and October 2018. The advanced access scheduling model visit status for missed appointments is 5.5% (*n*=264), cancelled appointments is 14.3% (*n*=690), and arrived appointments is 80.2% (*n*=3861).

Advanced access scheduling model, missed appt rates (AASM-MAR). The advanced access scheduling model for missed appointment rates describes only no-show appointments (*n*=264) prescheduled 24 hours or less prior to the appointment for the specific time frame of March, April, September, and October 2018 and grouped into preferred primary care provider and nonpreferred primary care provider. Patients that no-showed for the prescheduled appointment with a preferred primary care physicians equaled 46.6% (*n*=123) and patients that no-showed for the prescheduled appointment with a nonpreferred primary care physicians equaled 53.4% (*n*=141).

Advanced access scheduling model, provider (AASM-P). The advanced access scheduling model for provider type describes appointment prescheduled 24 hours or less prior to the appointment for the specific time frame of March, April, September, and October 2018 with either a preferred primary care physician or a nonpreferred primary care physician (*n*=4,815). Patients prescheduled with a preferred primary care physician equaled 56.8% (*n*=2,733) and patients prescheduled with a nonpreferred primary care physician equaled 43.2% (*n*=2,082).

Advanced access scheduling model, time (AASM-T). The advanced access scheduling model for time describes appointments prescheduled 24 hours prior to the appointment or prescheduled on the same day of the appointment for the specific time frame of March, April, September, and October 2018. Prescheduled appointments that were scheduled 24 hours prior to the appointment date equaled 47.9% (*n*=2,304) and prescheduled appointments that were scheduled the same day of the appointment equaled 52.1% (*n*=2,511).

Table 4 represents the non-variable descriptive statistics of the total patient population from March, April, September, and October 2018 of gender, age, race, ethnicity, insurance type, and geographical location via zip code categorized into county and out of state.

Table 4

Descriptive Statistics Demographics - Gender, Age, Race, Ethnicity, Insurance Type, and Geographical Location via Zip Code.

Data Element	Characteristic	Frequency	Valid Percentage (%)
Gender	Male	1,640	34.1%
	Female	3,175	65.9%
Age	18-29	524	10.9%
	30-39	613	12.7%
	40-49	887	18.4%
	50-59	941	19.5%
	60-69	925	19.2%
	70-79	653	13.6%
	80-89	232	4.8%
	90-99	40	0.8%
Race	Caucasian	1,160	24.9%
	African America	2,926	62.7%
	Asian	11	0.2%
	Other	203	4.3%
	Declined	367	7.9%
	Missing	148	
Ethnicity	Hispanic/Latino/Spanish Origin	188	4.1%
	Not Hispanic/Latino/Spanish Origin	3,947	84.8%
	Declined	518	11.1%
	Missing	162	
Insurance	Commercial	2,345	48.7%
	Medicare/Medicare HMO	1.640	34.1%
	Medicaid	706	14.7%
	Other/Crime Victim/Motor Vehicle	11	.2%
	Self-Pay	113	2.3%
Zip Code	Cook County, Illinois	3,910	81.2%
	Other Illinois Counties	801	16.6%
	Out of State Counties (14)	104	2.2%

As shown in the above non-variable descriptive table, the data population information of the total visits (n=4,815).

Population gender and age. There were more female patients than male patients. Female patients represented 65.9% (*n*=3,175) of the population, whereas 34.1% (*n*=1,640) were males. The patients spanned in age from 18 to 99 years old. Patients ranging from 18-29 totaled 10.9% (*n*=524), patients ranging from 30-39 years of age totaled 12.7% (*n*=613), patients ranging from 40-49 years of age totaled 18.4% (*n*=887), patient ranging from 50-59 years of age totaled 19.5% (*n*=941), patients ranging from 60-69 years of age totaled 19.2% (*n*=925), patients ranging from 70-79 years of age totaled 13.6% (*n*=653), patients ranging from 80-89 years of age totaled 4.8% (*n*=232) and patients ranging from 90-99 years of age totaled 0.8% (*n*=40).

Population race and ethnicity. The patient's race was identified as either Caucasian, African American, Asian, Other, Declined, and Missing. Caucasian patients is 24.9% (*n*=1,160), African American patients is 62.7% (*n*=2,926), Asian patients is 0.2% (*n*=11), Other patients is 4.3% (*n*=203), patients who indicated they were declining to answer this questions at registration is 7.9% (*n*=367), and patients that left this question blank during registration is 148. The patient's ethnicity was identified as Hispanic/Latino/Spanish Origin, Not Hispanic/Latino/Spanish Origin, Declined, or Missing. Hispanic/Latino/Spanish origin patients is 4.1% (*n*=188), Not Hispanic/Latino/Spanish origin patients is 84.8% (*n*= 3,947), patients who indicated they were declining to answer this question at registration is 11.1% (*n*=518), and patients that left this questions blank during registration is 162.

Population insurance. The patient's insurance was identified as commercial, Medicare/Medicare HMO, Medicaid, other/crime victim/motor vehicle, and self-pay.

Patients with commercial insurance is 48.7% (*n*=2,345), patients with Medicare/Medicare HMO insurance is 34.1% (*n*=1,640), patients with Medicaid insurance is 14.7% (*n*=706), patients with other, were crime victims, or used motor vehicle insurance is 0.2% (*n*=11), and patients that did not have insurance and were self-pay is 2.3% (*n*=113).

Population geographical location via zip code. The geographical location via zip code was categorized into individual counties that patients were residents. There were 212 unique zip codes that represented 17 Illinois counties and 14 counties in states outside of Illinois. Cook County, where the large multispecialty and primary care office is located, serviced 81.2% or 88 zip codes totaling 3,910 patients. There were 16.6% or 66 zip codes of the population that resided outside of Cook County totaling 801 patients. There were 2.2% or 58 zip codes of the population that resided in counties located outside of Illinois totaling 104 patients that lived in 14 states that included Texas, Michigan, Indiana, Florida, Georgia, Pennsylvania, Maryland, South Carolina, Tennessee, Kansas, Oklahoma, Mississippi, Arizona and New Mexico.

Study Results

After I completed the collection, organization, and description of the secondary data set above, I applied inferential statistics and hypothesis testing in order to test for all significant trends in the March, April, September, and October 2018 historic patient scheduling raw data. The inferential statistics tests used were *z*-test of proportion and chi-square test of association, and Cramer's V.

The *z*-Test of Proportion

Miller (2016) states that the *z*-test of proportion is completed to determine whether two population means are different when the variances are known and the sample size is large. Miller (2016) indicates that the test statistic is assumed to have a normal distribution based on the central limit theorem because as the sample size gets bigger the samples are approximately normally distributed. Miller (2016) positions that *z*-tests are similar to *t*-tests, but *t*-tests are best performed with a smaller sample size. Pandis (2015) states that the *z*-test of one proportion is used to assess whether a population proportion is significantly different for a hypothesized value, whereas the *z*-test of two proportions is used to compare two observed proportions to see if they are the same. Miller (2016) and Pandis (2015) stipulate that the null hypothesis for the *z*-test of proportion is the proportions are the same and the alternate hypothesis is that the proportions are not the same.

Chi-Square Test of Association

Albright & Winston (2015) state that the chi-square test of association tests strength of the association between two categorical variables measured at an ordinal or nominal level by determining if observed counts are different enough for the test to be significant. Albright & Winston (2105) indicated that when expected counts are equal to or close to the observed count there is no significant relationship between variables and when the chi-square test is less that alpha, also known as the P value, the results are significant and the null hypothesis can be rejected in favor of the alternative hypothesis.

There is a five-step approach used to conduct the chi-square test for independence. Moore, Notz, & Flinger (2013) position that the researcher formulates the hypotheses by stating the null hypothesis and alternative hypothesis, that the researcher specifies the expected values for each cell in the cross tabulation, the researcher compares the observed counts from the sample with the expected counts assuming the null hypothesis is true, the researcher computes the test statistic, and then determines if chi-square is statistically significant.

Research Question #1

RQ1: Is there a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the nonpreferred primary care physician sample?

One sample *z*-test of proportions. Boyer (2019) and Medical Group Management Association (October 2018) claim current benchmarks for national no-show rates in primary care are 19%. The population mean, assuming the null hypothesis is true, is $\mu H_{0} = .19$ and the population standard deviation, assuming the null hypothesis is true is $\sigma H_0 = .392$, which is calculated from the square root of the population percentage that no-shows multiplied by the population percentage that does not no-show ($\sigma H_0 = \sqrt{(.19)(.81)} = \sqrt{.1539} = .392$). The *z* statistic in a one sample *z*-test of proportion was calculated to determine if the no-show rate percentage with this study is different than the national no-show rate percentage. Miller (2016) presents that to run a *z*-test on data that the null and alternative hypothesis have to be stated, therefore the null hypothesis is accepted fact that $H_{0:} p = 0.19$ versus the alternative hypothesis that $H_{a:} p \neq 0.19$, where

p is the proportion of the percentage of patient's that missed prescheduled appointments with nonpreferred primary care physicians utilizing advanced access scheduling. The null hypothesis is claiming that the true proportion of the no-show rate in this study is the same as the national no-show rate, whereas the alternative hypothesis claims that the no-show rate in this study is different than the national no-show rate. Table 5 represents the values of the one sample *z*-test.

Table 5

One Sample Z-Test – Nonpreferred Primary Care Provider

Statistical Terms	Values	Notes
Null Hypothesis	$H_0 : p = 0.19$	No significant difference between the two population means
Two Tail Hypothesis	$H_a : p \neq 0.19$	There is a significant difference between the two population means.
Alpha	$\propto = 0.05$	.025 each tail (two tail hypothesis)
Critical Value or Z score	$\pm$ 1.96	Rejection regions
Sample size Non Preferred primary care physician	2,082	Prescheduled advanced access scheduling model visits
Sample size No Shows	141	Prescheduled visits with nonpreferred primary care physicians
Sample Proportion	0.067	Results from dividing the number of no-shows (141) by total sample population (2,082)
Z Statistic	-14.31	Number of standard deviations away from the mean
P Value	< .025	Strength of the evidence against the null hypothesis

The calculation for the sample proportion is shown as $\hat{p} = \frac{141}{2082} = 0.067$.

The calculation for the test statistic is $Z = \frac{0.067 - 0.19}{\sqrt{\frac{0.19(1-0.19)}{2082}}} = \frac{-0.123}{\sqrt{.00007}} = \frac{-0.123}{.008597634} \sim$ -14.31.

The *z* score does not fall within the range of the critical value of $\pm$ 1.96, therefore the null hypothesis is rejected. This demonstrates that the true proportion of the no-show rate in this study had a statistically significant difference in the mean proportion than the national no-show rate.

Research Question #2

RQ2: Is there a statistically significant mean proportion difference between the national no-show rate and the missed appointment rate of the preferred primary care physician sample?

One sample *z*-test of proportions. Boyer (2019) and Medical Group Management Association (October 2018) claim current benchmarks for national no-show rates in primary care are 19%. The population mean, assuming the null hypothesis is true, is $\mu H_{0 =}$ .19 and the population standard deviation, assuming the null hypothesis is true is σH_0 = .392, which is calculated from the square root of the population percentage that no-shows multiplied by the population percentage that does not no-show ($\sigma H_0 = \sqrt{(.19)(.81)} = \sqrt{.1539}$ = .392). The *z* statistic in a one-sample *z*-test of proportion was calculated to determine if the no-show rate percentage with this study is different than the national no-show rate percentage. Miller (2016) presents that to run a *z*-test on data that the null and alternative hypothesis have to be stated, therefore the null hypothesis is accepted fact that $H_{0 :} p = 0.19$ versus the alternative hypothesis that $H_{a :} p \neq 0.19$, where p is the proportion of the percentage of patients that missed prescheduled appointments with preferred primary care physicians utilizing advanced access scheduling. The null hypothesis is claiming that the true proportion of the no-show rate in this study is the

same as the national no-show rate, whereas the alternative hypothesis claims that the no-show rate in this study is different than the national no-show rate. Table 6 represents the values of the one sample *z*-test.

Table 6

One Sample Z-Test –Preferred Primary Care Provider

Statistical Terms	Values	Notes
Null Hypothesis	H_0 : p = 0.19	No significant difference between the two population means
Two Tail Hypothesis	H_a : p ≠ 0.19	There is a significant difference between the two population means.
Alpha	$\propto = 0.05$	.025 each tail (two tail hypothesis)
Critical Value or Z score	$\pm$ 1.96	Rejection regions
Sample size Non Preferred primary care physician	2,733	Prescheduled advanced access scheduling model visits
Sample size No Shows	123	Prescheduled visits with nonpreferred primary care physicians
Sample Proportion	0.045	Results from dividing the number of no-shows (123) by total sample population (2,733)
Z Statistic	-19.32	Number of standard deviations away from the mean
P Value	< .025	Strength of the evidence against the null hypothesis

The calculation for the sample proportion is shown as $\hat{p} = \frac{123}{2733} = 0.045$.

The calculation for the test statistic is $Z = \frac{0.045 - 0.19}{\sqrt{\frac{0.19(1-0.19)}{2733}}} = \frac{-0.145}{\sqrt{.00005}} = \frac{-0.145}{.007504115} \sim$ -19.32.

The *z* score does not fall within the range of the critical value of $\pm$ 1.96, therefore the null hypothesis is rejected. This demonstrates that the true proportion of the no-show rate in this study had a statistically significant difference in the mean proportion than the national no-show rate.

Research Question #3

RQ3: Is there an association between primary care physician type, preferred and nonpreferred, and the advanced access scheduling model visit status of arrived, cancelled, and no-show?

Two sample z-test for proportions. A two sample *z*-test for proportions was calculated to compare two proportions to determine if they are the same. Miller (2016) presents that to run a *z*-test on data that the null and alternative hypothesis have to be stated, therefore the null hypothesis is accepted fact that the proportions are the same, $P_1 = P_2$versus the alternative hypothesis that the proportions are not the same, $P_1 \neq P_2$. Table 7 represents the values of the two sample *z*-test for proportions.

Table 7

Two Sample Z-Test for Proportions

Statistical Terms	Values	Notes
Null Hypothesis	$H_0 : p_1 = p_2$	The proportions are the same
Two Tail Hypothesis	$H_a : p_1 \neq p_2$	The proportions are not the same
Alpha	$\propto = 0.05$	.025 each tail (two tail hypothesis)
Critical Value or Z score	$\pm$ 1.96	Rejection regions
Sample size p_1	2,733	Prescheduled visits with preferred primary care physicians
Sample size No Shows p_1	123	Prescheduled no show visits with preferred primary care physicians
Sample size p_2	2,082	Prescheduled visits with nonpreferred primary care physicians
Sample size No Shows p_2	141	Prescheduled no show visits with nonpreferred primary care physicians
Overall Sample Proportion	.054 (5.4%)	Results from adding no shows and dividing that by total population
Z Statistic	-4.80	Number of standard deviations away from the mean
P Value	< .025	Strength of the evidence against the null hypothesis

The calculation to find the two proportions is shown as: $P_1 = \frac{123}{2733}$ = .045 (4.5%) and $P_2 = \frac{141}{2082}$ = .067 (6.7%).

The calculation for the overall sample proportion is shown as: P = $\frac{(123+141)}{(2733+2082)}$ = $\frac{264}{4815}$ = .054 (5.4%).

The calculation is Z=$\frac{(0.045-0.067)-0}{\sqrt{0.054(1-.054)(\frac{1}{2733}+\frac{1}{2082})}}$ = -4.80. The test value is -4.80, which is outside of the critical value of $\pm$ 1.96, therefore the null hypothesis is rejected and the alternative is accepted. The *z*-test demonstrated there was a significant difference of the two proportions, concluding that $P_1 \neq P_2$.

Test for association. A chi-square test of association was conducted to examine whether there was an association between primary care physician type, preferred and nonpreferred, and the advance access scheduling model visit status of arrived, cancelled, and no-show. The advanced access scheduling sample of patients prescheduled 24 hours or less prior to the appointment was analyzed (*n=4,815*). The sample size of nonpreferred primary care physicians was 2,082 and preferred primary care physicians was 2,733. Statistical tests were 2-sided with statistical significance evaluated at the 5% level. Table 8, Table 9, and Table 10 represents the results. Table 8 depicts cross tabulation with frequencies and percentages for the categorical variable. Table 9 depicts the Pearson's chi-square test. Table 10 depicts the Phi and Cramer's V.

Table 8

Frequencies and Percentages for Categorical Direct Variables Advanced Access Scheduling Model Visit Status (ARR, CAN, NOS) and Primary Care Physician Type (Preferred PCP and Non Preferred PCP).

	Preferred PCP		Non Preferred PCP	
	n	%	n	%
ARR	2,234	57.9	1,627	42.1
CAN	376	54.5	314	45.5
NOS	123	46.6	141	53.4
TOTAL	2,733	100	2,082	100

Note. ARR = visit was arrived. CAN = visit was canceled. NOS = visit was a no-show.

As shown in the above table there appears that an association exists just by comparing across categories. The below Pearson's chi-square test will determine if a claim can be made that a statistical association exists. The Table 9 represents the values of the Pearson's chi-square test.

Table 9

Pearson's Chi-Square Test Results

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.474^{a}	2	.001
Likelihood Ratio	14.345	2	.001
Linear-by-Linear Association	13.621	1	.000
N of Valid Cases	4815		

Note. a = 0 cells (0.0%) have expected count less than 5. The minimum expected count is 114.15.

The results show that there is a statistical significant association between primary care physician type, preferred and nonpreferred, and the advanced access scheduling model visit status of arrived, cancelled, and no-show, $\chi^2(2,n=4,815) = 14.474$, p = .001. A claim can be made that the association observed in the sample also exists in the population. The hypothesis decision is to reject the null with more than 99% confidence and there is no Type 1 error because there is evidence to support the claim that there is an association between primary care physician type, preferred and nonpreferred, and the advance access scheduling model visit status of arrived, cancelled, and no-show.

Effect size. To determine the strength of the statistical significant association an effect size is helpful. Kim (2017) states that there are three measures of effect size for chi-squared tests, Phi, Cramer's V, and odds ratio. Phi and odds ratio would not be used for this test because those measures can only be used with 2 X 2 contingency tables, whereas the Cramer's V is used for bigger tables such as our 2 X 3 contingency table.

Cramer's V is a post-test to determine strengths of the statistical association between primary care physician type, preferred and nonpreferred, and the Advance Access Scheduling Model visit status of arrived, cancelled, and no-show after chi-square has determined a statistical significance exists. Miller (2016) and Pandis (2015) state that Cramer's V test is used when the cross tabulation variable has more than two categories. Moore et al. (2013) position that the Cramer's V value must be between 0, indicating complete independence, and 1.0, indicating complete dependence or association between the variables. The closer to 0.00 the weaker the strength of association. Table 10 represents the Cramer's V results.

Table 10

Cramer's V

	Value	Approximate Significance
Phi	.055	.001
Cramer's V	.055	.001
N of Valid Cases	4,815	

The results revealed that there is a weak association between primary care physician type, preferred and nonpreferred, and the advanced access scheduling model visit status of arrived, cancelled, and no-show because the V value is closer to 0 than 1. This small Cramer's V value indicates that even though there is an association between the variables the strength of the association is not very high.

Above, I presented the data analysis for descriptive statistics, as well as both the *z*-test of proportions and chi-square test of association for each research question. The results of those statistics determined that the true proportion of the no-show rates in this study had a statistically significant difference in the mean proportion than the national no-show rate with both nonpreferred primary care physicians and preferred primary care physicians. There was also a significant association between primary care physician type, preferred and nonpreferred, and the advanced access scheduling model visit status of arrived, cancelled, and no-show with a weak strength of association. The null hypothesis for each of the three research questions were rejected.

Summary

In section 3, I presented the results and findings of this study, including the data collection plan, data exclusions, data inclusions, descriptive statistics, and inferential statistics. The inferential statistics applied in the study was the *z*-test of proportions, both the one sample *z*-test and *z*-test of two proportions, and cross tabulations with chi-square test of association and effect size using Cramer's V. The study examined advanced access scheduled no show visits with preferred primary care physicians versus nonpreferred primary care physicians from a multispecialty and primary care medical office that is a part of a large medical group.

Section 4 includes the interpretation of the results, limitations of the study, recommendations, and implications for professional practice and social change.

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

Introduction

The purpose of this nonexperimental quantitative, correlation study was to determine if there was an association between advanced access scheduling and missed appointment rates, specifically focusing on no-shows with preferred primary care physicians versus nonpreferred primary care physicians. Findings from the *z*-tests of proportion, both the one sample and two sample *z*-tests of proportions, indicated significant differences with the national no-show rates and the missed appointment rates of the study samples, as well as a significant difference between the two sample proportions. Findings from the chi-square indicated significant association between primary care physician type, preferred primary care provider and nonpreferred primary care provider, and the advanced access scheduling model visit status of arrive, cancelled, and no-show. However, the strength of the association was weak indicating a need for further study.

Given the multiple dimensions that occur as reasons for and results of missed prescheduled primary care appointments, these findings may be used to ensure patients and physician offices appreciate the complexity of the missed appointment challenges and all partner for solutions. Section 4 includes an interpretation of the findings, limitations of the study, recommendations for further research, and implications for professional practice and social change.

Interpretation of Results

RQ1: Analysis

National no-show rate and no-show rate of the sample with nonpreferred primary care physicians. The nonpreferred primary care physician no-show rate in this study was significantly different than the national no-show rate ($p \neq 0.19$). Therefore, the $H_0$1was rejected, and the $H_1$1 was accepted. The *z* score of -14.31 does not fall within the range of the critical value of $\pm$ 1.96, thus the null hypothesis was rejected. The sample proportion of the nonpreferred primary care physician no-show rate in this study was 6.7%. This demonstrates the true proportion of the nonpreferred primary care physician no-show rate in this study has a statistically significant difference than the mean proportion of the national no-show rate.

RQ2: Analysis

National no-show rate and no-show rate of the sample with preferred primary care physicians. The preferred primary care physician no-show rate in this study was significantly different than the national no-show rate ($p \neq 0.19$). Therefore, the $H_0$2 was rejected, and the $H_1$2 was accepted. The *z* score of -19.32 does not fall within the range of the critical value of$\pm$ 1.96, thus the null hypothesis was rejected. The sample proportion of the preferred primary care physician no-show rate in this study was 4.5%. This demonstrates the true proportion of the preferred primary care physician no-show rate in this study has a statistically significant difference than the mean proportion of the national no-show rate.

RQ3: Analysis

Comparison of the two proportions to determine if they are the same and analysis of association between primary care physician type and the advanced access scheduling model visit status. The results revealed that there was a significant difference in the two sample proportions concluding that $P_1 \neq P_2$. The test value is -4.80. The test value was outside of the critical value of $\pm$ 1.96, therefore the null hypothesis was rejected and the alternative was accepted that the two proportions are not equal. Additionally, the chi-square results revealed that there was a statistical significant association between primary care physician type, preferred and nonpreferred, and the advance access scheduling model visit status of arrived, cancelled, and no-show (p = .001). Therefore, the $H_0$3 was rejected, and the $H_1$3 was accepted. However, Cramer's V post-test to determine strengths of the statistical association indicated a weak association between primary care physician type, preferred and nonpreferred, and the advance access scheduling model visit status of arrived, cancelled, and no-show because the V value was closer to 0 than 1 (V= .055).

Findings to Literature

My findings indicated that there was a significantly different no-show rate in this study than that of the national no-show rate and that there was a statistical significant association between primary care physician type and the advance access scheduling model visit status of arrived, cancelled, and no-show. I discuss the findings in the following subsections by the independent variable, advanced access scheduling, and

dependent variables missed appointment rate with preferred primary care physician and missed appointment rate with nonpreferred primary care physician.

Advanced access scheduling model. As shown in the literature review, an advanced access scheduling model is a scheduling strategy to offer patients prescheduled appointments that are made usually on the same day or within 24 hours of the schedule request with the patient's preferred primary care physician regardless of reason for the visit (Ansell et al., 2017; Kiran & O'Brien, 2015; Malham et al., 2017; Norris et al., 2014; Riedl et al., 2018; Samorani & LaGanga, 2015; Tsai & Teng, 2014). Findings from researchers in past studies on advanced access scheduling have made assumptions that appointments made 24 hours or less to the actual appointment have little to no missed appointment rates (Liu, 2016; Malham, et al., 2017; Norris et al., 2014; Samorani & LaGanga, 2015; Tsai & Teng, 2014). My findings in this study showed that patients did miss prescheduled appointments made 24 hours or less prior to the actual appointment. The missed appointment rate in this study for prescheduled appointments made 24 hours or less was 5.5%.

Missed appointment rate. Many researchers concentrated on missed appointment rates have calculated missed appointment rates between a wide range of 5 to 55%, (Anisi et al., 2018; Boos et al., 2016; Drewek et al., 2017; Goffman et al., 2017; Liu, 2016). Boyer (2019) and Medical Group Management Association (October 2018) claim current benchmarks for national no-show rates in primary care are 19%. The missed appointment rate in this study was 5.5%, which aligned with the lower end of the

missed appointment percentage range in missed appointment rate research, however it is much lower than the current 2019 national benchmarks for primary care.

Provider type, nonpreferred primary care physician and preferred primary care physician. As presented in the literature review, the physician-patient relationship begins at the very first encounter and builds, develops, and strengthens with every additional, subsequent visit establishing the patient's preferred primary care physician (Chipidza et al., 2015; Dang et al., 2017; Fuertes et al., 2016). Findings from researchers in past studies have shown that patients scheduled with physicians they have not seen before, nonpreferred primary care physicians, are more likely to miss initial appointments, subsequent appointments, and not seek care at all (Chipidza et al., 2015; Dang et al., 2017; Fuertes et al., 2016). This aligned with my findings in this study. My findings showed that there is a statistical significant association between primary care physician type, preferred and nonpreferred, and the advance access scheduling model visit status of arrived, cancelled, and no-show. The valid percentage of advanced access scheduled missed appointments with a preferred primary care physician was 46.6%, whereas the valid percentage of advanced access scheduled missed appointments with a nonpreferred primary care physician was higher at 53.4%.

Findings to Theory

The primary conceptual framework for this study was the health belief model. The health belief model is used to explain and predict health behaviors of individuals (Jones et al., 2014; Jones et al., 2015; Montanaro & Bryan, 2014). The health belief model theory is commonly used in health education, health promotion, and disease

prevention (Tarkang & Zotor, 2015). This model is used to theorize that people will act to prevent illness if they perceive they are susceptible to the illness, perceive existing illness is severe, perceive there is a benefit in taking action, perceive there are minimal barriers that avert taking action, and believe in themselves to take action (Jones et al., 2014). Missing a prescheduled primary care appointment is a health behavior. An impression of the health belief model, as the theory relates to advanced access scheduling happens when a patients request to receive care from his or her preferred primary care physician, at any time, for any reason, which promotes appointment compliance (McGough et al., 2017). The theoretical frame work of the health belief model is applicable to this study. The findings of the study demonstrate positive patient healthy behaviors supported by identified association between advanced access scheduling and missed appointments specific to scheduling with a specific provider type. The patients' perception of the prescheduled appointment with a preferred primary care provider and with a nonpreferred primary care provider impacts the patient's appointment behaviors. My findings in this study showed that more patients attended prescheduled appointments made 24 hours or less with a preferred primary care physician, 56.8%, than that of a nonpreferred primary care physician at 43.2%. Patients were less likely to miss a prescheduled appointment made 24 hours or less with a preferred primary care physician at 46.6%, than that with the nonpreferred primary care physician at 53.4%.

Summary of Key Findings and Interpretation

The quantitative outcomes of this research study affirm that there is a statistically significant mean proportion difference between the national primary care no-show rate

and the missed appointment rate of the nonpreferred primary care physician sample and the preferred primary care physician sample when each physician type was analyzed separately. Additionally, the findings indicated that the true proportion of the nonpreferred primary care physician no-show rate and the preferred primary care physician no-show rate in this study have a statistically significant difference between each sample proportion. The findings also showed there was a statistical significant association between primary care physician type, preferred and nonpreferred, and the advance access scheduling model visit status of arrived, cancelled, and no-show.

Limitations of the Study

Marshall & Rossman (2016) state that limitations are inadequacies of the study that could not be controlled by the researcher. A limitation of the study was the secondary data was abundant and challenging to thoroughly explore. I missed opportunities to identify specific scheduling details such as the reason for the visit and patterns of previous no-shows, which may have added supplementary value to the study. In addition, the secondary data did not offer any qualitative findings. Squires & Dorsen (2018) state that qualitative findings relate to the voice of the patient's individual perspectives and distinct reasoning for an action. The secondary data lacked the motivations, viewpoints, and experiences from the patients. The secondary data did not provide any emotional factors that may lead to a better understand of the patient's knowledge, attitude, belief, and intention of his or her missed appointment behavior.

Recommendations

Limitations of the study disclosed potential areas of opportunity for future researchers. Therefore, extending the research to include reason for the visit, primary diagnosis and/or level of service, as well as previous missed appointment patterns would align identification of possible predicative health behaviors based on the patient's medical conditions and past behaviors. Squires & Dorsen (2018) state that research extended to include qualitative tactics that align with the quantitative data may enhance and strengthen the overall study.

Implications for Professional Practice and Social Change

I intended to use this study's results to provide implications for professional practice and positive social change relevant to the impact of advanced access scheduling on missed appointment rates in primary care. I demonstrated that this study had a significantly lower no-show rate than that of the national no-show rate and that there was a statistical significant association between primary care physician type, preferred and nonpreferred, and the advance access scheduling model visit status of arrived, cancelled, and no-show. The study demonstrates to healthcare administrators that advanced access scheduling models may not eliminate missed appointments, but this scheduling model does improve the number of patients who keep their appointments (Malham et al., 2017; Tsai & Teng, 2014). This knowledge provides healthcare administrators and physicians opportunities to work together to create organizational structures that support patient care.

Professional Practice

Healthcare administrators are continuously challenged to solve problems including no-show appointments, which results in lost revenue and quality issues related to patient care (Aggarwal et al., 2015; AlRowaili et al, 2016; Hwang et al., 2015; Kheirkhan, et al., 2016; Norris et al., 2014; Saeed et al., 2018). Studies, such as this one, provide health care administrators with an affirmation that missed appointments are not random. In addition, this study provides health care administrators with an understanding of the significance surrounding advanced access scheduling and patient no-show behaviors (Anisi et al., 2018; Kiran & O'Brien, 2015; Malham et al., 2017; Riedl et al., 2018; Samorani & LaGanga, 2015; Tsai & Teng, 2014). Accepting that certain advanced access scheduling factors impact no-show behavior is important to healthcare administrators when developing interventions to lessen the number of missed appointments. As such, the results put forth in this study can substantiate necessary changes in scheduling templates, policies and overbooking, and establish best practices for advanced access scheduling. Knowing that patients are more likely to attend advanced access prescheduled appointments with preferred primary care providers allows healthcare administrators to design and implement more effective provider scheduling templates to improve prescheduled appointment compliance.

Social Change

Patients that fail to attend prescheduled appointments with a preferred primary care physician or a nonpreferred primary care physician stimulate a host of unfavorable health outcomes. Reducing missed appointment rates reverses these damaging outcomes

and improves compliance with medical treatments (Aggarwal et al., 2015; AlRowaili et al., 2016; Hwang et al., 2015; Weisz et al., 2015). Therefore, determining the impact that advanced access scheduling has on missed appointment rates in primary care supports ongoing research to improve appointment attendance. This study lays a foundation for rethinking and redesigning advanced access scheduling models to positively influence patient appointment behaviors by increasing appointment compliance and ultimately maximizing productivity in the clinic.

Conclusion

This study addressed the knowledge gap in missed appointment literature by contributing to existing research about advanced access scheduling and missed appointments with preferred primary care physicians versus nonpreferred primary care physicians. My findings indicated that there was significantly different no-show rates in this study than that of the national no-show rate, which suggest an advantage of using an advanced access scheduling model in outpatient clinics. Results also indicated a statistical significant association between physician type, preferred primary care physician and nonpreferred primary care physician, and the visit status of arrived, cancelled, and no-show, which suggest the physician-patient relationship contributes to attending prescheduled appointments. Based on this study, advanced access scheduling with preferred primary care physicians may lead to reduction of missed appointment rates, which enhances positive health outcomes for patients, decreased financial impediments, and strengthening of the physician-patient relationship. Healthcare administrators have a responsibility to embrace operational best practices to develop,

refine, and execute tactics specifically designed to improve the quality of care and overall health care experience for patients. Creating positive health care experiences that encourage patients to attend appointments is essential for the transformation of the healthcare industry.

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