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Patient Satisfaction Management in Office Visits and Telehealth in Health Care Technology

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Todd Price

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Walden University
2018

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Abstract

Patient Satisfaction Management in Office Visits and Telehealth in Health Care Technology

by

Todd Allen Price

MBA, Ferris State University, 2009

MS in Ed, Eastern Illinois University, 2000

BAA, Central Michigan University, 1998

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

March 2018

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Abstract

Telehealth and remote medical treatments have begun to be more commonly used in healthcare systems. Researchers have theorized that providers' abilities to treat patients are not directly tied to the proximity of the patient to the doctor, but by the identification and treatment of the patient's symptoms. Although the treatment and cure rates are being established within individual health systems and professional medical associations, empirical research is lacking regarding patient satisfaction with this remote treatment situation. The purpose of this quantitative study was to address this gap by examining satisfaction ratings of patients between virtual provider visits and face-to-face provider visits. The Clinician & Group Survey developed by the Consumer Assessment of Health Care Providers and Systems (CAHPS), through the United States government department, Agency for Health Care Research and Quality, measured patient satisfaction. Data from health care patients in the United States (N=8854) were randomly selected from the CAHPS data set containing 457,418 encounters. Of this number, 4,427 unique patient encounters were with face-to-face health care visits and 4,427 unique patient encounters were with telehealth providers. The ANOVA results showed no significant differences in patient satisfaction management between the availability of providers to meet face-to-face with patients who met with providers in a telehealth setting. Possible social change implications are a shift from face-to-face visits to virtual visits structured in the need to shift all patients from the standard office visit system to the on-demand network opportunity that virtual telehealth and mobile commerce health care offers to allow the benefit of technology to assist these patients.

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Dedication

This dissertation is dedicated to my wife and best friend, Kelly Marie Price. This project would not have happened without you and I owe all of the high points in my life to you.

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Acknowledgments

I would like to extend my sincere and heartfelt obligation toward the following individuals who helped me in this endeavor:

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Any omission in this brief acknowledgement does not mean a lack of gratitude.

Todd Price

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Chapter 1: Introduction to the Study

In this study, I examined how the care management of telehealth is affecting patients. By showing the adoption rate of telehealth and overall patient satisfaction, the study findings will help health care groups determine if this new delivery system will provide patient care to those who need it most and in a way that will possibly enhance their primary care experience. Positive social change may be advanced by this study through the support of increased access to managed health care for those who do not have access to it.

Background of the Study

Health care is crucial to the effectiveness of a country's productivity. Laborers control of the factors of production, the citizens presence is crucial to production and government provides health services to the public (Ettelt et al., 2015). A growing population has made it impossible for government facilities to meet the demands of its citizens. The United States of America has a governmental budget that is expected to cater for the recurrent and capital expenditure needs of the nation (Dracup. 2011). This leaves countries with insufficient funds to allocate to the ministries of health to help them budget for the health sector. This has allowed the private sector venture of insurance and healthcare to offer alternative services. Private companies offer quality services as they employ qualified staff and have acquired the modern equipment that diagnose various chronic diseases (Elliot et al., 2015). Some private hospitals have more sophisticated equipment than large government hospitals (Elliot el al., 2015).

Healthcare is a crucial sector in a nation. The leanest mode of running the health sector is key to service delivery in the sector. Governments establish health ministries to

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monitor the activities in in the medical industry in the United States of America as required by law (Bogue, 2014). Huge budgets are committed to pay medical personnel, run hospitals, and create new hospital infrastructures (Gaberial et al., 2014).

Due to the importance of health, international partnerships and collaboration in health affairs have arisen (Mustafee, & Katsaliaki, 2015). For instance, the United Nations (UN) has set up the World Health Organization (WHO), which facilitates health programs in various countries (Vardiman et al., 2009). The WHO facilitates mass education in partnership with respective health ministries in different countries creating awareness of the existence of certain diseases (Alkmin et al., 2012). Through the WHO, the UN offers aid to various nongovernmental organizations (NGOs) that have interest in health matters. Health has become an international agenda as countries have been collaborating to fight various diseases like Ebola that struck Western Africa in some months back (Gomes et al., 2014). World forum has been continuously held to discuss health matters.

The World Health Organization (WHO) has established collaborations with various governments through the ministries of health, whereby they assist in funding health activities (Alkmin et al., 2012). The WHO has been responsible for funding awareness campaigns in most of the developing countries in order to educate the public about ways to avoid some diseases and live a healthy lifestyle.

Other UN agencies such as the United Nations Environmental Program (UNEP) and the United Nations High Commission for Refugees (UNHCR) have also partnered with the WHO in improving health facilities (Vardiman et al., 2009). UNEP engages in activities that enhance the conservation of the environment and the ways mankind

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interacts with ecosystems to reduce the ultimate results of positive relations with the environment (Mustafee, & Katsaliaki, 2015). UNHCR advocates for refugees rights. UNHCR camps in refugee camps provide for the needs of the refugees in terms of basic needs such as food, shelter, health and security (Alkmin et al., 2012).

Health care has evolved over the years; however, the doctor patient visit has not changed much (Kaphingst, et al., 2014). Given that the earth's population is consistently growing and areas that previously did not have access to the Internet now do, the social change hope that health care can be accessed by all is a realistic goal. Many individuals newly online live in rural areas that do not have many medical professionals (Kaphingst, et al., 2014).

The Food and Drug Administration (FDA) is setting criteria for health care systems' use of mobile applications (Hartford, 2014). Comstock (2015) discussed the large database systems currently in use for mobile health applications by the National Health services (NHS). In addition to governments, clinicians also have expressed positive views regarding direct patient care via mobile health care (PWC Health Research Institute, 2014). The cost savings involved for patients and health care systems with telehealth programs were highlighted by Dolan (2012).

The health care sector has moved toward improvement of services. The health care sector's improvement in terms of economic conditions and better lifestyles has called for better health services. Chronic diseases such as heart failure and cancer require improved and better medical care facilities (Berns, & Hommes, 2013). The United State government has not been able to cater to the public health needs and this resulted in private sector engagement in the health field (Gran et al., 2014). Private hospitals have

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often been credited for offering quality services that meet the patient's needs (Matysiewicz, & Smyczek, 2013). Private sectors have attracted large numbers of new customers who need quality services (Henderson et al., 2013). The healthcare sector has been incorporating patients' opinions regarding their management through the use of suggestion boxes in their systems. Private health institutions have integrated patient views regarding quality services (Kenen, 2015). The delivery of quality services has been a great concern and priority for the private health facilities. Since the private health sectors are profit making oriented, they have set certain standards that enable them continue offering better and improved health care needs (Kumari, 2014).

The need to improve the health sector has created technological improvement and innovation (Lee & Meuter, 2010). Technologists have found new ways of offering efficient and better health services. Many innovations have been in the form of applications that are downloadable in play stores (Yang & Silverman, 2014). These applications allow easier access to care for people who have adopted technology (Zia, et al., 2015). Some of these applications are in form medical history of various diseases. Some contain instructions and advice on how to live a healthy life.

The Internet has been an avenue for accessing medical information concerning various diseases. It is now possible for the public to research the conditions they are suffering from in terms of the symptoms they are experiencing.

Telecommunication devices have improved communications between the patients and physicians (de Oliveira, 2014). Patients can remotely communicate with their doctors whenever a need arises. Doctors can monitor the patients' conditions in terms of

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changing signs and giving the proper advice whenever necessary (Schulz et al., 2015). This has improved the delivery of services in the health sector.

Increased technological innovations and advancement has led to the rise of telehealth. The advancement in technology has led to inventions of means of accessing health services at any time (Neergaard, 2013). Telehealth is a composition of various methods that enhance health care and promote health education via the use of technologies in telecommunication (Kvedar, Coye, & Everett, 2014). Telehealth is a means of making the health care services available through communication technology in areas of health diagnosis, health education, treatment, and the self-management of a patient's health at their locality while the health care provider is situated in different place (McBain, Shipley, & Newman, 2015).

Telehealth is personalized health care that entails the use of technology as a way to enable a physician-patient interaction. Telehealth takes many forms such as video conferencing or via the use of telephone and email (Bradford et al., 2014). In other forms, telehealth takes the mode of client applications containing tele medicine devices. In United Kingdom for instance, telehealth care has become part of the digital agenda of Europe (Dolan, 2012). Europe wants to digitize all forms of healthcare systems in the future (Frisbee et al., 2009). The same priority has been taken by the United States medical care providers, with the goal of increasing the number of patients who access medical services through technology (Ayatollahi, Sarabi, & Langarizadeh, 2015).

Telehealth has made it possible to counter the barriers of long distance that are travelled by the patients when accessing services. This has made it possible for access of improved medical facilities that would not formerly be accessible to rural communities

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(Mustafee & Katsaliaki, 2015). Telehealth has also been saving lives in emergency situations where immediate care is needed (Lindeman, 2011). The information passed between the patient and the medical personnel is convenient and reliable because it originates with qualified physicians. The information takes the form of images and information that is easily understandable by the general public. The nurses who monitor the patients' conditions at home give information that the patients can easily comprehend and comply with (Cai et al., 2015). Furthermore, any deterioration in the patients' health alarms the nurses who are monitoring the patient and immediate actions are taken to attend to the patient's needs.

Telehealth has positively benefited patients in isolated areas who are now in a position to receive medical care from specialists without the necessity of travelling (Mueller et al., 2014). This has solved problems of poor road networks and unreliable transport systems. Through technology, different health professionals in different places can converse and share information concerning the medication of various patients. Medical care cost is lowered as mobile technology lowers the outpatient's visits and enables prescription of drugs remotely to the location sites of the patients (Kaufman et al., 2011). Telehealth often offers medical education to patients, advising them on healthy practices such as nutrition (Martin et al., 2015).

The absence of physical presence of a physician and a patient reduces contraction of various communicable diseases. Telehealth services lower the rates of contraction of some of these diseases. Infectious diseases are evaded when the patients use telehealth services.

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Some patients fear explaining their issues in person to the doctors. Using telehealth technology, they can assess their conditions and communicate to physicians via emails and telephone (Parks, 2015). In some extreme cases, doctors are found to be bullying and they are rude to patients (Lee & Meuter, 2010). The telehealth facilities removes this obstacle and allows the patients to have a platform of knowing their health status and liaise with the physicians whenever necessary (Lee & Meuter, 2010).

Telehealth programs have been popular with healthcare providers in monitoring patients who are suffering from chronic diseases (Santamore et al., 2007). The patients are mostly the elderly who do not have the ability to rush to hospitals whenever a need arises (Abdoune & Fezari, 2016). The healthcare sector has come up with telehealth ways of monitoring their conditions at home (Biruk et al., 2014). Telehomecare programs are set up at the patients' home and have many forms. There are some that provide room for videoconferencing between the patient and the physician while there are others that allow for telephone sharing of information between the patient and the doctor (Parks, 2015). These tele-monitoring programs have an automatic way of detecting the conditions of the patients. Any irregular pattern experienced by the patients is passed to the nurses who are remotely monitoring the patients. The nurses then take action in terms of either asking the patients to take certain drugs or instructing the patients to immediately seek a doctor's assistance. In the United States of America, there has been numerous telehealth programs set up by hospitals and others by universities (Adler-Milstein, Kvedar, & Bates, 2014); good examples of these are the Veteran Health Administration (VHA) and John Hopkins University.

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Telehealth programs come with benefits both to the patients and to the government. The most appealing of these is the improvement of the quality services offered to the patients. The patients are given a chance of being under the watch of a nurse while the tele-monitoring equipment installed at home is monitoring the patient's chronic conditions. In case of any alarming changes, the nurses contact the patients to give them further instructions. This has enhanced the quality services that the patients receive from the programs. The telehealth programs have enhanced cost savings to the patient and to the hospitals (Lee & Meuter, 2010). For instance, the treatment of chronic diseases is very expensive in terms of having frequent visits to the hospital. Telehealth removes the necessity of visiting the hospital because patient conditions are always monitored remotely. Hospitals also save money in terms of the cost of installing new beds. Hospitalizing large numbers of patients is expensive in terms of care and monitoring (Rho et al., 2015). Telehealth has lowered the costs incurred in the health sector. The United State of America has benefited from this since the pressure on the limited public health facilities has lowered (Shea et al., 2013).

Telehealth programs are efficient in monitoring and catering for the needs of the patients (Baker et al., 2014). Patients who have used various telehealth programs have reduced their visits to hospitals. The rate of hospital admissions of the patients under telehealth programs have also lowered significantly. The number of days patients have spent in the hospital also decreased. In terms the improvement in health status, the patients who used the telehealth programs experienced a positive change to their health.

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Problem Statement

The Patient Protection and Affordable Care Act has created a situation in which more individuals have access to health care (Günes et al., 2014), but a dearth of available medical professionals hinders health care access for individuals in rural areas (Mcmurray et al., 2014). The result is often unsatisfactory health care and significant difficulties managing patient satisfaction (Tanner, 2014; Kumari, 2014). The problem has been managed through emergency rooms and patients delaying treatment (Mizra et al., 2014). The general problem is that with proper systems in place, a health care organization should be able to manage patient satisfaction for their patient population (Kaufman, 2011; Van, 2014). The specific problem is a lack of knowledge as to whether alternative methods of treating patients produces differing levels of patient satisfaction.

Purpose of the Study

The purpose of this quantitative study was to examine management of patient satisfaction in office visits and telehealth settings to determine if the level of patient satisfaction differs between these settings. Showcasing the management of patient satisfaction trends in this arena will give health care the needed next steps to make a transition into the management of patient satisfaction in telehealth settings serving a wider range of clients (Wainwright et al., 2014). Health care has traditionally been delivered in an office visit setting where patients are physically present with the doctor. Only recently have newer technologies begun to be used in health care (Sharma & Baoku, 2013). The purpose of this study was to examine management of patient satisfaction in office visit and telehealth settings to test if the level of patient satisfaction differs between these settings.

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Research Question and Hypotheses

RQ: To what degree, if any, does the management of patient satisfaction in telehealth appointments yield different levels of patient satisfaction than the management of patient satisfaction systems associated with in-office appointments?

H_0: There is no statistically significant difference in the management of patient satisfaction of health care consumers from a face-to-face visit with a medical professional versus a virtual visit from a medical professional. H_a: There is a statistically significant difference in the management of patient satisfaction of health care consumers from a face-to-face visit with a medical professional versus a virtual visit from a medical professional.

Theoretical Framework

According to the diffusion theory of innovation, (Sanson-Fisher, 2004)[which was created by whom??],innovation spreads through world networks without any resistance from the public. This theory has concepts of how an innovation is taken in the world. How people respond to an innovation is what is highlighted by the diffusion theory. In healthcare, there have been numerous technological innovations (Schartinger et al., 2015). The Internet allows groups and individuals to research innovations and create new equipment in different professions (Shea et al., 2012). Videophone and telehomecare telehealth programs were created in order to offer health services in a more effective manner than the usual outpatient services (Abekah-Nkrumah, Guerriero, & Purohit, 2014). Fairbrother et al., (2014) thought that the videophone and telephone monitoring would be effective.

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Other means that were sought to be of value is the installation of the telehomecare systems in the residential homes of the patients. The systems had internet connections that enabled the patients to communicate any essential issue to the physicians. Some of the systems monitored the conditions of the patients and the nurses were in a position to see the patients' health changes. The diffusion theory of innovation relate to telehealth systems in the angle of the innovation part. The telehealth systems were innovated, given a trial and they worked in providing services to the patients (Lindeman, 2011). In today's current world, they have been highly accredited for providing quality services to the patients. The systems has reported a decrease in the costs incurred by both the hospitals and the patients who are under the home care programs.

The proponent of implementation theory focused on the implementation part of an innovation or a project. When a project is conceived or innovated, the implementation part is very crucial toward its success. The management of the system require skills, hard work and commitment to make the project work (Maskin, & Sjöström, 2002).

In relation to the topic of study, the implementation theory relate to telehealth in that when the telehealth programs were innovated, the implementation part was very crucial. The management of various hospitals in the USA tested it with a sample of patients. The patients on the other hand collaborated with the physicians and made the program a success. For any program to operate effectively, the participants must be willing to cooperate in order to make the things easier and get effective results from the program. Because of the efficient and effective implementation process of the telehealth systems, the medical sector has achieved great success in monitoring the health status of

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the patients and improving their welfare by offering the quality services leading to high satisfaction levels.

The systems theory defines a system as a component of interrelated structures that operate in a place to meet certain goals. The system comprises of many elements such as the management, the employees, the suppliers, the buyers and all the stakeholders that have interest in the institution of concern. The elements of the systems work together to achieve certain specific goals concerning that field.

In the medical field, the main aim of the physicians is to offer quality and affordable health services to the public. The government employ all machineries to ensure that the health sector is working accordingly in meeting the needs of the public. The government employ high number of medical personnel in providing the medical services to the public. The ministry charged with the responsibilities of ensuring the health sector operate in the right way ensure that the physicians employed in the health institutions are qualified to diagnose and offer treatment to the patients (Sengstack, 2015). The government employs all means of making the health care affordable by reducing the charges of the health services. The government has other schemes such as insuring its citizens from medical risks and making it possible for the public to access the medical facilities from the government hospitals freely.

In terms of this study, telehealth is by itself a system that aspires to make the health care affordable to the patients. The telehealth services provide quality services to the patients. The cost effectiveness of the project is high as it has lowered the travelling costs of patients as they don't have the need of visiting hospitals since the physicians can monitor their situations while at home. The telehealth programs have numerous elements

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that work together to ensure that it provides efficient services to the public. The physicians, the patients and the technology experts' work together to ensure the operational effectiveness of the system.

I also used Myerson's (1991) game theory management and King's (2013) theory of management of patient satisfaction as theoretical frameworks for understand the principles of satisfaction management effectiveness and success in various systems. As Agee and Gates (2013) argued, the game theory of health care management is based upon the collective action problem interaction, which makes others more cooperative in serving the best interest of the collective. These theories have been used to study the correlation between health care management success and other variables such as satisfaction, leadership, and ethics (Bogue, 2014). In addition, prior research has clearly has linked satisfaction management effectiveness and success factors in patients Cronin, 2014). Each of these theories and prior studies on general management and project management are presented in detail in Chapter 2.

These theories provide the foundation for this study because King's (2013) theory of the management of patient satisfaction states that networks play an increasingly important role in delivering computerized public services. Health care organizations continue to expand their use of computerized services for patient interaction (Albadvi, et al. 2007). The current study examined the difference between patient satisfaction management for in-office and telehealth appointments.

Nature of the Study

I chose a quantitative research approach as the best methodology for this study. I addressed the research question and hypotheses by using previously approved surveys

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from health system research databases for data sets in my analysis. Patients and health care providers were randomly chosen through these data groups, and the collected information was analyzed via the use of both descriptive and inferential statistics (Bysinger, 1999).

Definitions

Administrative remote services: Any means by which technology is leveraged for administrative purposes or to provide nonclinical support in providing effective care.

Ancillary diagnosis: Interpretation of an ancillary test, such as x-ray or lab.

Asynchronous care: Health care that does not require simultaneous availability of the source and recipient of patient information (store and-forward).

CNP: Certified Nurse Practitioner.

Consumer health access and engagement: Consumer initiated electronic interaction with a provider or health care organization.

Diagnostic and treatment services: Provider-initiated contact with a specific patient for the purpose of providing a diagnosis or treatment plan.

Distant site provider: Practitioner providing service via interactive audio and video telecommunications systems.

DO: Doctor of Osteopathy.

Health system: Any combination of hospital and/or medical provider.

Inpatient consult: Consultation provided in the inpatient setting.

Medical provider: A medical professional such as MD, DO, CNP, or PA.

MD: Doctor of Medicine.

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Multidisciplinary consultation: A panel of providers who discuss a specific patient in order to come to a conclusion on diagnosis or treatment plan.

Online or remote learning: Any means by which technology is leveraged for teaching or learning purposes that is not patient-specific.

Originating site: The location of the patient receiving services.

Outpatient visit: Patient visit in the outpatient setting.

PA: Physician Assistant.

Remote monitoring (inpatient & home) and management: Monitoring of a specific patient in a setting which is outside of a land-based health care facility.

Satisfaction management: Measurement from a Likert score that details how satisfied (high score) or dissatisfied (low score) a patient was with their health care experience.

Synchronous care: Caregivers acquiring and acting upon information about a remote patient in real time.

Telehealth: The use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration. Technologies include videoconferencing, the Internet, store and-forward imaging, streaming media, and terrestrial and wireless communications.

Assumptions

In this study, I assumed that medical provider treatments of specific illnesses would be same across health systems. While clinical procedures may be different, the overall treatment is what is being considered. These treatment methods can be assumed to

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be valid based on the medical providers' training and governing board policies and practices.

Scope and Delimitations

The scope of this study is to test the satisfaction management of telehealth measures on different patient populations. This focus was chosen to see how satisfaction management can be obtained in different patient population areas where access to care is not easily achievable. The boundaries of this population will be those who are choosing to use telehealth in their treatment choice as there is no directive-based initiative to pull patients to this treatment option.

Limitations

Limitations of this study were in regards to patients' disease diagnosis. Since patients cannot choose the diseases they contract, the study's treatment process and results were limited based on what diagnoses were found during the study timeframe. While it would be best and most accurate to have all of the same diagnosis, the study's time constraints limited the diseases that could be observed.

Significance of the Study

The nature and purpose of this quantitative study was to test the management of patient satisfaction of telehealth & face-to-face visit measures. The independent variable was a virtual health care delivery platform described as a delivery tool by which a health care professional is able to diagnose and deliver care (Taylor et al., 2015). Such sessions are directed mainly at the patients during the appointments to diagnose, treat, and cure (de Oliveira, 2014). The medical professional's primary directive in telehealth appointments is to treat the patients as if there were a traditional face-to-face

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appointment. The dependent variable was patient appointment satisfaction, which is a common assessment made by health care professionals on an everyday basis during a traditional office workday (Sanclemente-Anso et al., 2015). The significance of this study is informing health care professionals regarding patient satisfaction in telehealth.

Significance to Theory

This study supports game theory (Agee & Gates, 2013) in showing that problems approached in cooperative action can be in the best interest of the collective. Seeing telehealth as a problem that needs to be examined to benefit the collective, this study affirms game theory ideas. The findings from this study will be available to others who want to advance this theory as well.

Game theory is defined as an analysis of strategies an individual may adopt in a competitive situation wherein the individual's actions are dependent on the actions of others (Agee & Gates, 2013). While such a situation may affect the individual, the idea of an individual working toward the benefit of others is a significant part of the equation. Agee & Gates (2013) stated that a person could work to benefit others when that person was in their employment, volunteering, or striving toward a personal betterment goal. In health care, game theory speaks to individuals working in an area that requires striving to better those around them.

Significance to Practice

This study may contribute to practice by showing patients and providers that virtual visits can be a sustainable opportunity for care management. Showcasing treatment options, which are most satisfying to patients, can assist health care providers.

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The findings from this study will be available to others who want to advance the practice of health care.

Significance to Social Change

This study will contribute to filling the research gap in regard to patient satisfaction with telehealth experiences. By showing this hypothesized positive adoption rate and overall patient satisfaction, health care groups can see that the management of this new delivery system will bring patient care to those who need it most and in a way that will not detract from, and possibly enhance, their primary care experience. Positive social change may be achieved through this study by encouraging increased access to managed health care to those who may not have access to it.

In having a healthier society, individuals can lead longer lives, enjoy more social activities, and create more through their work and outside passions. Overall, a healthier society is a society that values happiness and strives to make others healthier. A healthier society is a model that can pass on to future generations.

Summary

To summarize, this chapter examined the patient satisfaction management of telehealth experiences of different patient populations. This chapter contributed to theory, practice and social change of management and specifically patient satisfaction management in healthcare . In the next chapter, I review the extant literature on the topic and discuss why this study was needed.

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Chapter 2: Literature Review

The purpose of this study was to examine how the satisfaction management of telehealth is affecting patients. Showcasing satisfaction management in this arena will give health care the needed next steps to make a transition into the proper management of health care for the masses that society has desperately needed for the past many years (Bernstein et al., 2007; Kumari, 2014). Health care has traditionally occurred in traditional office visits and has not included newer technologies (Lee & Meuter, 2010).

This study's purpose will be to look at patient care in both face to face versus telehealth situations and view how satisfaction management differs between both settings. In this chapter, I discuss the research design and rationale, methodology, data analysis plan and threats to validity.

Literature review involves previous research that has been carried out regarding a subject. It usually takes the form of empirical literature and theoretical literature review (Webster, & Watson, 2002). In the empirical literature review, the researcher specifically addresses the research that has been carried out by individuals concerning a specific subject matter. By reviewing their research findings, the new researcher familiarizes himself with the old research that was carried out regarding a certain subject. In this analysis I examined the research that has been conducted in the areas of telehealth.

Literature Search Strategy

An initial literature search using the keyword *telehealth* returned more than 15,000 results in Google Scholar. In working through the results, the gap of satisfaction management became evident. I found that using refined key word searches through

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Walden University's academic research databases provided a more defined selection of articles to use for this writing.

Theoretical Foundation

A theory has a cause and effect relationship that it tends to establish between various variables. Theoretical reviews are the analysis of concepts that has been proposed concerning a certain aspect and field. The following are the theories that relate to telehealth services.

Diffusion theory of innovation (Sanson-Fisher, 2004) has the concepts of an innovation spreading fast to the world networks without any resistance from the public. Diffusion is the movement of an idea across various regions. Diffusion theory (Sanson-Fisher, 2004) has concepts of how an innovation is taken in the world and how people respond to an innovation. There have been numerous innovations that diffusion theory has been achieved in terms of technology (Schartinger et al., 2015). Competition in the world of business creates the need for coming up with ways that provide efficient and affordable services to the customers.

The telehealth programs in form of videophone and telehomecare program was innovated physicians who combined efforts to see how the health services could be offered in a more effective manner other than the usual outpatient services (Abekah-Nkrumah, Guerriero, & Purohit, 2014). It was thought that the videophone and telephone monitoring would be effective. Other means that were sought to be of value is the installation of the telehomecare systems in the residential homes of the patients (Sternberg et al., 2011). The systems had Internet connections that enabled patients to communicate any essential issue to physicians. Some of the systems monitored the

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patients' conditions and nurses were in a position to see the patients' health changes (Leff et al., 2005). The diffusion theory of innovation relates to telehealth systems in regards to emerging and disruptive innovation. The telehealth systems were created, given a clinical trial and they worked in providing services to the patients (Lindeman, 2011). This indicates how the concept of telehealth has diffused across the world and how many countries have been receptive to adopt them. Diffusion theory clearly showcases the relationship of technology and innovation with offering telehealth services and the adoption part of the telehealth services.

The proponent of implementation theory focused on the implementation part of an innovation or a project. When a project is conceived, implementation is crucial for success. The management of the system requires skill, hard work, and commitment to make the project work (Maskin, & Sjöström, 2002). The implementation plan and strategies dictates whether the project will succeed or will fail (LeRouge et al., 2002). The health ministries for instance are tasked with the responsibility of implementing various policies in the United States of America that foster the growth and service delivery in the health sector. The implementers are tasked with the responsibility of ensuring that the operations of the project are working in line with the plans and expectations of the stakeholders. For any program to operate effectively, the participants must be willing to cooperate in order to make the things easier and get effective results from the program. Because of the efficient and effective implementation process of the telehealth systems, the medical sector has achieved great success in monitoring the health status of patients and improving their welfare by offering the quality services leading to high satisfaction levels (Uscher-Pines & Mehrotra, 2014).

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Systems theory is defined as component of interrelated structures that operate in a place to meet certain goals. The system is composed of many elements such as the management, the employees, the suppliers, the buyers, and all the stakeholders that have interest in the institution of concern (Williams, 2017). The elements of the systems work together to achieve certain specific goals concerning that field (Sengstack, 2015). A failure in one of the component endangers the whole system. For a project to effectively work, all the components must be willing to collaborate toward achieving the goals of the program. The healthcare system takes form in many areas of life. Innovations in different sectors like computer software and hardware can take the form of a system. A normal project is a system that has many components that are joining efforts to achieve success of some goals (Schartinger et al., 2015). In the health sector, there various components that work together to ensure delivery of services to the public. This makes it possible for the systems theory to be applied in the telehealth sector (Williams, 2017).

Telehealth is a system that aspires to make the health care affordable to the patients. Telehealth services provide quality services to the patients. The cost effectiveness of the telehealth project is high as it has lowered the travelling costs of patients as they do not need to visit hospitals because physicians can monitor their situations while they are at home. The telehealth programs have numerous elements that work together to ensure that it provides efficient services to the public. The physicians, the patients, and the technology experts work together to ensure the operational effectiveness of the system. For an assured delivery of results of the telehealth services, all these stakeholders must join hands in ensuring that the telehealth facilities are working as expected and meeting the needs of the patients. The stakeholders in the health sector

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must continue working together in ensuring that the services offered are meeting the needs of the public are being met (Salas et al., 2009).

Game theory is the theoretical baseline, which individual stakeholders cooperate on a collective action problem in an effort to find a plausible solution. Seeing this as the theory for this study, this work will incorporate the collective action of health care management by utilizing the desired outcomes (better health) among the program participants. This process will include both patient and caregiver as the participants in this game theory work.

Three-factor theory has indicated (White, 2015) that a nonlinear relationship exists between performance attributes and performance. The theory raises the question of the applicability or performance analysis improvements in addition to the resulting managerial recommendations (Matysiewicz & Smyczek, 2013).

Literature Review

Telehealth is a way of minimizing the costs of treatment and improving the efficiency of medical facilities (Krupinski, & Bernard, 2014). Chronic diseases take a lot of treatment time and costs in medication (Chuang, 2009). Telehealth was seen as a better way of enhancing medication of the patients who were suffering from some of the chronic diseases (Jackson et al., 2013). Through telehealth, patients can receive medication in their different localities without travelling to medical institutions to visit a doctor. Empirical literature had more emphasis on chronic disease medication. Researchers have ventured in examining how telehealth services have been improving the lives of the patients who have been suffering from chronic diseases (Lee et al., 2014).

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Pare et al. (2007) carried out a study that focused on four chronic diseases: cardiovascular disease, diabetes, hypertension, and pulmonary conditions. The researchers examined previous empirical studies that had been carried out between the years 1990 and 2006. The researchers wanted to examine them to find a deeper meaning regarding the effect of telemonitoring of patients in the health sector. The researchers were using direct data and their results differed because of the different chronic diseases they were evaluating. It was discovered that besides the patients who were suffering from hypertension, the others had a reduction in their hospital admissions (Kellerman et al., 2013). They visited the emergency departments fewer times and the time they used to spend in hospital was less during the time they were telemonitored. Diabetes and hypertension persistently displayed a more decrease in blood pressure levels as well as glucose levels while cardiac studies showed an improvement in the quality of life during the period of telemonitoring. The results were inconclusive since the trend of the data was inconsistent (Holmen et al., 2016). The researchers suggested that in future, studies that examined cost effectiveness and the health care service providers' willingness of accepting technology as a way of getting medication could be of great importance (Holmen et al., 2016).

Bowles and Baugh (2007) conducted research in the United State and found that by using telehealth facilities, there would be billions of dollars saved from the cost of hospitalizing chronic heart disease patients. Medicare and Medicaid programs would also save more by supporting these telehealth programs as there would be a reduced number of patients who would seek emergency care in the hospitals (Kaufman, 2011).

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Inglis et al. (2013) researched on randomized controlled trials that used telephone and intervention of telemonitoring for the patients who were suffering from heart failure. The study aimed at an evaluation of the outcomes of the patients who relied on telehealth services to those who relied on the outpatient services. More than 8000 patients were analyzed using 25 studies. There was a positive relationship between telehealth and the heart failure. This is because the telephone support greatly lowered the number of patients who were hospitalized because of heart failure (Upatising, 2013).

Dansky et al. (2005) examined telehomecare programs that mainly dealt with patients who were suffering from heart failure. The outcomes were measured in terms of the rate of hospitalizations, the rate of use of the emergency care unit departments, the mortality signs that seemed to relate to the intake of sodium, and the levels of physical activity. The researchers defined telehomecare as a form of technology that would make it possible for people to send health information to nurses via electronic devices. For effective results, the study separated the groups that were being studied into two: one that had a telehomecare system and the other that had no access to a telehealth system. This telehomecare program had a video component that provided a platform for direct interaction between the patients and the physicians. Nurses had access to patients' blood pressure levels (Holmen et al., 2016).

The study relied on regression of variables to get the effect of the telehomecare program effect to the health of the patients. It was found that the patients who were under the telehomecare program were less likely to be hospitalized in emergency units than the patients who were not under the program of telehomecare. The number of patients who had worse symptoms of various illnesses was less as compared to the patients who were

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not under the program (Inglis et al., 2011). The program had an ability of alerting the health of a patient at home to the nurses via the monitoring equipment and this lowered the emergency cases of the patients under the program (Inglis et al., 2011).

Upatising (2013) analyzed the patients who were under a telemonitoring program who were suffering from heart failure. The study had 1653 patients in which half were under the telemonitoring program while the other half relied on outpatient facilities. The program had a telephone that was based on a voice response that would engage the patients. The information on symptoms and signs pertaining to the patients was collected daily. The research did not find differences between the two groups in the areas of the number of patients admitted to the hospital and the number of days the patients were hospitalized.

Gordon (2005) conducted a study found that children's diseases were reduced by 63 percent in childcare centers that provided telehealth programs. In this program, the visits in the emergency room were reduced. In another study carried on by Catholic Healthcare West monitored the patients' health through telephone calls from the nurses to the patients (Gordon, 2005); the study found that the catholic health care west reduced the number of patients who were admitted in hospital.

A 2001 study was carried in a rural area that evaluated the psychiatric facilities that were given to patients through video conferencing (Roine, Ohinmaa, & Hailey, 2001). The video conferencing clinical outcomes had positive satisfaction levels on the part of the patient (Roine, Ohinmaa, & Hailey, 2001). The study found that the satisfaction levels between the in-office appointments and the telehealth appointments were the same.

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In San Diego, a study examined patients who were suffering from stroke and relied on consulting physicians on an emergency basis at four community hospitals (Gabelle et al., 2008). The study considered the assessments of the patients who were using telephones and video conferencing via the telehealth program. The video conferencing stored images of the scans performed on the patients and later forwarded these scans to the physicians (Gabelle et al., 2008). In this study, more than 98% of the patients under the telehealth program were found to improve as their blood clots lowered (Steventon et al., 2014).

In a study on New Mexico's Project that used telehealth systems that centered at learning cases and managing diseases that aimed at expanding care to patients in rural areas and state prisons. The program showed a great level of effectiveness in service delivery to the patients (Gagnon et al., 2007). After a period of about one year, the study found that the patients cases of isolation had reduced and the patients received more satisfaction from the professional services.

A study that evaluated traumatized stress disorder found that the patients who were under the telemedicine appointments had less therapy appointments as compared to their counterparts who were under the in-office appointments (LeRouge, Garfield, & Hevner, 2002). The study found that the telemedicine appointments offered more satisfactory services to the patients. The efficient services lowered the rates at which the patients needed therapy checkups with the physicians (LeRouge, Garfield, & Hevner, 2002).

Bay area test examined the patients who were using interactive application software by the name of Bewell Mobile (Goumopoulos, Papa & Stavrianos, 2017). The

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patients who were suffering from asthma and diabetes were supposed to transmit crucial signs through the cell phone to the nurses. They were in return expected to get recommendations of tackling certain conditions. In some instances, the physicians intervened in person to check on the progress of the patient. Another study carried out in San Francisco compared skin cancer patients who were receiving tele-dermatology services with the patients who had direct dermatology referrals (Krupinski et al., 2008). The study found that the patients who were under the tele-dermatology spent less days in treatment than those who were under the dermatology referrals.

Nelson et al. (2014) used a cell phone to evaluate the rapidness of a diagnostic test on leprosy. The cell phone was based on a reader that had an attached camera unit that was used to capture and verify the images. The study found that the monitoring process which was made possible by the monitoring of the images sent improved the health of the patients who were suffering from leprosy. This is because the test reader detected a greater number of people who were suffering from leprosy. The reader had a very high sensitivity of close to 88 percent and a specificity percentage of 96.

Srivastava (2012) carried out research in Taiwan where the information system of the patients was tracked. The patients who were suffering from leprosy were examined in terms of those who were receiving treatments in their homes and those who used to have direct visits to hospitals. The study used reviews on the public health officials. The study found that there was an improvement in monitoring the patients from their homes. The compliance levels of the patients were high and the disease surveillance means was improved. In Indonesia, Rachmani et al. (2013) used a standardized digital program to compile certain reports about the demographic features of the patients. To get the reports,

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interviews and discussions were used and observations made at three health centers. The digital feature was observed to be effective in system expansion and surveillance of the patients who were suffering from leprosy.

Bhowmik et al. (2013) carried out a research in India where the mobile phones were being used by the paramedic employees to contact the physicians. The study compared the tele dermatologist diagnosis that was performed by a dermatologist through the telehealth systems and the in-person appointments. The study found that via the telehealth systems, communication between the patients and the physicians was faster, more reliable and accurate since the source was predetermined and known. The telehealth services provided quality care to the patients. The conclusion of the Ganapati was that the telehealth systems were more effective in providing satisfying services to the patients (Prodhan, Rahman, & Jahan, 2015). The in-patients' appointments were found to have lapses in communications. For the physician to communicate with the patients, the patient must avail himself to the hospital. In case of emergency situations, the patient would not be in a position to talk to a physician since there is no digital connectivity program between the patient and the doctors. The quality of care provided under the in-office appointments were wanting and the some of the patients expressed dissatisfaction (Prodhan, Rahman, & Jahan, 2015).

Tripathi (2015) led the campaign of laying much emphasis on the development of telehealth networks that were efficient. Tripathi (2015) explained telehealth systems that address a disease like leprosy would be effective in improving the life of the patients suffering from leprosy. The use of digital readers attached on cameras would substantially identify the number of people who are suffering from leprosy. McLean et al.

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(2013) carried out a research in India back in 2001 that evaluated the efficiency of using the real time method of telemedicine that used to store and forward images of leprosy patients which enabled the physicians to evaluate the images and draw graphics from the computer. The outcome showed that the physicians captured accurate information regarding the patients which enabled the physicians to come up with effective ways of treating the patients. The real time drawing of graphics helped the physicians in analyzing the rate of the leprosy growth in the patient's life.

In Italy, Nunzi et al. (2003) examined the remote systems of diagnosing the patients' conditions. The study found that the remote diagnosis was made possible by the transmission of clinical images which were sent through email, where biological materials were also sent via mail. This made it possible for the physicians to diagnose the patients from their homes. The patient's physicians would liaison with the nurses to evaluate the conditions of the patients and then offer the correct medication and treatment.

Levin, & Warshaw (2009) observed that if certain assumptions were made like the travelling distance of the patients, the volume of the tele dermatology services and the clinic costs incurred in tele dermatology, the then the telehealth facilities are cheaper as compared to the in-office appointments. The study found that the act of sharing costs between the patients who are under the telehealth services would have made it cheaper to diagnose the patients. The sustainability of the project is guaranteed due to the community projects of having a common telehealth system that is offering medical services to the patients (Henderson et al., 2013).

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In order for the telehealth services to provide more satisfaction to the patients who are under the telemedicine systems as compared to the patients who are under in-office appointments, a study was carried out in United States to determine whether tele-leprology (Nelson et al., 2014) would be a form of enlightening and educating the patients more about the disease they are suffering from. The study observed the adults who were suffering from diabetes mellitus. The study found that most of the patients who were under the telehealth program were easily educated and informed about their disease. Many knew how to respond in cases of changes in signs and symptoms. Many patients who were under the program responded directly to the nurses whenever they felt significant changes in their lives.

Telehealth information lowers the misconception that is there concerning various illnesses. The information given by the telemedicine facilities are effective in educating the patients on various diseases. Misra et al. (2004) conducted a research in India to evaluate the satisfaction levels of the leprosy patients who received neurology education via videoconferencing technology (Jain et al., 2014). The study wanted to determine the changes that happen to the leprosy patients who got information through videoconferencing. The respondents of the study expressed satisfaction from the services they were receiving from the videoconferencing systems. This showed that the videoconferences offered quality and effective services to the patients. Telehealth services offers quality and reliable services that satisfy the interests of the patients. Miot et al. (2007) carried out a study evaluating the impact of virtual animation program on the leprosy patients (Matheus, & Ribeiro, 2009). The study used questionnaires assessing the knowledge impacted on the leprosy patients by the virtual animation programs. More

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than 80 percent of the respondents gave a positive response showing that they received quality education about leprosy via the telehealth virtual animation systems. Paixao et al. (2009) conducted a research study in Brazil evaluated the Dermatunel channel which was an interactive platform that created an environment of educating the leprosy patients. The study design made use of questionnaires that checked on the satisfaction degrees of the patients. Between the dermatologist and the non-dermatologist who were questioned indicated that the Dermatunel channel was excellent in assessing the conditions of the leprosy patients.

Clark et al. (2007) carried out a study evaluating the effects of telehealth facilities on the patients. The researchers concluded that the telehealth facilities have positive outcomes on the health and clinical aspect of the patient. The services offered to patients such as telemonitoring and direct conversations between the patients and nurses enable the physicians to offer feasible services that lead to positive clinical outcomes on the patients. Other research by (Finkelstein & Wood, 2011) assessed the possibility of applying the telehealth devices in improving the health of the patients. It was found that, telehealth services are more effective in diagnosing the patients who are under the telehealth appointments than the patients under in-office appointments.

In one of the articles published in the Journal of Clinical Nursing, professionals who were interviewed laid emphasis on the suitability of choosing the patients to the relevant telemonitoring devices. The professionals proposed that the telemonitoring devices would be best suited in supporting the patients who were suffering from heart failure (Reitsema, 2016). The professionals suggested that the effectiveness of the telemonitoring devices would be enhanced by an association between the physicians and

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the patients. The physicians would assist the patients in interpreting and conceptualizing the data received from the telehealth devices. The patients who were suffering from chronic heart failure lamented that they received high levels of satisfaction from the telemonitoring facilities. Many patients felt that they had the reassurance of good health since someone was watching over them. The study also found that the telemonitoring systems promoted the patient's ability of knowing and comprehending their illness condition. The patients and the professionals who were respondents in this study indicated that telehealth services lowered the number of hospital admissions. Telehealth facilities offered quality services that led to reduction of the number of patient's visits to hospitals (Steventon et al., 2012). The cost of the facility was considered low and therefore there was cost savings. The researcher finally made proposes of the developments to be made in the telehealth facilities like integration of the good leadership and effective project management in telehealth service delivery. The study suggested that the patients and the physicians had to have an efficient communication system that enhanced delivery of feedback whenever issues were raised. This would enhance the physicians in offering quality services that give patient satisfaction.

Pekmezaris at al. (2012) conducted a study that had the purpose of understanding the impact of remotely monitoring patients who had the heart failure condition. In this study, telehealth proved ineffective in lowering the costs of Medicare and improving the health of the patients who were using the program. Watson et al. (2014) reviewed one of the largest systems of telehealth in the USA by the name of Care Coordination Home Telehealth (CCHT) program. The program deals with a very big number of patients suffering from chronic diseases. The patients in the program meet with a coordinator

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who identifies the most appropriate form of telehealth technology and equips the patients with skills of running it. The coordinator of the caring unit reviews the telehealth data and gives the required information and if necessary communicates with the patient doctor. The research found that the patients under the CCHT program showed a reduction in hospital admission and a reduction in the number of days spent in the hospital bed. This showed that the CCHT gave improved and quality services to the patients.

To complement the Watson (2014) findings, Bendixen et al. (2009) studied another set of patients who were suffering from cancer and they were under the CCHT program. They also studied another set of patients who were not part of the CCHT program as a control experiment. Their conclusions coincided with the Watson (2014) findings as they indicated that participation in the program significantly lowered the chances of having preventable diseases, the number of hospital stays was less, the clinic visits were less and the number of patients admitted was also less.

Jia et al. (2011) examined the CCHT program on whether the program had the ability of lowering hospitalizations for the patients who were suffering from Diabetes mellitus. The study had a total of three hundred and eighty seven patients who comprised a sample of both the units of experiment and the control group. In the short term range, the cases of hospitalizations for the patients under the program were high but the number increased in the long term (Hill et al., 2010). The increased number indicated that the home telehealth program is more effective in the short term than in the long term.

In another study by Chumbler et al. (2011) concerning the Veteran Health Administration (VHA) program, Chumbler (2011) laid his focus on the patients who had diabetes. The experimental group had a total number of 387 patients and the control

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group had the same number of patients. This study had a span of four years where multivariate regression was used. The patients under the program had a messaging device that gathered information from the patient regarding important signs and then transmitted them back to the health care provider reporting the health status of the patients. The study concluded that the telemonitoring program lead to better outcomes since the mortality rates of the veterans greatly lowered.

In another research, Dansky (2005) carried out a meta-analysis that involved 29 articles. The study aimed at establishing the effect of telehealth services between the years of 2001 and 2007. The study limited itself to studies that were carried out in English and the clinical services that directly took place at home. The researchers considered a variety of diseases that comprised of hypertension, diabetes, asthma and many others. The studies had an element of monitoring data. The study included the use of telephone videos and components of internet. The study failed to establish a link between diabetes outcomes and telehealth. A positive relationship was found to exist between heart failure and telehealth monitoring. Psychiatrist conditions were seen to have a positive effect regarding areas of adherence to medical instructions, reporting of personal health status, readmission in hospitals and visits to emergency units in hospitals. The conclusion was that there was a positive effect of telehealth in clinical outcomes. Dansky (2005) made a suggestion of cost effectiveness of telehealth to be addressed in future research.

Kathryn H. Bowles (2007) in one of her articles in the Cardiovascular Nursing Journal noted that positive results had been achieved in the case of the patients who had diabetes as a result of telehomecare program which promoted their self-management

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service. By managing their health at their own level and homes, patients can lower the rate of being hospitalized or the likelihood of getting further complications. Guzman-Clark et al. (2013) carried similar research to find out whether adherence to the home telehealth program to the elderly people who had heart failure would lead to better outcome of the patient health. They utilized data from the Veteran Health unit and had a sample of 248 elders who were based in California. The patients used a health buddy whereby they would respond to questions regarding their conditions. Nurses were then supposed to contact the patients whose health was not quite wanting. The study found that there was no relation between the adherence of the telehealth program at an early stage and the outcome of the patient's health.

In a research of evaluating the quality of service of the telehealth services, Dansky (2005) concluded that telehealth offers quality service as it gives the physicians an opportunity to be alerted about the health conditions of the patients. The alerts make it possible to intervene quickly in case there is an emergency that needs a doctor's intervention. This is because the monitoring device monitors the trend of the patient's health and reports any worrying changes to the doctors. By this, the rate of hospitalizations is lowered and the patients are in a position to receive quality services.

Bashshur et al. (2014) carried out research that looked at telemonitoring impact on adults at an older age that suffered from chronic heart disease. The research had two groups, one comprising of the patients who would be monitored and another control sample that would not experience the monitoring. A home health device was used that monitored weight, oxygen and temperature levels. For the program to succeed, nurses were initially supposed to visit the patients at their homes and install the systems. They

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were then supposed to train the patients on how to make use of the home device after which the data entry was monitored by the nurses and if need arose, the nurses would contact the patients and alert them about the inconsistency in the entry of data. The study compared the number of patients who visited the emergency unit between the two samples and it was observed that the patients who were under the care of the home device program visited the emergency unit lesser times than their counterparts who were not under the program (Bashshur et al., 2014). It was further concluded that the patients who were under the control of the home program showed a great improvement in their health. The standard of the health care program provided improved health care services to the patients and their health recorded a great level of improvement.

Landolina et al. (2012) proposed that remote monitoring would provide a more complete information concerning the patient's varying conditions which would make the medical team respond fast to their issues (Landolina et al., 2012). Landolina et al. (2012) used a sample of 200 patients who were divided into two. One sample comprising of those who were under the telehealth program while the other comprised of those who relied on the outpatient services. The patients in this study were suffering from heart failure and had Implantable Cardioverter Defibrillators (ICD) for therapy. The study lasted for 16 months and it was observed that the frequency by which the patients who were under the telehealth program visited the hospital was lowered. This was because the ICD alert would immediately lead to the response of a clinical officer. This enhanced the provision of better and quality services to the patients who were under the program.

Crossley et al. (2011) examined the monitoring remote effects concerning the time of a clinical event and decision that was related to a cardiovascular disease. The

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study took a period of fifteen months and they named it Clinical Evaluation of Remote Notification to Reduce Time to Clinical Decision abbreviated as CONNECT. This method involved randomized evaluation of 1990 patients who were sampled from a total number of 135 clinics. All the patients had cardioverter-defibrillators that were implantable and the study assessed the patients in the areas of hospitalizations, emergency visits and physician's visits. The study also had a control group. The study found that the number of days the patients who were under the program were spending in hospital had lowered from 4.3 days to 3.0 days on average. It was also found that monitoring patients remotely decreased the time for a clinical decision. The results showed that the program offered better services and that the patients improved quite positively in their results.

Wakefield et al. in one of their articles evaluated the suitability of telephone and videophone services in improving the telehealth home services. Their measuring parameters were self-efficacy, whether the patients were satisfied with the care provided by the telehealth program and whether the patients complied with the required medical prescriptions. The study comprised of forty nine patients who were under the outpatients program, fifty two who were receiving care via videophone and forty seven who received care through the telephone. In the first ninety days there was no difference in the area of complying with medical prescriptions and satisfaction and this meant that the varying methods were equal. In the group that was under telephone and videophone, it was found that there were interventions due to the remote monitoring by nurses and this denoted better treatment and care that the patients were receiving.

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In a research to check on the patients' adherence to proper medication regimens, Chan et al. (2003) carried out a study that lasted for one year. Their objectives were to determine whether telemonitoring of asthma patients using store and forward technology would be one of the ways of improving outcomes as compared to patients who visited physicians in persons. Their study comprised of children between the ages of six and 17 and the sample size had a 120 asthma patients. There were two groups where one was supposed to be visiting the physicians in their working places and they received the traditional one to one management and education of what to do from the clinicians. The other group used Internet connections from their homes for education and case management. The evaluation parameters were the quality of life, how the systems were utilized and how the symptoms were controlled. The study found that the two groups adhered to the instructions of therapeutic plan and medication. However, the virtual care group that had Internet connections from their homes was found to be more dedicated to daily instructions of asthma patients. The study concluded that the patients under the telehealth program observe the instructions given by the physicians and they follow the right medications prescriptions issued to them.

Patient satisfaction is a key component in telehealth programs. The program has been assessed by researchers to find out the perception of the patients toward the program and whether they get quality services that satisfy their needs. Hogan et al. (2011) cross examined the patients perception with regard to the VHA and CCHT programs. Patients were interviewed and then asked to complete a certain standard survey. The results showed that the patients received high satisfaction with CCHT program. They mostly acknowledged its ease of access, the opportunity of being educated and the program

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monitoring capacity. They however expressed various problems regarding the program such as problems facing the equipment, inaccessibility of the caring team and sometimes slow response.

A study that involved the tele-intensive units at Memorial Medical Center of Massachusetts University discovered that the hospital was in a position to diagnose more patients using telemonitoring systems (Cummings et al., 2007). This showed that the average number of patients attended to increased significantly indicating the effectiveness of the telehealth facilities in their operations providing efficient and effective medical services. The study further discovered that the cost of each patient lowered as compared to the former costs that were charged when the hospital had not adopted the telehealth systems.

Frisbee et al. (2009) carried out a survey report that was investigating the recent technologies that have been used in the health care sector. The study found that information technology has enabled an efficient performance in the health sector where considerations of the patients are regarded. The patient's interests take the center stage of the use of the technologies that aim at providing safer, comfortable and private services to the patients. The study found that the telehealth care systems had a diverse form. The technological health systems adopted the form of applications that were installed in the modern phones of the users. The mobile phones would also be connected with some sensors that could then be made available at the homes of the patients.

Robots were identified as one of the forms the telehealth systems is taking (Dahl, & Boulos, 2013). Patients' records proved to be of importance in the telehealth systems. The records of the patients would be stored in central place and then systems would be

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applied to ensure that the information is made available to other physicians in different health institutions. This was noted to be one of the ways of improving the type of decisions that are made by physicians. Human health is paramount and it is very important to ensure that the kind of decisions made pertaining to the health of an individual is a quality decision that will restore the health of the patient. The patients records need to be stored in a safe manner that ensures its confidentiality and that the information does not leak to other people who are mandated to have access to the health records. The research found that some measures had been taken to ensure the privacy of data taken from the patients. Various techniques were taken that ensured data security and privacy. One of the method that was deemed fit for the program of ensuring privacy was a directory access protocol that had a grid authentication security that had infrastructure for granting access of the data. Telehealth facilities are seen to be effective in monitoring the health of the patients. The telemonitoring facilities were connecting the patient's home with the health care provider. A network platform is then set that enhances communication between the patients and the physicians (Otto et al., 2006).

Another study that was carried out at a California hospital was a community project that found that the hospital was saving significant amount of costs when they adopted the telehealth systems. The community hospital was mandated to provide health services to the population around. The study found that the hospital offered quality and affordable services. The surrounding people showed high satisfaction levels from the medication services they received from hospital (Mashima, & Doarn, 2008).

A study that St. Mary's Heart Center had a program that was managing a congestive heart failure via home telemonitoring (Benatar et al., 2003). This program led

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to an increase in the use of medications specifications appropriately. There was improved functional status of the patients. The admission and readmission rates that were recorded were lowered since the telemonitoring systems provided efficient services to the patients. The patients were getting feasible services that offered effective methods of treating the patient's conditions. The patient's length of stay became shorter as compared to the amount of time the patients were staying in the hospital under the outpatient services. The overall costs of running the program were low and the patients who were under the program were found to spend lesser money under the telemonitoring systems (Benatar et al., 2003).

There are other studies that have shown that telehealth programs give high satisfaction to the patients. In a study conducted by Purvis et al. (2013), it was observed that the patients get high satisfaction from the telehealth programs. Whitton and Mickus (2009) evaluated the patients' perception of the telehealth facility. Their experimental sample had 83 patients who were visiting the physicians and were still under the telehealth program. The control group had the conventional outpatients' services. The mental and physical composite of the patients were measured before and after the study. Majority of the patients expressed positive perception concerning the telehealth program.

The telehealth facilities were also evaluated in terms of their costs, that is, whether it was affordable for the patients to cater for the telehealth facilities. Darkins et al. (2015) conducted a research on the VHA/CCHT telehealth programs to estimate the costs incurred by the patients who were receiving services from them. It was estimated that the cost was low which showed that the CCHT program was a cost effective means of managing the veterans who had chronic illnesses.

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Dimmick et al. (2003) conducted a research in USA and found that by using the telehealth facilities there would be billions of money saved from the cost of hospitalizing chronic heart disease patients. The government would save more by supporting the telehealth programs as there would be a reduced number of patients who would seek the emergency units of the hospitals. The cost of installing intensive care units and hospital beds would be lowered.

Hasan and Paul (2011) found that telemonitoring saved a significant cost on the part of the patient. Rojas and Gagnon (2008) through another study found that telehomecare program that comprised of telephone monitoring indicated a great reduction in the cost levels of the program. Through their analysis, they found average evidence of telehomecare applications cost part. Glassman et al. (2012) carried out a fiscal analysis regarding the impact of the California's Telehealth Advancement's Act which expanded the eligible locations for telehealth programs and also allowed the reimbursement of patients who were remotely being monitored. They posited that the law would lead to large savings of the cost monitoring patients who were suffering from heart attack (Glass man et al., 2012). The patients who were suffering from diabetes would also record significant savings. Davidson et al. (2007) explored the impact of the coordination of the care units via the Health Buddy program for the Medicare beneficiaries who had chronic diseases. Two clinics that implemented the Health Buddy program were compared with two other clinics that did not have the Health Buddy program. Significant savings were found to those patients who used the telehealth Health Buddy program. The Health Buddy program also reported less mortality rates.

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Johns Hopkins University developed a hospital at home model that has shown significant savings in cost (Leff et al., 2005). The model accepts patients who are suffering from chronic conditions such as cellulites, congestive heart failure and thrombosis. Instead of admissions in the hospitals, patients are lined up for the hospital at home whereby a physician and a nurse pay a regular visit. There is also remote monitoring of the patients by the nurses. The telehealth services unit had a monitor of blood pressure, a stethoscope and a glucometer. The patients who were enrolled in this program had higher satisfaction levels and had positive outcomes compared to the others who were not in the program. The hospital at home program also recorded large savings in terms of the costs charged to the patients.

Patient satisfaction has long been a benchmark of health care providers (Glenngård, 2013). Baker et al. (2011) further discuss how an integrated telehealth satisfaction management program for Medicare beneficiaries with chronic disease. Seeing these two items as separate but equal will allow for the continued development and betterment of patient satisfaction and telehealth procedures. McMurray et al. (2014) and Mueller et al. (2014) both detail how expanding telehealth can improve care quality and access for individuals.

A decline in patient satisfaction results in the rejection of the traditional ways of thinking and approaches in science (Abdoune & Fezari, 2016). Despite strong resistance from some parties, changes can be completed through open- minded professionals that give way to improving the practice. Through the new changes, much change to the health care system is able to deliver better services than before. e-commerce, which is the process through which the exchange of products, services and information as well as

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buying and selling through computer networks is recently very general in the health care system (Yang & Silverman, 2014).

Some of the major uses of ecommerce include keeping electronic records, telemedicine and the transmission of information (Xu et al., 2014). The use of e-commerce in the industry could be of significant benefit to improve the relationship between customers, suppliers, hospitals, and the clinics (Adler-Milstein et al., 2014). Collaborative commerce (c-commerce) is a model that allows groups and individuals collaborate and communicate online (Alkmim et al., 2012). Through e-commerce, doors may also be opened through which the doctors and practitioners could monitor bed-ridden patients, even in a case of coma (Bagayoko et al., 2014). Technologies can be used effectively in the health care industry to benefit all the stakeholders. A wide range of businesses fall under ecommerce making it one of the most significant aspects of the Internet to emerge recently.

Ecommerce in health care is also one of the most growing areas (Charlesworth et al., 2015). As an industry with well over one trillion dollars in revenue, the health care system accounts for about a seventh of the economy in the United States but a great portion of the revenue is lost due to the health care system costs that are ever escalating (Baig et al., 2013). The traditional system of health care delivery has a number of shortcomings in terms of information flow, case collections, communication standards as well as it spending (Wye et al., 2015). For this reasons, e-commerce would be a better alternative for a more effective and cost effective transactions, where the Internet would be a better platform for delivery.

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Today, the health care system is plagued by rising costs of services, poor customer services and failing patient benefits (Wells et al., 2015). According to a recent survey research, about 59 percent of American citizens feel that the health care system as a whole requires a major change (Ter Matt, 2013). A majority of the organizations have preserved practices in business they feel are well established to expand market share and reduce operating costs (Adler-Miilstein, Kvedar & Bates, 2014). Interactions between the patients and health care providers tend to exist at the point of service.

This system (ecommerce) promises to benefit the health care industry due to its reengineering efforts. E-commerce is the use of electronic information technologies for the purpose of conducting business transactions among the sellers, buyers and other involved parties (Abdersson et al., 2014). Through ecommerce, electronic infrastructure is combined with business allowing for the traditional business transactions to be conducted in an electronic manner (Wodskou et al., 2014). In this case, the geographic and physical boundaries that separate the two are removed or ignored. The web is used as infrastructure hence offering the advantages of providing a universal software client, this being the web browser as well as an infrastructure that tends to be ubiquitous, which can serve as a platform that is ready made.

This will significantly reduce costs associated with setting up as an e-commerce merchant given that it helps in eliminating the need for each of the vendors so as to develop, support and distribute a software client in addition to maintaining a dedicated network and dialing access facilities (Adler-Milsteain, Sarma, Woskie & Jha, 2014). It has the potential to lay the foundation for more effective and efficient transactions between the payers, employers, providers and the patients at low cost. This will affect

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whatever will be ordered. In health care, b2b e-commerce typically involves the transactions as well as the exchange of information among hospitals, insurance agents, vendors, state and federal regulators as well as the doctor's offices (Bradford et al., 2015).

Efficiencies are improved in the health care system by e-commerce in a number of ways that include:

- Simplifying the health care.
- Abolishing and replacing multilayer approvals by faster and simpler ones through the use of artificial intelligence technologies.
- Better management of tracking of inventories by locating them centrally as well as sharing information on usage and demands of the future (Wells et al., 2013).

By proactively managing illnesses and implementation of preventive health maintenance, it would be beneficial in that prolonged hospital stays would be avoided or significantly reduced (Bardslet et al., 2013). Through erphysician.com, a physician is allowed to write prescriptions to patients on-line via smart phones (Bauch, 2013). Moreover, the physicians would also be able to interact with the clinical systems to also order lab tests and view the information for a given patient. The costs of transactions are reduced a reduction of the costs of executing purchase orders with the vendors, reduction of the costs of transferring vital information and reduction of the payment related to goods and services (Wacker et al., 2013). To achieve these, the requests of different departments have to be pooled together so as to quality for quantity receiving discounts, using the internet for the purpose of processing all the transactions and to attain the latest pricing information (Blackman et al., 2016).

Through real- time information, a number of status reports that will be provided include:

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- Hospital utilization
- Revisions of the information to be exchanged
- Tracking of treatment (Bradford et al., 2014).

Reporting in this case is achieved through streamlining of the standards of communication, actively sharing of the information and linking of all the constituents of health care through the Internet backbone (Wade et al., 2014). A good example of this is Portland's e-health companies within the sapient health network, which used the internet as a means of through which patients could visit and interact with doctors, nurses as well as therapists for the purposes of research and to share information (Anderson, 2013). The next proposal involved to electronically link the patients with data from health plans, doctors, pharmacist, hospitals, laboratories, and the other alternative medical practitioners. In this case, the overall goal is to ensure that there is an improvement that will ensure:

- Excellent patient satisfaction
- A significant reduction of health care services
- Enhanced quality of health care (Anderson, 2013).

The Internet is also being used by some of the vendors in health care as one of the means of promoting brand loyalty through building of relationships with the patients, collecting information with regards to the buying habits of the patients, and in the development of new web based markets (Ward et al., 2015). Some of the health care information providers such as MayoClinic, Intelihealth, WebMD and Medtropolis are getting more and more consumers, who largely depend on the web as their main source of health care information (Ward et al., 2015). On the other hand, the health care suppliers

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are also moving in to the Internet bandwagon to ensure that health care goods are directly available to the patients (Beate-Christin et al., 2016).

E-commerce health care solutions include options which tend to mimic expert behaviors (Cynthia et al., 2015). Some of the most prominent application of the system involves solving diagnosis, prescription type problems and interpretation (Cynthia et al., 2015). Despite the fact that a multitude of problems could be solved by the expert system, the extent to which it has been used in the health care industry is still limited some of the areas in which the system can assist in include:

- Claim verification, diagnosis of disease.
- Information with regard to a given disease (s).
- Standard diagnostic codes for reimbursement, among others (Wade et al., 2014).

These expert systems have shown a good promise to help the health care industry (Cremieux, 2015). The high level of connectivity presented by the Internet will allow the systems reside on networks, which will provide a good level of help to the parties concerned (Vidyanti et al., 2015). In particular, this will be significantly beneficial to the rural populations with limited access to good quality services from the health care system as well as those with limited resources (Cosgrove et al., 2013). However, the system has to be embellished on two fronts namely:

- Computational speeds, facilitated by faster chips.
- Advances in the natural language of processing, which have eased fears of naive users through accepting English like inputs (Cosgrove et al., 2013).

Extensible markup language (xml), a medical standard that was created in 1998 is meant to allow for effective communication between the different health care players and

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is independent platforms of hardware, operating systems, database management system or business applications (Taylor et al., 2015). Applications that use xml tend to use local data definitions of an end user (Uscher-Pines & Mehrotra, 2014). This makes it much easier for a variety of health care partners (doctors, suppliers, wholesalers as patients to share among others) through its application of simple and universal specifications. This has permitted for the much required relief to the organizations in the health care systems, which are stuck with ineffective and inefficient legacy systems (Cai et al., 2015). The systems are modified by xml so as to allow changes in workflow and management for care.

E-commerce in the health care would be beneficial to developing nations. This is particularly due to the limited access they have on medical services and information in comparison to the more developed nations (Charlesworth et al., 2015). However, studies have shown that there is a need for the professional in the health care system to promote and encourage the patients to use online services (Cai et al., 2015). In such a case, a chain reaction would follow that will see even the traditional and conservative individuals get comfortable with its use. With the ever rising costs in the health care system, developing nations as well as the developed are searching for more innovative and cost effective ways that will be beneficial to these issues (Stefanic et al., 2013). The online solutions that e-commerce presents has been attracting attention in the health sector.

BPM (business process management) plays a significant role in patient satisfaction. This makes the process management methodology a very important part of the international quality awards framework. The framework (BPM) is also important given that it helps the management of an organization be able to continuously adjust and

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successfully execute given strategies within an organization (Spigelman & Rendalls, 2015). In this case, it will provide them with more flexibility by providing the management with a sense of uncertain changes earlier allowing for faster response to the changes (Charrier et al., 2016). It is through such changes and implementation of strategies that high quality if ensured for customer or patient satisfaction. BPM focuses on process performance in addition to process analytics, which makes it a good fit for quality programs. It can be used to understand the current process of a given business during the define phase given that it contains a detailed business flow of the business process to be improved.

An online clinic launched in 2010 by non-profit HMO HealthPartners for the diagnosis and treatment of 40 simple medical conditions showed an average savings of $88 per episode over care in a traditional setting (Anderson, 2013). The service, called Virtuwell, provides 24-hour online access for patients to nurse practitioners who can help diagnose and prescribe treatment – including writing prescriptions – of conditions such as sinus infections and urinary tract infection. Further, after studying the results from 40,000 cases of patients using the online care portal, 98 percent of patients said they would be willing to recommend the service to others (Anderson, 2013).

Can care delivered online be delivered in a safe and secure environment and be compliant with existing regulations? And will patients both embrace this new method of delivering care while also being happy with the care they received? If the two-year history of Virtuwell is any indication, the answer is a qualified yes. That said, the author (Anderson, 2013) was cautious about broadly applying their findings to other models of online care, but noted that the potential to provide significant cost savings is enticing.

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Specifically, the study analyzed both medical and pharmacy data of thousands of Virtuwell visits and compared them to care delivered in traditional health care settings. Costs measured were total insurer and patient payments for full episodes of illness including pharmacy costs. The analysis showed an average savings of $88.03 per episode in Virtuwell-treated cases (Anderson, 2013). Treatment costs for three common conditions (sinus infection, urinary tract infection and pink eye) averaged:

- $20-$30 less than convenience clinics.
- $80-$142 less than office visits.
- $82-$124 less than urgent care visits.
- $159-$469 less than emergency department visits (Anderson, 2013).

The authors also studied whether the 24/7 availability of the Virtuwell service led to an increase in demand for the service, which would then eat into the savings reported (Anderson, 2013). Based on their findings, fully 90 percent of the Virtuwell visits replaced office visits, while about 6 percent of the Virtuwell cases replaced the "watch and wait" home care approach (Anderson, 2013). In all, the researchers estimated this slight increase in utilization, given the costs associated with providing Virtuwell service, only increase the cost difference between Virtuwell and non-Virtuwell care by 10 percent (Anderson, 2013).

Health care has evolved but the patient visit to the doctor's office has not changed much in many years (Kaphingst, et al., 2014; Kellermann et al., 2013). Knowing that the earth's population is consistently growing and areas which did not have access to the Internet, suddenly do; the idea that health care can be accessed by all could be a realistic goal (Abekah-Nkrumah et al., 2014). The Food and Drug Administration (FDA) has

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taken long strides in setting criteria for health care system's utilizing mobile applications (Hartford, 2014; Henderson, 2015). Comstock (2015) showed the large database systems currently in use for mobile health applications by the National Health services (NHS). The philosophy behind the patient-centered medical home is to catch illness early on, manage already-sick people so they do not get much sicker and improve population health to reduce avoidable hospitalizations, emergency department visits and other costs. It is accomplished by putting primary care physicians in charge of a defined population to manage health proactively instead of reacting only to complaints of patients who come for office visits (Carey et al., 2013).

In a study published in the Journal of Health Care Management, Agarwal (2010) estimates that US hospitals waste more than $12 billion annually from communication inefficiencies among care providers. Of that amount, increased length of stay accounts for 53 percent. Looking more closely at what poor communications cost an individual facility, the authors estimate a 500-bed hospital loses more than $4 million per year. The article's concluding remarks mention that, "Information technologies and process redesign may help alleviate some of this burden" (Agarwal et al., 2010).

"There is no one defined way of either organizing a system of care around these patient needs or staffing for it", says Pamela Thompson, RN, CEO of the American Organization of Nurse Executives, an affiliate of the American Hospital Association, and a member of the AHA's primary care workforce roundtable. "One guiding principle of the patient conversation is trying to maximize the use of the entire health care workforce by having people work to the top of their skill level" (Morrissey, 2013). When asked in general what type of medical provider they would prefer to get care from, consumers tend

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to pick the MD. But, 60% of those surveyed said they would choose to see an APP today instead of a MD tomorrow; therefore reinforcing the notion of immediate care (Dill et al., 2013). The below table shows the gap between physician shortages versus demand grows (Stempniak, 2010):

Figure 1. Physician Shortage versus Demand

	Physician Supply	***Physician Demand***	***Physician Shortage***
2010	709,700	723,400	*13,700*
2015	735,600	798,500	*62,900*
2020	459,800	851,300	*91,500*
2025	785,400	916,000	*130,600*

Prakash (2010) defined patient satisfaction as measuring quality, clinical outcomes and patient retention in health care. Seeing mobile health applications as a large step in having governments on board, we also see clinician's positive views in completing direct patient care with mobile health care (PWC Health Research Institute, 2014). The cost savings and patient satisfaction involved for patients and health care systems with telehealth programs are highlighted by Dolan (2012) & Grustam et al., (2014).

Some hospitals have implemented 'The Hospital Communication Bill of Rights' which states: Hospitals and their caregivers shall have the right to decide which types of mobile communication devices make the most sense to use for the good of patients' health. Newer mobile technologies such as smart phones, Wi-Fi phones and two way pagers are the most desirable personal communication devices for health care because they offer the ability to track recipient responses (Amcom Software, 2013). Technologies exist today that can significantly improve communication efficiency throughout a hospital and make giant strides toward the Joint Commission's goal to improve the

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effectiveness of communication among caregivers. More specifically, solutions are available to facilitate hospital compliance with to report critical results on a timely basis. The ability for staff to instantly connect with one another on their mobile devices gives providers a leg up in the fight against time in critical situations (Stojmenova et al., 2013). Overall, efficient communications increase patient safety and satisfaction, promote health care quality and improve delivery of care. Medicare pays for a limited number of Part B services that are furnished by a physician or practitioner to an eligible beneficiary via a telecommunications system. For eligible telehealth services, the use of a tele-communications system substitutes for an in-person encounter (Aston, 2013).

"We are recognizing more and more that not all care needs to be delivered face to face," said Dr. Glen Stream of the American Academy of Family Physicians (Neergaard, 2013). CMS may pay physicians for non in-person visits – CMS may reimburse PCPs for providing chronic disease management services to beneficiaries without an in-person visit beginning in 2015. CMS's proposal states that "successful efforts to improve chronic-care management for these patients could improve the quality of care while simultaneously decreasing costs." In addition, CMS has proposed expanding reimbursements for telehealth visits, including refining the definition of "rural" to avoid disrupting health services if an area's geographic designation changes (Neergaard, 2013). Medicare beneficiaries are eligible for telehealth services if they are presented from an originating site located in a rural Health Professional Shortage Area or in a county outside of a Metropolitan Statistical Area.

The originating sites authorized by law are:

- The offices of physicians or practitioners

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- Hospitals
- Critical Access Hospitals
- Rural Health Clinics
- Federally Qualified Health Centers (CMS Telehealth Fact Sheet, 2012).

The Department of Veteran Affairs has continued to expand its home telehealth programs, which have reduced readmissions and bed days at a cost of $16,000 per patient per year, compared to $13,000 per patient per year for direct home care (or $77,000 for nursing home care) (Rhoads & Flashman, 2013). Recently, health care has adopted a manufacturing mindset in its work by implementing lean practices (Machado et al., 2014; McCaughey et al., 2013). The process of having a supply chain and factory mindset of management of patient satisfaction gives the idea of efficiency, and can sometimes lack in the area of budgeting and staffing. Taking health care into the next decade could benefit from having more outside influences as these areas rolled into the new management of patient satisfaction. Creating budget and time saving efforts for patients lead to management of patient satisfaction differences from their previous encounters (de Oliveira, 2014). There are a number of interactive technologies that old a great promise of improving health care that has been developed (Grobart, 2013; Tozzi, 2013):

- The advances in speech recognition have made it possible to attain the 99% accuracy. For this reason, medical transcription is now a possibility.
- Through voice controlled robots, doctors can get assistance with given programmed tasks within the operating room.

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- Interactive voice response systems with the ability to respond to the FAQ (frequently asked questions) are being used to enhance customer service.
- Patients can learn and be educated about their ailments by intelligent, voice controlled kiosks.
- Real time translations of conversations by automatic voice translators that can bridge language gap.
- Intelligent, optical character recognition systems that allow for the conversion of handwritten documents to text at speeds of about a thousand characters per second.
- RxAnte – Founded by Josh Benner from McLean, VA, uses algorithms to mine patient data to predict who is likely to need prodding to take their prescriptions.
- EClinicalWorks – A Westborough, MA software vendor that sends patients voice and text reminders about appointments and prescription refills.
- Vitality – Los Angeles, CA makes GlowCap that fits over prescription bottles and lights up and beeps when a dose is due. Sends alert to family members if the bottle is not open. Cap is $80. Data plan is $15 per month via AT&T.
- Proteus Digital Health – Tiny ingestible sensor that can be inserted into a pill that will signal when a medication has been taken.
- MC10 – Founded by Benjamin Schlatka from Cambridge, MA creator of BioStamp. This flexible computing prototype applies to skin like a Band-Aid and collects data such as body temperature, heart rate, brain activity and UV exposure. Uses near field communication to upload information to any nearby smart phone

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for analysis & each stamp lasts about 2 weeks which changes the nature of medical diagnosis. Implanting sensors can provide full-time monitoring which means medical staff can get health care information when they need it. Cost is less than $10 per unit and commercial product will be available in the next five years (Steventon et al., 2014).

"If you ask primary care physicians, 'Do you have enough to fill your day?' they will say they have more than enough," Dr. Patrick Courneya, MD said. "We [as primary care physicians] have gotten beyond looking forward to that ear infection to break up the day. We have a lot more complex cases. I want to use my skills to the highest and best use. I want to use my time for more serious challenges and let someone else take care of the other stuff" (Ter Matt, 2013). "Most patients who use tele-health services fall into two categories: uninsured, young, transient people who do not have chronic health problems, and patients who live in remote locations where physicians are in short supply," said Gary Capistrant, senior director of public policy at the American Telemedicine Association (Baluja, 2013). "We [physicians] are going in a direction where we want accountable care organizations and better support for people with complex medical needs," said Kevin Palattao, vice president of clinic patient care systems at HealthPartners and vice president of Virtuwell. "A physician who is treating a simple bladder infection is not working at the top of his license" (Ter Matt, 2013).

Making telehealth to align the strategy is a key component in health care's future (Dansky et al., 2005). By understanding the discriminating factors that influence the adoption any use of clinical communities of practice positions can work toward

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delivering better care to their patients and caregivers (Davis et al., 2015). Self-care in patients with chronic heart failure is a piece by which a health can be a provider based solution to a technology problem in today's health care (Davidson et al., 2013). Junior medical doctors on the front lines of rural care showed that the multiple purposes of policy piloting and their consequences in England is on the forefront of the telehealth revolution (Ettelt et al., 2015).

A collaborative workflow for computer aided design in ambient assisted living shows that telehealth can be adapted to assist geriatric individuals and those in the nursing home environments (Ferry et al., 2015). Seeing telehealth as a global brand challenge, the summit of leaders through progress and challenges show the implementation and use of health information technologies among critical access hospitals helps to improve patient care (Flores, 2013). This is different than what Gabriel (2014) says in the diagnostic related guidelines hospitals. Telehealth adoption in hospitals gives an organizational perspective of a better health organization and management three using health practices (Gagnon et al., 2005).

Grustam et al., (2014) shows the cost-effectiveness of telehealth interventions for chronic heart failure patients in addition to the technological assessment of these hospitals show a high ability for technology. This is an addition to understanding that telehealth brings forth benefit to patients not aware of care. Questions so still remain about the satisfaction link to telehealth as well. This lack of satisfaction knowledge is evident in both rural populations (Hage et al., 2013) and urban areas (Hall & McGraw, 2014). Patient care is evident in certain disease areas and benefits of care are shown through studies. Patients who have depression (Gum et al., 2014), drug abuse (Holland,

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2013), neurology (Jaglal et al., 2014), cardiology (Joanna dArc et al., 2016), schizophrenia (Kasckow et al., 2014), post-traumatic stress disorder (Kasckow et al., 2015), audiology (Khoza-Shangase & Kassner, 2013), palliative care (Luckett et al., 2014), pulmonology (MacNab et al., 2015), occupational therapy (Martin et al., 2015), lung disease (Martin-Lesende et al., 2013), emergency medicine (Martinez & Carr, 2013), diabetes (Shea et al., 2013) all show the clinical benefits of telehealth.

Telehealth's role in the health care can be divided into the categories of business use and clinical use. Within industry standards, this is classified as office side and patient side (Iglehart, 2014). To assist on the business side case, health systems are utilizing content management systems for public health professionals (Hashim et al., 2015). This system set up allows for a more up-to-date schedule and reduced operational time and resource waste (Sperber et al., 2014). Age wise, this set up and deployment is being adopted by patients of all ages (Siciliano et al., 2014; Sorell & Draper, 2014).

Patient side, health care has two audiences which utilize telehealth: patients and caregivers. These two different and distinct audiences have two different and distinct needs. Caregivers, both professional and family/friends desire a telehealth system which works and is responsive to their and the patient's needs (Sengstack, 2015; Sharma & Clarke, 2014). Patients, both themselves and their family members want a telehealth system that works and has an ease of use (Sparks et al., 2016). Understanding patient and caregiver audiences as a predictive model of a telehealth system deployment and operation means that care must meet all of these desire points (Jean et al., 2015).

The development of telehealth meets patients in both a rural (Hex et al., 2015) and urban (Hunting et al., 2015) care setting. These two different patient populations again

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have different and distinct needs. Rural patients on occasion have a great deal of travel to reach a medical provider (Lowery et al., 2014). Urban patients, while closer to medical offices, sometimes run into the problems of wait times and acuity levels coming in front of the patient (Kvedar et al., 2014). These two areas showcase a need to help develop and sustain telehealth so patients can be seen without geography or other patients getting in the way (Lorgelly, 2015).

As governments take more of a lead with health care (MacVane, 2015), the desire to serve vulnerable patients can be seen as a keystone to the program's success (McBain et al., 2015). Veterans and the facilities that serve them are specialized health care facilities that deal with disease treatment on a specific patient population (Kasckow et al., 2015). Bringing telehealth to these patients is a treatment method which has taken hold in the United States (Linderman, 2011) and Australia (McKenzie & Williamson, 2016; Lobo et al., 2015). By retooling the decided resources that government health care providers have, one can see that telehealth is making care strides with these patients (Lee et al., 2014).

Governance of telehealth programs brings on the need for not only clinical leadership (Martin-Khan et al., 2015), but also technical leadership (Mago & Gibbanelli, 2016). Keeping patient data secure (Nordgren, 2013), as well as maintenance of the systems (Parks, 2013), adds a great deal of labor and capital purchases to execute (Pearl, 2014). Health systems must decide if the benefit of having a telehealth system outweighs the initial and continued costs of operation (Quilty et al., 2014).

Telehealth involves more than direct patient care. With a patient's treatment, items like medications, therapy and home medical equipment all come into use as well.

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McMillan et al. (2014) lay out how pharmacies that utilize telehealth meet the needs of patients with chronic conditions. This chronic condition treatment benefit is also laid out in Pare et al.'s (2013) writing which showcases the economic benefits of home telehealth for patients and providers. Since a patient or family member's home is the most desired location for a patient to be (Paul, 2013), telehealth continues to evolve and serve patients in their residences (Parks, 2015; Polisena et al., 2009).

The benefit of telehealth lays in the fact that emergency room and urgent care visits are expensive for both patient and provider (Pope et al., 2013; Mueller et al., 2014). By utilizing telehealth to reduce emergency room and urgent care visits, health care systems notice both clinical (Moffatt & Eley, 2010) and business (Mustafee & Katsaliaki, 2015) benefits. The patients that benefit from telehealth care instead of emergency room and urgent care settings include patients who are vulnerable and underserved (Paul & McDaniel, 2016). By routing these patients to more appropriate levels of care, health care systems can have providers work at the top of the license and deliver care in the most effective manner (Savage et al., 2013).

Telehealth can also assist providers and patients in illnesses which are hard to see. In treating behavioral health, providers have seen economic (Pizzo & Cohen, 2016) and clinical (Rosenberg, 2014) benefits in treating behavior health via telehealth. Patients who hold insurance through veterans' providers have specific organizations (VA centers) and treatment methods by which they need to be seen (Saurman et al., 2014). By utilizing telehealth to deliver this care instead of making patients travel to VA Centers has proven to show greater utilization (Possemato et al., 2013).

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Grouping telehealth into an area which is just for tech-savvy individuals could be considered due to the elderly's unfamiliarity with emerging technology (Pecina et al., 2013). As patients get older, their diseases become more complex and the treatment methods take on a different set of clinical skills (Pedone et al., 2013). The ability to treat these diseases and the elderly patients' familiarity with the telehealth system will be key to creating a sustainable health care system (Sanchez-Morillo et al., 2015). Creating this sustainable treatment option will be a benefit to both public (Rho et al., 2015) and private (Rosenberg, 2014) health care.

Telehealth continues to innovate as the technology continues to evolve (Schwamm, 2014). From treating refugees across different countries (Schulz et al., 2015), to servicing patients in critical crisis times (Schartinger et al., 2015), telehealth can continue to be a change driver in both health care and technology. The innovation to develop this care based system with emerging technology will be key to the survival and growth of both sectors.

One of the main benefits of telehealth is the option for providers to be remote from the patient (Ayatollahi et al., 2015). This ability for clinicians' knowledge and perception of telemedicine is helpful when health care providers want to advise patients on selecting care (Basilico et al., 2016). Having this remote ability gives providers the first step in the transformation to value-based health care delivery (Berns & Hommes, 2013). Working not from a financial standpoint of office space and cost recouping, providers have the needed network and support to enhance interventions for properly diagnosis of patients (Daker-White & Rogers, 2013). By having internet-based health

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symptom data, providers and nations are able to effectively control their patients' disease surveillance across entire countries (Elliott et al., 2015).

Looking at health care as a nationwide event and layout for practice, providers are starting to discover how treatment can work across a singular country (Strouthidis et al., 2014). This treatment of clinical governance and compliance with the use of online health care service delivery to patients is evident in both Australia (Spigelman & Rendalls, 2015) and Israel (Shahrabami & Mizrachi, 2016). Clinically and operationally, the delivery of health care signifies the new delivery improvements for patients (Samiei et al., 2016) and health care systems (Rosiek et al., 2015). Having wide acceptance of improving access to health care shows the trends that attitudes toward a different view of treatment is being realized among patients (Mansfield, 2014), family members (Nikbakht-Nasrabadi & Shabany-Hamedan, 2016) and health care providers (Biruk et al., 2014).

Having a wide abundance of acceptance allows for personalization of medicine for a patient (Greenhalgh & Keen, 2014). This personalization can have both potentials and challenges for patients, family members, health care providers and health care systems as health care is transforming into this electronic point of care (Gu et al., 2014). Research suggests personalizing a treatment to make the most of a patient's care plan accessible, technology must not replace human contact in the drive for self-care (Limb, 2014). Hawkes (2015) also states that providing care at home is not always a process by which health care systems can save money. Seeing both the pros and cons of remote patient care, health care systems are looking at the impact of tele monitoring home care patients as both a method of a care plan study and as a method of a feasibility study when

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looking at health care resource use (Martin-Lesende et al., 2013; Mason et al., 2015; Mihalas, 2014).

Since most health care programs are government run and supported, the idea of proper budgeting and implementation is a key in the implementation of telehealth systems (Gran et al., 2014). One of the largest and most noticeable government health care programs is the treatment and service of military members (Carey et al., 2016). The ability to treat service members both in the battlefield (Watson et al., 2014), in traditional clinics (McClellan et al., 2013) and after the service member's discharge (Averill et al., 2015) creates a wide treatment cycle. Seeking adoption by both specialized provider (Inglehart, 2014) and patient (Hoad, 2016) gives government run health care a reason for successful adaptive development and application of virtual health services (Kuo-Chung & Lun-Ping, 2014; Li & Mao, 2015). Designing for success with this environment creates an adoption rate based on increased health care utilization (Krupinski, 2014; McBain et al., 2015)

The disease management of patients in the military balances a line between personal innovativeness and user acceptance of technology (Jackson et al., 2013; Watson et al., 2014). Disease treatments including diabetes (Holmen et al., 2016; Suksomboon et al., 2014; Thoumi et al., 2015), stroke (Kizony et al., 2014), speech pathology (Lincoln et al., 2014; Tetu et al., 2013), neonatology (Minton et al., 2014), diabetes (Mohammad, 2015), incontinence (Parvaiz, 2015), breast cancer (Pruthi et al., 2013), podiatry (Schoen & Norman, 2014), chronic obstructive pulmonary disease (Segrelles et al., 2014; Stoikova et al., 2013), occupational health (Krupinski, 2014; Han et al., 2014), pain management (Parker et al., 2013), geriatrics (Siciliano et al., 2014), gastroenterology (Zia

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et al., 2015) & chronic illness (Chang, 2015; McBain et al., 2015) all have their documented benefits and reasons for more studies. This desire for more work is a key to the development of this study.

Expansion of telehealth continues to develop and improve the normalization of complex interventions (Finch et al., 2013). The analysis of telehealth use indicates expanded access for patients without a prior connection to a health care provider (Uscher-Pines & Mehrotra, 2014). Having patients with access to a health care provider who otherwise would not due to travel barriers creates social change via healthier populations (Syed et al., 2013). Stewart (2013) supports this with his study on how web based cooperation and collaboration work together in patient care. This social change development is also supported by Passut (2015) and Phillips (2015) in their work with on how health care professionals can work in the electronic age and still provide quality patient care.

While theory and literature support the evaluation of telehealth, the long lasting benefits still need to be viewed. Holmer et al., (2014) examine telehealth solutions to the carbon footprint that health care delivers. Seeing this as a long lasting benefit to reducing waste, Park et al. (2014) also study how telehealth can sustainably develop and work with patients in extreme rural areas that require higher level technologies and antennas to be reached. This methodology of both provider and patient trust will continue to be a keystone to the future of health care (Huei-Shan et al., 2015).

Finally, the work of health care follows an organizational structure like any other business. Having support and buy in from executive leaders assist the work of health care practice. Moran et al., (2014) examine the supervision and support for health

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practitioners in rural and remote contexts. Zournazis & Marlow (2015) further support this study by acknowledging the use of video conferencing to develop a community practice for preceptors located in rural and non-traditional placement settings. The support and challenges in telehealth can be dealt with by high fidelity simulation (Onello & Regan, 2013) and analytical hierarchy processes (Schmidt et al., 2015).

The unveiling of the telemedicine system as an E-commerce platform in the health care sector raises the hopes of the patient to get health attention in a more convenient manner. The expectation was blown to the top of all things but patience on the operationability of the telehealth system. The satisfaction of management of telehealth attributes to an efficient functioning of the E-commerce platform (Stojmenova et al., 2013). It is essential to establish a long-lasting relationship between the core units of the telehealth system and other components of health care administer involving medical assistance and financial support. According to Machado et al., (2014), the compatibility of the telehealth system with other components of the health care management. This is to ensure that the E-commerce system operates properly and serves patients as it should. Establishing a swift interactive platform is a necessity to subsequently aid patient access medical attention in a convenient manner (Vidyanti et al., 2015). Compatibility entails the suitable integration of hardware and software of telehealth system and the health care service provision.

Questions are usually raised over the right protocol to integrate technological advancement especially the E-commerce platform in the field of health care provision. The successful transition to the technology era for the health sector proves somehow a challenge due to the continuous change in technology while the health care sector lags

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behind (McCaughey et al., 2013). The integration of the E-commerce platform in a health setting is a massive emissary of innovation. However, compatibility issues must be principally addressed to avoid a slump of the innovation right after the implementation. The assembly of adequate resources to facilitate a swift transition may derail the implementation of a telehealth at worst rendering it incompatible with the health care environment (Ferry et al., 2015). The essence of establishing compatibility is to ensure the proper functioning of the telehealth system so as to be readily available to a patient who vests their faith on the platform (Ferry et al., 2015). If a system fails to adopt the full features of compatibility, it may result in massive damages which may be severe at times especially in the health sector.

Furthermore, non-compatibility of an E-commerce in the health sector could mean bad news leading to unintentional deaths of chronic patients. A failure on the end of telehealth system to interact accordingly with the human resources in charge depicts the failure of the system (Prakash, 2010). In the attendance to some health issues, the subject of system compatibility and a backup plan is essential in a health care field as it primarily concerns the lives of others (Stefanic et al., 2013). The basic fundamental checks on the adoption of a new system should involve the establishment of compatibility with the existing resources regarding people and the general environment. A compatibility test cautions against the deployment of a technological platform which is not yet in good shape for adoption and at times incompatible system (Vidyanti et al., 2015). In a health care setting, accuracy is an essential virtue without which other people's lives are put at extreme risks. A compatible system such as the telehealth should also assemble a backup plan to caution against instantaneous failures which could be severe (McCaughey et al.,

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2013).

The development and adoption of technological changes in the health care field are fueled by the needs to advance in the current manner of doing things in a different way. Moreover, needs triggers an extensive process to develop and implement such platforms as telehealth. However, the acceptance of system such as the telehealth by the final users is integral to the functioning of the system (Grobart, 2013). Without the approval of the final user, technological development is nothing more of an engineered carcass that calls for the revival through convincing the ultimate user of the ability and efficiency of the system (Stefanic et al., 2013). While developing the framework of the system, it is essential to incorporate the influence of the finals users. The acceptability of a telehealth system would spur continued utility resulting to subsequent usage and modifications in the future. The end user has a big say on the kind of end product they would want to use and access.

Uniform acceptance depicts the last bit of implementation of a system. The utility of telehealth is volatile and thereby necessitates the massive public acceptance to ensure its efficient functioning and provision of the service it was intended to provide (Grobart, 2013). The adoption of a new innovative product calls participatory engagement of the targeted final users. A telehealth that strives to provide a convenient way of accessing medical attention ought to surpass the backing of the public (Ferry et al., 2015). The acceptance of a system ensures that the final users can freely interact with such platform leading to easy detection of flaws which should be corrected soonest. The essence of incorporating patience acceptance for telehealth system is to affirm that the system is actually in service and the manner that it should. Additionally, the public backing also

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ensures that such a platform is easily translated into the next phase and eventually attaining appropriate assistance when necessary (Stefanic et al., 2013). It is thus imperative to amass the uniform acceptance of most concerned patients as well as the general public who could turn to the rescues of the system.

Most studies have found that the home telehealth facilities have a positive impact on the patients' health (Kumari, 2014). Telehealth is viewed as a means of easing the access of medical facilities to patients. Telehealth systems are installed at the homes of the patients thereby bringing the medical facilities near the patient. The patient is in a position to assess his health status and know when to alert the physicians (Dracup, 2011). The telehealth systems have means of linking the information regarding the health of the patient directly to the nurses. Some videophones are installed in such a way that they pass direct information from the patient's residential place to the nurses (Zournazis, & Marlow, 2015).

Telehealth systems provide room for the doctor to communicate directly to the patients and advise them on the actions to take to reduce the symptoms and signs showed in a particular period. The direct counsel by the physicians greatly satisfies the needs of the patients (White, 2015). Majority of the respondents who comprised of both patients and physicians responded positively to telehealth services. Many patients acknowledged the importance of the telehealth services in their lives. They claimed that their emergency visits to hospitals had significantly lowered (Kenen, 2015). The veterans who were suffering from chronic diseases were in a position to be diagnosed effectively without incurring unnecessary commuter fees to visit the physicians (Kenen, 2015).

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Telehealth systems offers quality services that range from reduction of patient mortality rate to lowering of admissions in hospitals (Sanclemente-Anso, 2015). The veterans who are suffering from chronic diseases have a high risk of emergency cases that can easily take their lives (Kellermann et al., 2013). Telehealth appointments grant them the opportunity of checking their health regularly and being monitored by the nurses now and then. This reduces the number of patients who succumb to death under the telehealth monitoring programs. The patient's visits to hospitals are also lowered since the patients are in a position to assess their conditions and know when it's necessary to see a physician. The nurses who monitor the health of the patients counsel them on the kind of medication to take and this lowers their chances of having hospital admissions. The telehealth program leads to a significant improvement in the life of the patient (Inglis et al., 2011). The blood pressure of the patient who is being directly monitored by the nurses is lowered. The patients who have been suffering from diabetes and hypertension have recorded a positive decrease in their blood pressure. In general, the telehealth services offer more quality services to the patients.

To ensure that the telehealth systems are working out effectively, it is recommended health officials ensure the various stakeholders involved in the health sector work together to ensure effective delivery of results to the patients (Stronge, Rogers, & Fisk, 2007). Patients should be integrated in the inception of the various methods of telehealth services and should be allowed to voice out their opinions concerning the form of telehealth program they need. It is therefore necessary for the private hospitals and the community projects to fully engage the physicians and the patients in the telemedicine systems.

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Researchers proposed that the government should partner with the private hospitals and other non-government organizations in offering and improving service delivery to the patients (Gagnon et al., 2005). Researchers found it more practicable for the government to be in the front line of promoting the telehealth facilities (Elliot et al., 2015). This is because the government is the one charged in providing effective and reliable health facilities. The government has current systems and resources to support the delivery of health services via telehealth medical systems. Government can also ease the cost of accessing the telehealth services to the patients by setting up a fund for the patients. In many countries, governments usually have an insurance fund that insures its citizens and enables them to access free medication using the insurance cards (Wye, 2015).

Internet connections were one of the ways found to be effective in providing the telehealth services to the patients. Researchers proposed that the fiber network cables should be installed in the residential areas with large population of citizens to increase the internet connectivity in those areas (Xu, et al., 2014). Some telehealth systems require Internet connectivity such as videophones. If the Internet is not stable and reliable, it therefore means that the communication between the patient and the physician will be hampered. Reliable internet and connectivity networks will ease communication and therefore the patients and the nurses will have a platform of exchanging views (Pearl, 2014).

Researchers found Internet connections were a challenge for some communities and private hospitals to provide the telehealth services. They therefore recommended government take a high task of providing the telehealth services and come up with

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veteran telehealth programs (Paul, & McDaniel, 2016). Various state governments initiated ways of coming up with telehealth monitoring programs for the elderly people in the state since many veterans have high chances of contracting chronic diseases since the chronic diseases are more prevalent to the old aged people. State governments employed nurses specifically mandated with the task of monitoring the patients under the telehealth appointments (Aston, 2013).

Patient satisfaction has long been a benchmark of health care providers (Glenngård, 2013). A decline in patient satisfaction results in the rejection of the traditional ways of thinking and approaches in science (Abdoune & Fezari, 2016). The structural alignment of the telehealth system aims to reach out to as many patients over broad geographical stretches and establish a reliable mode of accessing health care at the patient convenience. The essence of the electronic health care admission lies in making patients comfortable in seeking medical assistance and satisfactory delivering value for the e-commerce platform e-commerce platform in the field of health care. Telehealth involves a technologically driven business undertaking with patients being the final customer with a high expectation of a convenient means to access health services through an online platform.

The principle driver of telehealth system functionality is the backing of satisfied clients and thus imperative to mainly lay concerns in ensuring that telehealth system fully achieves patient satisfaction (Abdoune & Fezari, 2016). According to Glenngård (2013), patient satisfaction is thus an integral pillar in the study of the functioning of the telehealth system in the health care field. The structural development of patient satisfaction strategies is further reinforced by deploying the fundaments of a theoretical

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approach involving a review of the game theory.

Game theory plays a significant role in influencing satisfactory behavior in economic models thus a fitting suit in the selling of telehealth to the public. Telehealth is an important innovation in the health care management and ought to be promoted to the public by various methodologies (Agee & Gates, 2013). The adoption of game theory in administering a satisfactory behavior to the users of telehealth system is a huge step in publicizing the practice in the health care management. Game theory has been identified as an integral contribution not only in the field of finance and economics but also branches that incorporate the practice of economics and finance (Myerson, 1991). It is, therefore, imperative to note that game theory perfectly suits as the theoretical baseline, which private stakeholders cooperate on a collective action problem in an effort to find a plausible solution. Notably, the incorporation of the theory in the foundation of this study leads the establishment of the collective action of health care management by utilizing the desired outcomes (better health) among the program participants (Myerson, 1991). This process will include both patient and caregiver as the participants in this game theory work.

However, many scholars heavily criticize the utility of the game theory in the study on telehealth due to the more commercial focus than relative primary health principle thus being rather contradictory. Myerson (1991) notes that game theory directs its focus on the economic benefit of adopting a telehealth system and its application in ensuring satisfactory performance to the users. The financial cost and benefits focus of the telehealth system is rather a bias and must incorporate an integration interface between the fundamental parameters of health provision through the telehealth system and the

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financial implication of the practice (Agee & Gates, 2013). Additionally, the conflict surrounding the theory and the anthropomorphism applicability also cause a series of discussion. However, game theory cannot be wholly be detached from the relation to anthropomorphism but can be primarily be integrated to ensure that patients get good value for the telehealth services they commit to seeking regularly. Customer satisfaction being the primary guide to the adoption of telehealth as a business model ought to be prioritized. The game theory model perfectly suits the description of an operational telemedicine patient satisfaction model (Agee & Gates, 2013).

According to Xu et al., (2014), electronic commerce in health care is also one of the most growing areas. An extensive range of businesses fall under E-commerce, but the adoption of such mechanism in health care management marks the use of telehealth as being among most significant technical innovation in the health care field. Despite stiff resistance from various parties, changes are constant and can be completed through open-minded professionals that give way to improving the practice. Through the new changes, much change to the health care system can deliver better services than before (Stojmenova et al., 2013). E-commerce, which is the process through which the exchange of products, services, and information as well as buying and selling through computer networks is recently very general in the health care system (Yang & Silverman, 2014). The use of e- commerce in the industry could be of significant benefit to improving the relationship between customers, suppliers, hospitals, and the clinics (Adler-Milstein et al., 2014).

Collaborative commerce (c-commerce) refers to an E-commerce model that allows groups and individuals collaborate and communicate online (Alkmim et al., 2012).

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Through the application of electronic commerce in the health sector, doors have been opened through which the doctors and practitioners could monitor bed- ridden patients, even in a case of coma (Bagayoko et al., 2014). As an industry with well over one trillion dollars in revenue, the health care system accounts for about a seventh of the economy in the United States, but a great portion of the revenue is lost due to the health system costs that are ever escalating (Baig et al., 2013). The traditional system of health care delivery has some shortcomings regarding information flow, case collections, communication standards as well as it spending (Wye et al., 2015). For this reasons, e-commerce would be a better alternative for more practical and cost-effective transactions, where the Internet would be a better platform for delivery. Through the application of E-commerce in the health sector, doors have been opened through which the doctors and practitioners could monitor bed- ridden patients, even in a case of coma (Bagayoko et al., 2014). As an industry with well over one trillion dollars in revenue, the health care system accounts for about a seventh of the economy in the United States but a great portion of the revenue is lost due to the health care system costs that are ever escalating (Baig et al., 2013). The traditional system of health care delivery has a number of shortcomings in terms of information flow, case collections, communication standards as well as it spending (Wye et al., 2015). For this reasons, e-commerce would be a better alternative for a more effective and cost effective transactions, where the Internet would be a better platform for delivery.

Mortara et al. (2009) in one of their studies described the high faith that the patients expressed in the telehealth services. The patients highly valued the practitioner's surveillance on their health status. The patients still expressed faith in the telehealth

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services despite the different failure that was recorded from the systems (Fairbrother et al., 2014). This showed that the patients who utilize telehealth get quality services that lead to a significant positive improvement in their health. The positive improvement enables them to have great satisfaction in terms of the health utility.

Summary and Conclusions

Knowing that literature for telehealth is continuously growing and evolving; I see this study as a unique and detailed piece, which is much needed for the field of management. It can be concluded that as technology expands, so will the literature and comparable studies along with its expansion. With the following research method, the participants and study points will assist the field of management in filling the current gap in its literature.

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Chapter 3: Research Method

The purpose of this study was to examine how the satisfaction management of telehealth is affecting patients. Showcasing the satisfaction management trends in this arena will give health care the needed next steps to make a transition into the care and proper management of health care for the masses that has been needed for many years (Bernstein et al., 2007; Kumari, 2014). For too long, health care has been in the traditional 'office visit' mentality of patients being in front of the doctor and not embracing newer technologies that are available (Lee & Meuter, 2010). Technology advancements will continue to evolve, and health care must as well. The purpose of this study was to look at patient care in both face-to-face and telehealth situations and view how satisfaction management differs between both settings. Within this section, time and attention was paid to research design and rationale, methodology, data analysis plan and threats to validity.

Research Design and Rationale

The research design and rationale of this quantitative study will be to measure the satisfaction of telehealth measures on different patient populations. The independent variable is identified as a mobile health care delivery platform (Moch, 2000) and will be described as a delivery tool by which a health care professional is able to diagnose and deliver care. . The health care treatment sessions are directed mainly at the patients during the appointments to treat, diagnosis and cure (Kapur, 2001). The medical professional's primary directive is to treat the patients as if there were a traditional face-to-face appointment. The dependent variable has been identified as treatments, diagnosis and disease progressions (Snee, 2010) which is commonplace to the routine visits that a

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health care professional would see on an everyday basis during a traditional office workday.

This research design is aligned with the research question, "How does the use of telehealth in health care provide satisfaction management results compared with face to face appointments for patients in a health care system?" The time and resource constraints issued by this design and question came from the health systems and patient populations. Since disease diagnoses and patient populations cannot be entirely planned out in advance, the limitations of the study were only able to be constructed based on the study's time period.

Methodology

Population

The target population of this study is patients that were selected from treatment populations that use the Clinician & Group Survey developed by the Consumer Assessment of Health Care Providers and Systems (CAHPS). This survey was developed in 2000 by the United States government department, Agency for Health Care Research & Quality. This survey is the national patient satisfaction benchmark used by a majority of health care groups in the United States and was updated on July 1, 2015. Use of this survey is allowed because it is an open-sourced government document. Validity and reliability of the CAHPS survey tool has been developed by Co, Sternberg & Homer (2011). The survey was then re-validated in 2011 in a separate study by Sternberg, Co & Homer.

This data set contained 457,418 encounters, reduced down based on determined variables. The patient list was focused on a manageable number of encounters based on

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virtual and face to face visits. A G-power test was conducted and revealed the encounter number for this study to be:

Critical T: 1.9626851

Non-Eccentricity Parameter: 3.6938752

Degrees of Freedom: 873

Actual Power: 0.9581710

Sample Size: 438.29

Sampling and Sampling Procedures

Sampling procedures in this study were used by taking selected patients who were seen virtually by a health care provider within a system. This number of patients was varied across different health systems, ages, sex, race and geographic regions. The purpose of a random sampling was to allow for the widest variance of patient demographics.

Procedures for Recruitment, Participation, and Data Collection (Primary Data)

Participants for this study were obtained through the CAHPS database system that had either face to face or virtual appointments. Informed consent was obtained through the health systems internal means of data release and the detailed forms are attached in the back of this dissertation as Appendix A. Participants are able to opt out of the survey format by not returning the surveys to the CAHPS database.

Data Analysis Plan

Research Question (RQ1): To what degree, if any, does the management of patient satisfaction in telehealth appointments yield different levels of patient satisfaction

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than the management of patient satisfaction systems associated with in-office appointments?

$H_0$1: There is no statistically significant difference in the management of patient satisfaction of health care consumers from a face-to-face visit with a medical professional versus a virtual visit from a medical professional.

H_a1: There is a statistically significant difference in the management of patient satisfaction of health care consumers from a face-to-face visit with a medical professional versus a virtual visit from a medical professional.

Data received from this study were run through SAP's Business Intelligence platform. A separate data universe was created to allow for Structured Query Language (SQL) data queries to be run and not allow for any cross contamination of data in the universe dimension. Data cleaning and screening was conducted as a double-blind examination with the health system contact staff member and the searcher both screening the data coming in for errors. Analysis of variance (ANOVA) was used to analyze the differences between the patient groups.

Data came on a 5-point Likert scale which will rank results from a highly dissatisfied to a highly satisfied. On this scale, 5 will be scored as a highly satisfied and 1 will be scored as a highly dissatisfied. The test statistic will follow a normal distribution pattern and the probability threshold, which the null hypothesis will be rejected, will be 5% and 1%.

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Threats to Validity

External Validity

Threats to external validity will be kept to a minimum during this study. Due to using secondary data, the highest threats to validity were transferability and situation. Because the patient population being used is based on those patients who were part of the health system's patient population, the study will be reliant on narrow transferability. The characteristics of those studied are based on which patients come into the health systems and are not able to be prescreened. This situation-based validity threat allows for the researcher to spend more time determining which participants are most closely aligned with the study guidelines.

Internal Validity

Due to using secondary data, threats to internal validity are kept to a minimum during this study. The highest threats were selection bias and history. Because the patient population being used are set based on those patients who are part of the health system's patient population, the study allows to have a narrow view on those selected. In trying to seek out the best method to make sure that selection bias did not occur, I used all participants allowed by the health care systems. Additionally, history is considered to be a threat to internal validity due to the changing landscape of health care law. With the outside influence of federal, state, and local laws determining the delivery of health care in the United States of America, this study views the development of legislation which could affect this study.

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Construct Validity

Threats to construct validity in this study are null. Heavy time and attention are paid to reducing hypothesis guessing, bias in experimental design and researcher expectations. During the prospectus and proposal development process, eliminating confounding variables (covariates) from this study is led by the dissertation committee and the University Research Reviewer (URR).

Ethical Procedures

Study participant information is treated with the utmost respect and dignity when being used. Because the data used in this study are confidential, double masking of identity is provided in an effort to only have numeric identifiers for patients. This ability to have masked identities based solely on patient characteristics instead of names allow for HIPAA compliance and proper institutional data governance.

Within this study process, there are no ethical concerns related to recruitment materials and processes due to the data and patient samples. Data collection is completed during the double blind recruitment in which the masking of patient information is conducted to protect patient confidentiality. The opt out options are available for participants during the initial pre-screening if the participants chose to withdraw from the study. If anyone wishes to withdraw from the study, the participant information will be removed and data stricken from the study.

Data access will be conducted via a secured file transfer process (SFTP) site in which the pass word protected data will be accessed. Upon receiving the data, the data will be stored on a secured cloud storage device which will also be password protected.

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Only the study lead will have access to the data and once the study is complete, the data will be destroyed via a SQL clear code.

Summary

The purpose of this quantitative study will be to test the management of patient satisfaction of telehealth & face-to-face visit measures on patients. The independent variable is identified as a virtual health care delivery platform and will be described as a delivery tool by which a health care professional is able to diagnose and deliver care (Taylor et al., 2015). The sessions are directed mainly at the patients during the appointments to treat, diagnosis and cure their diseases or health ailments (de Oliveira, 2014). The medical professional's primary directive is to treat the patients as if there were a traditional face-to-face appointment. The dependent variable has been identified as patient appointment satisfaction, which is commonplace to the routine visits that a health care professional would see on an everyday basis during a traditional office workday (Sanclemente-Anso et al., 2015). This research design is aligned with the research question, "To what degree, if any, does the management of patient satisfaction in telehealth appointments yield different levels of patient satisfaction than the management of patient satisfaction systems associated with in-office appointments?" The target population of this study is patients that were selected from treatment populations of the Agency for Health Care Research & Quality provider locations.

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Chapter 4: Results

The purpose of this study was to examine the management of patient satisfaction in office visit and telehealth settings and to test if the level of management of patient satisfaction differed between these settings. Showcasing the management of patient satisfaction trends in this arena will give health care professionals the information needed to improve patient satisfaction (Wainwright et al., 2014). Health care has been delivered in a traditional office visit setting where patients are physically present with the doctor. Only recently has newer technologies begun to be used within health care (Sharma & Baoku, 2013). These newer technology based visits include computer monitoring of vitals and face to virtual face visiting from the health care provider (Sharma & Baoku, 2013).

The research question and hypotheses for this study are listed below:

RQ: To what degree, if any, does the management of patient satisfaction in telehealth appointments yield different levels of patient satisfaction than the management of patient satisfaction systems associated with in-office appointments?

H_0: There is no statistically significant difference in the management of patient satisfaction of health care consumers from a face-to-face visit with a medical professional versus a virtual visit from a medical professional. H_a: There is a statistically significant difference in the management of patient satisfaction of health care consumers from a face-to-face visit with a medical professional versus a virtual visit from a medical professional.

In this chapter, I present the data collection and study results. I also describe the results for each demographic group I surveyed.

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Data Collection

The participants for this study were selected from treatment populations that used the Clinician & Group Survey developed by the CAHPS. This survey was developed by the Agency for Health Care Research & Quality in 2000. The CAHPS was the national patient satisfaction benchmark used by a majority of health care groups in the United States and was updated July 1, 2015.

I was able to use this survey because it is an open-sourced government document. Validity and reliability of this study has been developed by Co et al. (2011). Sampling procedures in this study were conducted by selecting patients who were seen virtually by a health care provider within a system. These patients were varied across different health systems, ages, sex, race, and geographic regions. I used random sampling to allow for the widest variance of patient demographics. The CAHPS data set contained 457,418 encounters that were reduced based on completed answers to all questions. The patient list was focused on a manageable number of encounters based on virtual and face-to-face visits. A G*power test was conducted, and I determined the encounter number for this study to be the following:

- Critical T: 1.9626851
- Noneccentricity Parameter: 3.6938752
- Degrees of freedom: 873
- Actual power: 0.9581710
- Requested sample size: 438.29
- Used sample size: 8854

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Study Results

The CAHPS dataset included 457,418 respondents that were reduced based on completed answers to all of the questions. The final patient list was a total respondent number of 8,854 unique patient visits. Of this number, 4,427 unique patient encounters were with face-to-face health care visits (labeled: This Doctor) and 4,427 unique patient encounters were with telehealth providers (labeled: This Provider). From this dataset, the characteristics were also reviewed based on comparisons against age, gender, education, Hispanic/Non-Hispanic, and race. In each of these areas, I found significant satisfaction with seeing a telehealth provider versus a face-to-face except for the comparison field of education. In the field of education, patients who had less than a high school diploma were more satisfied seeing a face-to-face provider rather than a telehealth provider.

I assumed that overall medical provider treatments for disease-specific illnesses would be same across health systems. These treatment methods were assumed to be valid based on the medical providers' training and governing board policies and practices. These items were tested against the CAHPS data by quantitative analysis.

In the quantitative analysis, the random selected data set was run through SPSS using ANOVA: single factor on comparing telehealth visits against face-to-face provider visits. This ANOVA: single factor variation was conducted between groups and within groups. ANOVA: single factor variation was conducted to determine whether there are any statistically significant differences between the single groups of study. The ANOVA: two-factor without replication was used on all other demographic comparisons (age, gender, education, Hispanic/Non-Hispanic, and race). ANOVA: two-factor

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replication was used because each of the groups had multiple sets of demographic and cultural variances to examine in each of the questions.

This study contained one research question and two hypotheses. The data was over analyzed to allow for all surveyed groups to be reviewed in context with the key research question and hypothesis. In reviewing each of these demographic groups as well as the initial satisfaction question, this study fully examines the true levels of satisfaction in healthcare through many different lenses.

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Table 1

This Doctor vs. This Provider

ANOVA: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
This Doctor	4427	40100	9.058052857	2.419358431
This Provider	4427	40470	9.141630901	1.954405202

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	15.46193811	1	15.46193811	7.070312621	0.007851261	3.842509546
Within Groups	19358.27784	8852	2.186881817			
Total	19373.73978	8853				

I choose the CAHPS data score results of five different areas to compare satisfaction levels against. The areas were This Doctor vs. This Provider; This Doctor vs. This Provider (Broken With Age); This Doctor vs. This Provider (Broken With Gender); This Doctor vs. This Provider (Broken With Education); This Doctor vs. This Provider (Broken With Hispanic/Non-Hispanic) and This Doctor vs. This Provider (Broken With Race). In the first analysis, I performed a comparison of the patient satisfaction between face-to-face providers and telehealth providers.

I created two data frames for the first analysis: one for patient satisfaction between patients and face-to-face providers and one for patient satisfaction between patients and telehealth providers. I removed from my analysis any values that were null. This reduced the data set to 80570 entries. With the removal of the null values, I conducted a single factor ANOVA to evaluate the differences in patient satisfaction with

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regards to seeing a face-to-face provider or a virtual provider. This produces results of 2 comparisons with $F(3.842)$, unadjusted critical value for significance data.

The following tables contains information important for the analysis. This table shows the data results for the patient satisfaction scores from the CAHPS database. With these overall results, the group with significant satisfaction results was patients who saw a telehealth provider; the unadjusted significance being $p<.007$.

In Table 1, I demonstrated the pre- and post-minimum, and mean statistical test for this initial overall satisfaction question. I then demonstrated the standard deviation and ANOVA testing of these numbers. I then demonstrated the difference with data values upon completion.

This ANOVA replication variation was conducted to encompass rows, columns, and error. The summary of the ANOVA: single factor output of comparing telehealth visits against face-to-face provider visits yielded an average satisfaction score of 9.14 for patient satisfaction of telehealth visits versus an average of 9.06 for patient satisfaction of face-to-face visits (Table 1). This means that all patients had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting. The ANOVA statistical method is appropriate due to insinuations about means that are made by analyzing variance between the two areas. The variance of this ANOVA: single factor replication showed a variance of 2.42 for face-to-face visits and a variance of 1.95 for telehealth visits. This shows statistical signifiance for this question in the study beacuse the *P* value is 0.008; therefore showing that statistically the study results are 99.992% accurate and not by chance.

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Table 2

This Doctor vs. This Provider (Broken With Age)

ANOVA: Two-Factor Without Replication

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
18-24 years old	2	3031	1515.5	16020.5
25-34 years old	2	8866	4433	75272
35-44 years old	2	9481	4740.5	107184.5
45-54 years old	2	13206	6603	76050
55-64 years old	2	16903	8451.5	4512.5
65-74 years old	2	15945	7972.5	33540.5
75 or older	2	13138	6569	3200
This Doctor	7	40100	5728.571	5937280
This Provider	7	40470	5781.429	5553844

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	68640746	6	11440124	224.3151	0	4.283866
Columns	9778.571	1	9778.571	0.191736	0.6768	5.987378
Error	306001.4	6	51000.24			
Total	68956526	13				

I created seven data frames for the second analysis: one for patient satisfaction between patients and face-to-face providers and one for patient satisfaction between patients and telehealth providers (each broken with age). I removed from my analysis any values that were null. This reduced the data set to 80,570 entries. With the removal of the null values, I conducted an ANOVA: Two-Factor Without Replication to evaluate the differences in patient satisfaction with regards to seeing a face-to-face provider or a virtual provider. This produces results of two comparisons with $F(4.283)$ and $F(5.987)$, unadjusted critical value for significance data.

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The following table contains information important for the analysis. This table shows the data results for the patient satisfaction scores from the CAHPS database. With these overall results, the group with significant satisfaction results was patients who saw a telehealth provider; the unadjusted significance being $p<.676$.

In Table 2, I demonstrated the pre- and post-minimum, and mean statistical test for this initial overall satisfaction question. I then demonstrated the standard deviation and ANOVA testing of these numbers. I then demonstrated the difference with data values upon completion. I found the main statistics for patient satisfaction broken by participant age. Ages 18-24 years old had a variance of 16,020.5; ages 25-34 years old had a variance of 75,272; ages 35-44 years old had a variance of 107,184.5; ages 45-54 years old had a variance of 76,050; ages 55-64 years old had a variance of 4512.5; ages 65-74 years old had a variance of 33,540.5 and ages 75 years old or older had a variance of 3200. The *p*-value and *F*-criteria tests showed the data was statistically significant. For all age groups $F(4.283)$, $p=0.00$, for individual groups $F(5.987)$, $p=0.676$.

The age summary of the ANOVA: two-factor without replication of comparing telehealth visits against face-to-face provider visits both yielded an average patient satisfaction score of 7. This count was then averaged out against all age groups with telehealth visits having less variance against face-to-face visits. The age group in this study that had the most significant satisfaction of telehealth visits were patients 55-64 years old (Table 2.).This means that all patients had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting. Additionally, the group with the highest satisfaction of seeing a virtual provider over a face-to-face provider was patients 55-64

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years old. The ANOVA statistical method is appropriate due to insinuations about means that are made by analyzing variance between the two areas. The variance of this ANOVA: Two-Facor Without Replication showed a variance of 5937280 for face-to-face visits and a variance of 5553844 for telehealth visits. This shows statistical signifiance for this question in the study beacuse the P-value is 0.677; therefore showing that statistically the study results are 99.323% accurate and not by chance.

Table 3
This Doctor vs. This Provider (Broken With Gender)

ANOVA: Two-Factor Without Replication

SUMMARY	Count	Sum	Average	Variance
Male	2	23330	11665	177608
Female	2	57240	28620	25538
This Doctor	2	40100	20050	150788978
This Provider	2	40470	20235	136851968

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Rows	287472025	1	287472025	1701.813422	0.015429047	161.4476388
Columns	34225	1	34225	0.202609504	0.730738427	161.4476388
Error	168921	1	168921			
Total	287675171	3				

I created 2 data frames for the third analysis: one for patient satisfaction between patients and face-to-face providers and one for patient satisfaction between patients and telehealth providers (each broken with gender). I removed from my analysis any values

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that were null. This reduced the data set to 80,570 entries. With the removal of the null values, I conducted an ANOVA: Two-Factor Without Replication to evaluate the differences in patient satisfaction with regards to seeing a face-to-face provider or a virtual provider. This produces results of 2 comparisons with F(161.448), unadjusted critical value for both significance data.

The following table contains information important for the analysis. This table shows the data results for the patient satisfaction scores from the CAHPS database. With these overall results, the group with significant satisfaction results was patients who saw a telehealth provider; the unadjusted significance being $p<.015$.

In table 3, I demonstrated the pre and post minimum, and mean statistical test for this initial overall satisfaction question. I then demonstrated the standard deviation and ANOVA testing of these numbers. I then demonstrated the difference with data values upon completion. I found the main statistics for patient satisfaction broken by participant gender. Males had a variance of 177,608 and females had a variance of 25,538. The p-value and F criteria showed the data was statistically significant. For all genders F(161.448), p=0.015, for specific genders F(161.448), p=0.730.

The gender summary of the ANOVA: two-factor without replication of comparing telehealth visits against face-to-face provider visits yielded a significant higher average for telehealth visits for males. The same calculation provided a slightly higher satisfaction level for females in regards to face-to-face visits. These areas came with a variance of 1.51E+08 for face-to-face visits and a variance of 1.37E+08 for telehealth visits (Table 3). This means that both genders had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting. The ANOVA statistical method

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is appropriate due to insinuations about means that are made by analyzing variance between the two areas. The variance of this ANOVA: Two-Facor Without Replication showed a variance of 150788978 for face-to-face visits and a variance of 136851968 for telehealth visits. This shows statistical signifiance for this question in the study beacuse the P-value is 0.731; therefore showing that statistically the study results are 99.269% accurate and not by chance.

Table 4

This Doctor vs. This Provider (Broken With Education)

ANOVA: Two-Factor Without Replication

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
8th Grade or less	2	1042	521	27848
Some high school, but did not graduate	2	2615	1307.5	6384.5
High School Graduate or GED	2	18702	9351	6728
Some College or 2-year degree	2	26081	13040.5	312.5
4-year college Graduate	2	17186	8593	57800
More than 4-year college degree	2	14944	7472	1152
This Doctor	6	40100	6683.333	23870192
This Provider	6	40470	6745	23614398

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	2.37E+08	5	47466827	2672.18	1.47E-08	5.050329
Columns	11408.33	1	11408.33	0.642241	0.459274	6.607891
Error	88816.67	5	17763.33			
Total	2.37E+08	11				

I created 6 data frames for the fourth analysis: one for patient satisfaction between patients and face-to-face providers and one for patient satisfaction between patients and

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telehealth providers (each broken with education). I removed from my analysis any values that were null. This reduced the data set to 80,570 entries. With the removal of the null values, I conducted an ANOVA: Two-Factor Without Replication to evaluate the differences in patient satisfaction with regards to seeing a face-to-face provider or a virtual provider. This produces results of 2 comparisons with F(5.050) and F(6.607), unadjusted critical value for significance data.

The following table contains information important for the analysis. This table shows the data results for the patient satisfaction scores from the CAHPS database. With these overall results, the group with significant satisfaction results was patients who saw a telehealth provider; the unadjusted significance being $p<.459$.

In table 4, I demonstrated the pre and post minimum, and mean statistical test for this initial overall satisfaction question. I then demonstrated the standard deviation and ANOVA testing of these numbers. I then demonstrated the difference with data values upon completion. I found the main statistics for patient satisfaction broken by participant education. Education level of 8th grade of less had a variance of 27,848; education level of some high school, but did not graduate had a variance of 6384.5; education level of high school graduate or GED had a variance of 6728; education level of some college or 2-year degree had a variance of 312.5; education level of 4-year college graduate had a variance of 57,800 and education level of more than a 4-year college degree had a variance level of 1152. The p-value and F criteria tests showed the data was statistically significant. For all education groups F(5.050), p=0.00, for individual education groups F(6.607), p=0.642.

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The education summary of the ANOVA: two-factor without replication of comparing telehealth visits against face-to-face provider visits showed an overall significance of 6.745 to 6.683. This meant that all education levels prefer telehealth visits to face-to-face visits. Education levels were broken down by eighth grade or less; some high school, but did not graduate; high school graduate or General Education Development (GED); some college or 2-year degree; 4-year college graduate; more than 4-year college degree. The group with the highest preference for telehealth visits over face-to-face visits was patients with some college or 2-year degree (Table 4). This means that all patients with all levels of educational attainment had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting. The ANOVA statistical method is appropriate due to insinuations about means that are made by analyzing variance between the two areas. The variance of this ANOVA: Two-Facor Without Replication showed a variance of 23870192 for face-to-face visits and a variance of 23614398 for telehealth visits. This shows statistical signifiance for this question in the study beacuse the P-value is 0.459; therefore showing that statistically the study results are 99.541% accurate and not by chance.

Table 5
This Doctor vs. This Provider (Broken With Hispanic/Non-Hispanic)

ANOVA: Two-Factor Without Replication

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Yes, Hispanic or Latino	2	1551	775.5	1860.5
No, not Hispanic or Latino	2	79019	39509.5	92880.5
This Doctor	2	40100	20050	7.41E+08
This Provider	2	40470	20235	7.60E+08

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ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	1500322756	1	1.50E+09	24792.17	0.004043	161.4476
Columns	34225	1	34225	0.565553	0.589507	161.4476
Error	60516	1	60516			
Total	1500417497	3				

I created 2 data frames for the fifth analysis: one for patient satisfaction between patients and face-to-face providers and one for patient satisfaction between patients and telehealth providers (each broken with Hispanic/non-Hispanic). I removed from my analysis any values that were null. This reduced the data set to 80,570 entries. With the removal of the null values, I conducted an ANOVA: Two-Factor Without Replication to evaluate the differences in patient satisfaction with regards to seeing a face-to-face provider or a virtual provider. This produces results of 2 comparisons with F(161.447), unadjusted critical value for both significance data.

The following table contains information important for the analysis. This table shows the data results for the patient satisfaction scores from the CAHPS database. With these overall results, the group with significant satisfaction results was patients who saw a telehealth provider; the unadjusted significance being $p<.004$.

In table 5, I demonstrated the pre and post minimum, and mean statistical test for this initial overall satisfaction question. I then demonstrated the standard deviation and ANOVA testing of these numbers. I then demonstrated the difference with data values upon completion. I found the main statistics for patient satisfaction broken by participant Hispanic/non-Hispanic identification. Hispanics and Latinos had a variance

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of 1860.5 and non-Hispanics and Latinos had a variance of 92,880.5. The p-value and F criteria showed the data was statistically significant. For all groups F(161.448), p=0.004, for specific groups F(161.448), p=0.589.

Both Hispanic and Non-Hispanic individuals prefer telehealth visits to face-to-face visits. The preference of the Hispanic/non-Hispanic summary of the ANOVA: two-factor without replication of comparing telehealth visits against face-to-face provider visits showed an overall significance of 2.024 to 2.005 (Table 5). This means that all patients that identify as Hispanic and non-Hispanic had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting. The ANOVA statistical method is appropriate due to insinuations about means that are made by analyzing variance between the two areas. The variance of this ANOVA: Two-Facor Without Replication showed a variance of 7.41E+08 for face-to-face visits and a variance of 7.60E+08 for telehealth visits. This shows statistical signifiance for this question in the study beacuse the P-value is 0.589; therefore showing that statistically the study results are 99.411% accurate and not by chance.

Table 6

This Doctor vs. This Provider (Broken With Race)

ANOVA: Two-Factor Without Replication

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
White	2	74357	37178.5	125500.5
Black or African American	2	2156	1078	1058
Asian	2	735	367.5	1984.5
Native Hawaiian or other Pacific Islander	2	37	18.5	180.5
American Indian or Alaskan Native	2	210	105	242
Other	2	713	356.5	220.5
Two or More Races	2	2362	1181	2

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This Doctor	7	40100	5728.571	1.89E+08
This Provider	7	40470	5781.429	1.95E+08

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	2.31E+09	6	3.84E+08	19315.58	1.39E-12	4.283865714
Columns	9778.571	1	9778.571	0.491347	0.509585	5.987377607
Error	119409.4	6	19901.57			
Total	2.31E+09	13				

I created 7 data frames for the sixth analysis: one for patient satisfaction between patients and face-to-face providers and one for patient satisfaction between patients and telehealth providers (each broken with race). I removed from my analysis any values that were null. This reduced the data set to 80,570 entries. With the removal of the null values, I conducted an ANOVA: Two-Factor Without Replication to evaluate the differences in patient satisfaction with regards to seeing a face-to-face provider or a virtual provider. This produces results of 2 comparisons with F(4.283) and F(5.987), unadjusted critical value for significance data.

The following table contains information important for the analysis. This table shows the data results for the patient satisfaction scores from the CAHPS database. With these overall results, the group with significant satisfaction results was patients who saw a telehealth provider; the unadjusted significance being $p<.000$.

In table 6, I demonstrated the pre and post minimum, and mean statistical test for this initial overall satisfaction question. I then demonstrated the standard deviation and ANOVA testing of these numbers. I then demonstrated the difference with data values

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upon completion. I found the main statistics for patient satisfaction broken by participant race. White had a variance of 125,500.5; Black or African American had a variance of 1058; Asian had a variance of 1984.5; Native Hawaiian or other Pacific Islander had a variance of 180.5; American Indian or Alaskan Native had a variance of 242; other had a variance of 220.5 and two or more races had a variance of 2. The p-value and F criteria tests showed the data was statistically significant. For all racial groups F(4.283), p=0.00, for individual racial groups F(5.987), p=0.509.

All racial groups prefer telehealth visits to face-to-face visits. The preference of the race summary of the ANOVA: two-factor without replication of comparing telehealth visits against face-to-face provider visits showed an overall preference of 5.781 to 5.728 (Table 6). Racial groups were broken down by White; Black or African American; Asian; Native Hawaiian or other Pacific Islander; American Indian or Alaskan Native; other; two or more races. The group with the highest preference for telehealth visits over face-to-face visits was patients in the White racial group. This means that all patients within all racial groups had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting. The ANOVA statistical method is appropriate due to insinuations about means that are made by analyzing variance between the two areas. The variance of this ANOVA: Two-Facor Without Replication showed a variance of 1.89E+08 for face-to-face visits and a variance of 1.95E+08 for telehealth visits. This shows statistical signifiance for this question in the study beacuse the P-value is 0.510; therefore showing that statistically the study results are 99.490% accurate and not by chance.

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The first assumption of ANOVA shows independence in variables. The second assumption of ANOVA is normality. The final assumption of an ANOVA is equal variance. With this study, I have concluded that all of these assumptions were met. I conducted the ANOVAs and found results indicating support for the hypothesis that satisfaction in patients is higher when seeing a virtual provider versus a face-to-face provider. With the study's ANOVAs, I performed a regression. The dependent variable was patient appointment satisfaction, which is a common assessment made by health care professionals on an everyday basis during a traditional office workday (Sanclemente-Anso et al., 2015). I included no adjustment for autocorrelation.

Summary

This study's research question was the following: "To what degree, if any, does the management of patient satisfaction in telehealth appointments yield different levels of patient satisfaction than the management of patient satisfaction systems associated with in-office appointments?" According to the study results, there was greater patient satisfaction in the use of virtual appointments versus in-office appointments.

- All patients had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting.
- The group with the highest satisfaction of seeing a virtual provider over a face-to-face provider was patients 55-64 years old.
- Both genders had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting.

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- Patients with all levels of educational attainment had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting.
- All patients within all racial groups had higher satisfaction seeing a provider in a virtual setting than in a face-to-face setting and the group with the highest preference for telehealth visits over face-to-face visits was patients in the White racial group.

These findings will allow practice management in health care to move forward due to the ability of patient's being satisfied with their treatment whether they are in a face-to-face visit or a virtual visit. Health care can take the results from this study and move forward with providing care that patients need and approve of.

In the next chapter, the findings will be interpreted, and I will discuss the study's limitations and recommendations and implications for future study. Finally, the topic of social change will be discussed.

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Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to examine management of patient satisfaction in office visit and telehealth settings and to test if the level of management of patient satisfaction differs between these settings. Showcasing the management of patient satisfaction trends in these arenas will give health care providers the necessary guidance for increased patient satisfaction (Wainwright et al., 2014). Health care is traditionally delivered in an office visit setting where patients are physically present with the doctor. Only recently have newer technologies begun to be used within health care (Sharma & Baoku, 2013).

The significance of this study is that it may assist health care professionals in understanding if patients are satisfied with telehealth. The findings of this study support the theory that patients have a more positive satisfaction level with telehealth visits than face-to-face visits.

Interpretation of Findings

This study confirms and extends health care research. In Chapter 2, I wrote about patient satisfaction being a benchmark of health care providers (Glenngård, 2013). Baker et al. (2011) discussed how an integrated telehealth satisfaction management program for Medicare beneficiaries with chronic disease. Seeing these two items as separate but equal will allow for the continued development and betterment of patient satisfaction and telehealth procedures. McMurray et al. (2014) and Mueller et al. (2014) both detailed how expanding telehealth can improve care quality and access for individuals. This study has shown a relationship that an expansive telehealth program allows for access and care satisfaction for different groups.

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The hypotheses of this investigation focused on the statistically significant differences in the management of patient satisfaction of health care consumers from a face-to-face visit with a medical professional versus a virtual visit from a medical professional. In this study, it was determined that the nationwide patient population surveyed experienced a statistically significant positive appreciation through this delivery of healthcare. A decline in patient satisfaction results in the rejection of the traditional ways of thinking and approaches in science (Abdoune & Fezari, 2016). Despite strong resistance, changes can be made by open-minded professionals and can improve practice. Change to the health care system can result in the delivery of better services than before ecommerce was available to patients. (Yang & Silverman, 2014). This new step in health care can be achieved through future testing and implementation.

Some of the major uses of ecommerce include keeping electronic records, the use of telemedicine, and the transmission of information (Xu et al., 2014). The use of ecommerce in the health care industry could be of significant benefit to improve the relationship between customers, suppliers, hospitals, and clinics (Adler-Milstein et al., 2014). Collaborative commerce (c-commerce) is a model that allows groups and individuals to collaborate and communicate online (Alkmim et al., 2012). Through ecommerce, doors may also be opened through which the doctors and practitioners could remote monitor bed- ridden patients, even in a case of coma (Bagayoko et al., 2014). Patients and health care professionals can use technologies effectively in the health care industry to benefit all the stakeholders. While only the future can tell what technology will bring within health care, seeing that patients have high satisfaction of technology

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intersecting with their health care, the interpretation can be taken that this is an area to explore more.

Ecommerce in health care is also one of the highest growing service lines of health care systems (Charlesworth et al., 2015). As an industry with well over one trillion dollars in revenue, the health care system accounts for about a seventh of the economy in the United States; however, a great portion of that revenue is lost due to escalating health care system costs including facilities and extra labor for patient care (Baig et al., 2013). The traditional system of health care delivery has a number of shortcomings in terms of information flow, case collections, communication standards, and spending (Wye et al., 2015). For these reasons, ecommerce would be a good alternative for more effective and cost-effective transactions.

Today, the health care system faces rising costs of services, poor customer services, and failing patient benefits (Wells et al., 2015). According to a recent survey study, about 59% of American citizens feel that the health care system requires a major change (Ter Matt, 2013). A majority of the health care organizations have preserved primary care practices in business areas and locations they feel are well established to expand market share and reduce operating costs (Adler-Miilstein, Kvedar & Bates, 2014).

Interactions between patients and health care providers tend to exist at the point of service. Understanding that telehealth has the technology platform of a robust Internet, and that this study shows a relationship of patient satisfaction, it can be interpreted that telehealth can be used to treat and manage patient populations. In this case, the geographic and physical boundaries that separate the patient and provider are removed or

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ignored. The Internet provides a universal software client, can be a web browser as well as an infrastructure, and can serve as a platform that is ready made.

I examined Myerson's (1991) game theory management and King's (2013) theory of management of patient satisfaction to understand the variables that influence the development of the principles of satisfaction management effectiveness and success in various systems. As Agee & Gates, (2013) argued, the game theory of health care management is based on the collective action problem interaction, which makes others more cooperative in serving the best interest of the collective. Game theory and King's theory of management (Williams, 2017) study the correlation between health care management success and such other variables as satisfaction, leadership, and ethics (Bogue, 2014). Game theory and King's theory of management also link satisfaction management effectiveness and success factors (Cronin, 2014). Each of these theories and prior studies on general management and project management were confirmed by my study's results. My study contributes to these theories because King's (2013) theory of the management of patient satisfaction states that networks play an increasing role in delivering computerized public services. Health care continues to grow and use computerized services for much of their patient interaction (Albadvi et al., 2007).

This study illustrates that all demographics of patients are satisfied with telehealth services. Telehealth systems are much more cost effective than the in-office appointments (Bagayoko et al., 2014). The patient does not incur any travelling expenses to see a doctor. The patient monitors their body changes while at home and refers any significant issue to a physician, who in turn attends to the needs of the patients. Once the system is installed at the home of the patient, either in form of videophone or telephone,

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the nurses remotely monitor the condition of the patient and advise them (Hersh et al., 2001). This saves significant costs to the patients and to the government. The hospitals incur large cost in installation of beds in wards. If the number of patients admitted to hospitals increases, the increased employment of nurses and aides will be necessary. Running a hospital that has many patients is expensive. Treating chronic diseases is expensive and many patients spend most of their resources in diagnosing these diseases. The cost of diagnosing these diseases stresses the patients (Wells et al., 2013). When the patients are being monitored from home, the patient incurs fewer costs in terms of less commuter fees and the cost of admission to a hospital (Bergmo, 2015). The lower costs of telehealth systems make them more satisfactory to the patients.

Limitations of the Study

Limitations of this study were related to patients' disease diagnosis. Because patients cannot choose the diseases they contract, the study's treatment process and results were limited based on what diagnoses are found during the study timeframe. While it would be best and most accurate to have all of the same diagnosis, the study's time constraints limit the diseases that can be observed. The regions of the United States from which the patients originated were masked as well. Having this geographical information would have proven useful in determining if location based issues contributed to the results of this study.

Recommendations

One of the next steps for future study on this topic would be to survey the providers of virtual appointments and test their satisfaction levels. Patients are happy with virtual visits, but the satisfaction of the providers should also be looked at. If a

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health system's workers are not happy with their work environment, the management of these professionals could further impact the relationship between patients and providers in virtual appointments.

Another recommendation would be to look at the length of time that both providers and patients had been using telehealth. The ability to understand the familiarity of the telehealth system and what it requires for communication could be a factor in further satisfaction development. This satisfaction development goes both ways in the realm of systems usability. If a patient or provider is new to the system, they could either be satisfied with the device or they could become frustrated with the user interface of the device. Both extremes could factor into satisfaction with the telehealth system and either of these provider satisfaction extremes could be beneficial for further study.

Length of time in using the system could also be studied. The time of the patient and health care provider relationship could affect the satisfaction management of the virtual appointment. This relationship variable would be affected by both the provider and the patient. Items to study could be upgrade capabilities, user interface based on previous versions, and technology advances and human interaction. Each of these items could affect the satisfaction of the patient/provider and would be benefitted by further study.

Disease diagnosis could be an additional area of further study. Chapter 3 outlined certain fields and diseases which are well-suited for virtual visits. With this study, I was unable to segment patients by disease diagnosis and a study which solely investigates this topic would contribute to this field.

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Implications

This study may affect positive social change if health care systems begin to put this study's findings to work. Seeing these results can allow patients and providers to embrace telehealth as a new standard of practice instead of traditional face-to-face visits. The benefits of time savings and increased access for patients will allow health care to be delivered as never before. This study has shown that patient satisfaction management is high for patients in telehealth treatments and the recommendations for management of health care practices can be wide and varied.

This may relieve health care systems of the burden of having providers in certain cities only. Being able to serve patients as far away as the Internet will allow is the only variable that needs to be present for service. Providers will also now be able to practice at the top of their license. By having a patient panel that is varied not by geographic location, but by disease specialty, telehealth will allow providers to keep up with current science and ensure that they are staying fresh and challenged.

As any worker gets stagnant in their work by completing the same tasks repeatedly, a medical provider could fall into the same rut. Seeing everyday diseases like colds, flus, and other day to day treatments could wear at a provider's rigor and practice intensity. However, by having the opportunity to pick up cases through a telehealth management system, the medical provider could choose a disease or other medical condition that they might enjoy more. This ability to work through a challenge that is not set up by those walking through the door, but instead by those who need help, can supplement the provider's practice.

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Conclusions

I set out to determine if there were different levels of patient satisfaction between virtual appointments and in-office appointments. The results of this study showed that there is greater satisfaction for patients who use virtual appointments as opposed to those patients who are seen by a health provider in an in-office appointment. There is a greater satisfaction among patients who use virtual appointments as opposed to those patients who are seen by a health provider in an in-office appointment. The next step will be to move this information systems management process forward in health care in an effort to continue to bring the management of satisfactory health care to the masses.

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Appendix A: CAHPS Documents

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