Veteran Patient Satisfaction: A Causal-Comparative Study

Submitted by

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Abstract

Telehealth technology is a 20th century innovation for delivering healthcare services with tremendous benefits in mitigating barriers to obtaining healthcare for many people, including veterans of the United States military. Researchers have identified healthcare access and indirect cost factors at patient and societal levels as gaps needing further investigation with the use of telehealth technology. However, the existence of significant differences in patient satisfaction experiences between active duty, reserve, and retired military veterans who have used telehealth technology requires further research. The purpose of this non-experimental quantitative causal-comparative research study was to examine the differences in patient satisfaction with telehealth technology experiences of active duty, reserve and retired military personnel. Using the Patient Satisfaction Questionnaire as a data collection instrument (N = 99), significant differences were found in aspects of patient satisfaction between active duty members with 6 or more years of service, reserve duty members with 3 or more years of service, and a

*Keywords:* Telehealth, Veterans, Access, Healthcare, Patient Satisfaction Questionnaire, PSQ-18
Dedication

I am dedicating this work to the glory of God Almighty from whom all blessings flow and without whom the attainment of this academic milestone will ever remain an unattainable pipe dream. Bless His Holy name, honor to His Beloved Son Jesus Christ and adoration to the Holy Ghost, amen.

And to the world’s Best Dad; Late Prince Pius Ajibade Adebíyi Aremu Taiwo-Olatunji, J. P. (whose joy would have known no bounds seeing the completion of this work but his sun set unexpectedly at age 82, peacefully on 31st December 2014) & Mrs. Grace Mopelola Olatunji. My invaluable progenitors who taught me the basics of assiduity, honesty, courage, and diligence. I will forever be proud and grateful for having you both as loving parents who sacrificed every bit of your own comfort/conveniences to give my siblings (Olugbenga, Oluwatoyin, Adewale, Sunday, Olusola, Morolake, Olaniyi, Bolatito, Aderonke) and me the best opportunities in life.

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Finally, I dedicate this work to the fond memories of my dearly beloved brothers Joseph Babatunde Ajao and Francis Oyewole Akanbi Olatunji whose bright sun set earlier in life. To the entire Olatunji family in Iree, Osun state of Nigeria and in Diaspora.
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Chapter 1: Introduction to the Study

Telehealth technology, also termed *teledmedicine*, is a valuable 20th century technological innovation that has exerted a meaningful and positive impact on veterans’ healthcare access in large Veterans Administration Health Care Systems (VAHCS) since its evolution. Moore, Moreschi, Rieger, and Vardaro (2013) wrote that one of the cardinal goals of the Veterans Health Administration (VHA) is making quality healthcare accessible with ease for veterans using telehealth as the vehicle of delivery. The impact and value of scientific advancement or technological sophistication in every sphere of human life, growth, and development cannot be over-emphasized. There is hardly any area of human existence that science and technology have not infiltrated, whether by deliberate design or because of another unique innovation. Agha (2012) demonstrated the significant roles played by telemedicine in providing Post Traumatic Stress Disorder (PTSD) services to veterans. Fouad (2014) successfully documented that the use of information and communication technologies (ICT) helped in overcoming geographical barriers and expanding access to healthcare services, just as Hostetter, Klein, and McCarthy (2014) emphasized the potential of digital health technologies to transform healthcare.

A great deal of healthcare and medical advances have systematically shaped human existence over the years in illness as well as in health evidenced by new disease discovery methods, proper diagnostic profiling, or better prognostic indices. Numerous ancillary but influential cost factors abound, whether direct or indirect and at the patient or societal levels, which threaten expedited healthcare access, cost control, and healthcare quality. Lindeman (2011) stated that the VHA is reputable as one of the global leaders in
the use of telehealth technology for promoting independent living for its patient population of military veterans.

This study involved an examination of the effects of telehealth technology on military veterans, which is a very special population in the United States. These military veterans have patriotically sacrificed their lives and albeit, everything for the enduring freedom that all Americans enjoy. Not only has such freedom benefited Americans but the ideals of it the world over cannot be underestimated in that America has become known or referred to as the cradle of global development.

Morland et al. (2013) focused on telemedicine as a cost-reducing means of psychotherapy delivery to rural combat veterans who suffered from PTSD. The researchers identified long-term healthcare costs, indirect cost factors at the patient and societal levels, and the use of Clinical Video Telehealth (CVT) in other regions of the U.S. as important research gaps in providing veterans access to healthcare through any of the telehealth technological modalities. To reduce the research gap, a quantitative causal-comparative research study was conducted to determine the degree or level of differences in patient satisfaction with telehealth technology between active duty and reserve military veterans regarding veterans’ healthcare access, indirect cost factors and overall patient satisfaction at the patient level.

**Background of the Study**

Observers have recognized that access to healthcare, including specialty and general services, has been challenging for many veterans who live in the remotest parts of the country. Patients who periodically strive to beat the accompanying odds of traveling long distances to receive the desired level of healthcare services incur indirect costs
including inconvenience, temporary hotel lodging, and lost wages. Costs associated with seeking care could be quite daunting not only to these patients, but society as a whole represented in this case, by the VHA. Recognizing the potential influence of such indirect costs on healthcare access, the study included telehealth technology’s impact on veterans’ indirect cost factors or ROI at the patient level.

Kehle, Greer, Rutks, and Wilt (2011) broadly defined access and included three pivotal characteristics:

The timely use of personal health services to achieve the best health outcomes . . .

[consists of] three discrete steps: 1) gaining entry into the system, 2) getting access to sites of care where patients can receive needed services, and 3) finding providers who meet the needs of the patient and with whom a productive working relationship can form.

Thus, indirect cost factors at patient and societal levels could exert a major influence on access to needed healthcare services, but telehealth modalities have the potential to mitigate this problem for many veterans who have avoided seeking care from the VAHCS because of these indirect costs.

The United States has been engaged in a number of military conflicts up to 2012 when leaders began to draw down the number of service members involved in the two most recent combat operations coined Operations Enduring Freedom and Iraqi Freedom (OEF/OIF). The drawdown led to a continuous surge in the number of veterans using the available healthcare services available from the VHA. The surge is inadvertently making it imperative to institute urgent measures for reducing or eliminating the associated problem of impeded or limited access to quality healthcare services, especially for
veterans dwelling in remote, rural American areas. Hodson and Wells (2013) supported a position that no fewer than 50,000 U.S. veterans enrolled in the home telehealth service alone in a short space of time. The rapid expanse was anchored largely on patient satisfaction and an added benefit of significant cost-savings.

Approximately 40 percent of the benefit-eligible veterans reside in the rural areas, and many of them have been reported to be encountering difficulties getting the general or specialty healthcare they needed over the years (VA Telehealth Services, 2015). The ensuing difficulties these veterans encountered led to the development of a three-pronged approach involving the provision of additional care sites, adoption of/adaptation to new technologies, and forging of sustained partnerships with non-Veterans Affairs healthcare providers. Wade, Eliott, and Hiller (2014) described telehealth as the innovative process by which healthcare services are delivered at a distance with information and communication technologies that is traceable to the 20th century evolution of mobile phones and the Internet. Rosenfeld (2015) described the Department of Veterans Affairs as a front-runner or longtime pioneer in healthcare information technology by implementing a comprehensive telehealth program for intensive care coined tele-ICU, which was deployed in Minnesota and Ohio-centered DVA regions.

Problem Statement

The differences in patient satisfaction experiences between active duty, reserve and retired military veterans who use telehealth technology was not known in terms of overall patient satisfaction, veterans’ healthcare access, and indirect cost factors or ROI at patient level for telehealth modalities in smaller VAHCS. Morland et al. (2013) identified indirect cost factors or ROI at patient and societal levels as gaps requiring further
exploration in their study of telemedicine using CVT. Veterans of the U.S. armed forces who live in remote rural areas are said to be experiencing difficulty getting access to quality healthcare services (Darkins, Kendall, Edmonson, Young, & Stressel, 2015). There are studies pointing to how investment in telehealth modalities in VAHCS facilities may reduce this trend (Darkins, 2014; Darkins et al., 2015; Goldschmidt, 2012; Lutz, Chumbler & Roland, 2007; Rosenfeld, 2015; Wade et al. 2014).

The VHA is the largest integrated healthcare system in the U.S. (Darkins, 2014; Lindeman, 2011), and is responsible for providing healthcare to over 5 million veterans yearly. As the healthcare arm of the Department of Veterans Affairs (DVA), VHA leaders embraced telehealth technology in the early 2000s for the original purpose of decreasing healthcare utilization and reducing costs as well as improving care access (VA Telehealth Services, 2015). Telehealth has continued to expand in efforts to meet the needs of the patients. Beginning as a mere Care Co-ordination/Home-Telehealth (CCHT) program, telehealth has grown into a more sophisticated service with numerous technological peripherals or specialty telehealth modalities that characterize the system in the century’s second decade (Lutz et al., 2007). Despite the growth of telehealth services, healthcare providers continue to question whether investment in telehealth technology increases veterans’ access to healthcare and offers VHA patients some economic benefits when compared to physically traveling to receive healthcare in traditional healthcare facilities.

Purpose of the Study

The purpose of this non-experimental quantitative causal-comparative research study was to examine the differences in patient satisfaction experiences with telehealth
technology of active duty, reserve and retired military personnel. The Patient Satisfaction Questionnaire (PSQ-18) instrument was used to measure patient satisfaction experience. The PSQ-18 instrument consists of seven scales: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. The researcher used Fiscal Year 2014 telehealth patient encounters at Veterans Integrated Service Network (VISN) Region 4 as the benchmark.

The research design of the study, the quantitative causal-comparative method, was useful in describing the perceived differences in patient satisfaction between these identified variables: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. Causal-comparative research (Suter, 2006) is a design that compares existing differences among different groups before researchers’ observation thereby enabling identification of the cause and effect relationships between study variables. This explained why this study design offered a good choice.

The general definition of telehealth applicable to the study was that mode of healthcare services delivery using information and communication technologies for enabling the diagnosis, consultation, treatment, care management, education, and patient self-management remotely or at a distance from the healthcare providers. The service delivery process may be synchronous or asynchronous. Synchronous communications involve simultaneous interaction between the patient and providers through video-conferencing using technological peripherals (Newman & McMahon, 2011). Asynchronous communications occur through modalities such as store-and-forward technologies that providers often employ for examination and subsequent interpretation
Examples of asynchronous technology may include imaging obtained radio-graphically such as X-rays or other types of photographs.

**Research Questions**

Obtaining timely access to an array of clinical or healthcare services in any healthcare system, not only the VAHCS, has been challenging to many. However, the unique situation of U.S. veterans makes consideration of telehealth technology as one of the initiatives for minimizing this scourge, a paramount endeavor. Researchers, such as Darkins (2014), have written that telehealth technology made significant progress in the novel area of healthcare delivered at a distance from the patient, but many potential users, including healthcare professionals and policy makers, remain caught in a web of skepticism regarding the method’s efficacy, logistics, cost-effectiveness, and overall patient satisfaction. Potential clinical professionals who might benefit from telehealth include physicians in all specialties, nurses, nurse practitioners, radiologists, ophthalmologists, and physician assistants. Answering the three research questions becomes compelling, especially concerning the urgent needs of a unique population comprised of U.S. veterans.

Telehealth in the VHA has become so renowned that even large outside healthcare agencies nationally and internationally are seeking to replicate the process. For example, regarding the United Kingdom’s national health system, Cruickshank and Harding (2013) wrote, “the National Health Service (NHS)’s current approach to healthcare delivery for people with chronic or long-term conditions has become unsustainable” (p. 5). Cruickshank and Harding expressed an urgent call for borrowing a
strategy from the U.S. VHA telehealth initiative to rein in costs and ensure continued access to needed healthcare services.

The following research questions and hypotheses guided this quantitative, causal-comparative research study:

RQ1: What is the difference between the patient satisfaction experience of military personnel who were or have been on active duty longer (over 6 years) and those who served or have served for fewer years?

H1₀: Military personnel who were or have been on active duty longer (over 6 years) will report no more or less patient satisfaction with telehealth technology than those who served or have served for fewer years.

H1₁: Military personnel who were or have been on active duty longer (over 6 years) will report more or less patient satisfaction with telehealth technology than those who served or have served for fewer years.

RQ2: What is the difference between the patient satisfaction experience of military personnel who were or have been on reserve duty longer (over 3 years) and those who have been on reserve for fewer years?

H2₀: Military personnel who were or have been on reserve duty longer (over 3 years) will report no more or less patient satisfaction with their healthcare access than those who have been on reserve for fewer years.

H2₁: Military personnel who were or have been on reserve duty longer (over 3 years) will report more or less patient satisfaction with their healthcare access than those who have been on reserve for fewer years.
RQ3: What is the difference between the patient satisfaction experience of military personnel who are still on active duty with telehealth technology and those who are retired or separated from the military?

H3₀: Military personnel who are still on active duty will report no more or less patient satisfaction with their healthcare than those who are retired or separated from the military.

H3₁: Military personnel who are still on active duty will report more or less patient satisfaction with their healthcare than those who are retired or separated from the military.

Advancing Scientific Knowledge

Researchers have conducted impressive telehealth technology research since the evolution of the new healthcare delivery method, from inception through its growth and development over the years; however, several other newly emerging factors have necessitated further research into telehealth technology to reduce the research gaps (Morland et al., 2013). Findings from this quantitative causal-comparative study expanded upon previous bodies of knowledge concerning healthcare access, as the researcher explored the differences in patient satisfaction with telehealth technological modalities and U.S. veterans’ healthcare access. The study supported further appraisal of the role or influence of telehealth technology on veterans’ access to healthcare services through the VHA, which has the potential to enhance the quality of life of patients diagnosed with chronic illnesses as well as those who have decided not to seek care from the VHA. Potential patients who have not sought healthcare from the VHA did so due to restrictions posed by distance and the attendant indirect cost factors (Rosenfeld, 2015;
Wade et al., 2014). This researcher, therefore, has added to the existing body of scientific knowledge regarding the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. Analysis of veterans’ responses to the PSQ-18 questionnaire has shown that there are varying degrees of differences in patient satisfaction experiences with telehealth technology regarding overall patient satisfaction, veterans’ healthcare access, and indirect cost factors or ROI at the patient level. Increasing investment in telehealth technology in smaller VAHCS may constitute a huge potential for expanding veterans’ access to different arrays of healthcare, especially to those patients in rural areas.

**Significance of the Study**

When the study commenced, knowledge existed about the differences in patient satisfaction experiences with telehealth technology regarding the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience in bigger VAHCS but was inadequate for the smaller VAHCS (Morland et al., 2013). In a case study, Darkins et al. (2015) emphasized the cost and mortality reduction benefits attributable to the VHA’s use of home telehealth technology in promoting self-management of complex chronic conditions among veterans. Results of this quantitative causal-comparative study of a smaller VAHCS may potentially wield significant influence on how U.S. veterans perceive telehealth technology modalities for obtaining good access to healthcare through the VHA. Bearing in mind the hindrance of telehealth technology might make VHA care
available to many more veterans living at a distance from a VAHCS facility. Findings from this study will likely motivate those veterans (active duty and reserve) averse to telehealth technology modalities to join their fellow satisfied users of VHA telehealth services to receive healthcare through the VHA. Veterans choosing to stay their current course of abandoning available care from the VHA while they use other more expensive traditional healthcare resources miss a significant opportunity to obtain quality healthcare services.

The research findings showed differences existed between the dependent and independent variables identified in this study. The independent variables studied were years of activity in the military, years of reserve service, and separation situation. The different dependent variables of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which includes general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience. These findings will prepare any future researchers that need solid groundwork or a foundation upon which they will further explore the differences in patient satisfaction with telehealth technology and indirect cost factors at societal levels, especially in a smaller VAHCS.

Nature of the Research Design for the Study

The choice of a quantitative causal-comparative study design was borne out of the method’s capability to offset the brevity of the researcher’s time and other limited resources while attaining desired research findings worthy of generalization to the U.S. veteran populations in smaller VAHCSs. By using an adaptable, appropriate, validated and reliable instrument PSQ-18 (Thayaparan & Mahdi, 2013; Vrijhoef, Berbee, Wagner,
& Steuten, 2009) for collecting the needed research data. A causal-comparative study design facilitated the determination of differences in patient satisfaction experiences of active duty, reserve and retired military personnel with telehealth technology. The study was causal-comparative because it compared the differences among study variables. After statistical data analysis using non-parametric Mann-Whitney U test, findings showed varying degrees of differences between the independent and dependent variables that supported a partial acceptance of alternative hypothesis 1, full acceptance of alternative hypothesis 2 and partial acceptance of alternative hypothesis 3, which the researcher advanced.

The research design and the findings of the study-exemplified aspects of causal-comparative research those experts in quantitative research methods have described. Yilmaz (2013) defined quantitative research as that research which explains a phenomenon according to derived numerical data analyzed through mathematically based methods. In a broader sense, quantitative research is a type of research conducted empirically concerning a given social phenomenon or human problem through testing a theory or set of theories. Such theories consist of those variables that one can measure numerically and statistically analyze for determining if the theory will explain or predict the phenomenon of interest. Cooper and Schindler (2011) summarized quantitative research as any attempt to offer a precise measurement of something such as consumer behavior, knowledge, opinions, or attitudes; while Leedy and Ormod’s (2010) definition was the extent to which differences in one study characteristic or variable are related to those in one or more other characteristics or variables.
Rationale for Methodology

Quantitative research methodology formed the groundwork of this research as the most appropriate choice because of the existence of independent and dependent variables as well as the availability of valid instruments for required research measurements. In quantitative research, a researcher proposes research questions, develops hypotheses from those questions, and after collecting and analyzing quantitative data from distinct observations, can accept or reject each hypothesis (Leedy & Ormrod, 2010). Cooper and Schindler (2011) defined quantitative research as a formal study design beneficial for examining relationships between variables by testing the proposed hypotheses to answer any research questions. Quantitative research designs also involve numbers that allow for data measurement resulting in evidence gathering which can serve as trend identifiers or predictors of future performance.

The telehealth study of VHA healthcare access was descriptive, non-experimental causal-comparative with the singular intent of not influencing any behavior, rather aimed at either accepting or rejecting developed hypotheses by analyzing data reflecting individual patients’ observations. In light of the benefits and relevance of the quantitative method in health services research compared to qualitative and mixed methods, and availability of a valid quantitative data measurement instrument, a causal-comparative study design became appropriate. Singh, Mathiassen, Stachura, and Astapova (2011) stressed the higher frequency of quantitative studies in health services research despite the growth of qualitative methods for exploring emerging issues and particular events in a natural context. A qualitative or mixed-method design would not have sufficed to fulfill the study’s purpose of discovering relationships between different variables, namely
years of activity in the military, years of reserve service, and separation situation as the independent variables and seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience as dependent variables. The required selection process with a balanced array of judgmental and analytical tools or techniques required to quantitative research design is indeed mandatory (Thamhain, 2014).

In conclusion, neither qualitative nor mixed-method study designs would have been adequate in conducting this study owing to such factors as sampling procedures (randomized sampling is useful for selection bias control and generalizability in quantitative studies). In effect, there will be no place for either qualitative or mixed-methods design since the intent of this study was to test new hypotheses aimed at establishing facts or designating and distinguishing if any relationships existed between the identified study variables. Leedy and Ormrod (2010) lent credence to this by indicating with quantitative studies researchers may measure objective aspects of reality for confirming and predicting phenomena, compared to qualitative studies, which are exploratory and involve multiple possibilities for understanding and interpreting experience. The absence of either quantitative or qualitative elements will disqualify a mixed-method approach. The implication of Leedy and Ormrod’s explanation is neither qualitative nor mixed-method research would be appropriate to fulfil the purpose of the study of telehealth technology in a smaller VAHCS.
Definition of Terms

The following definitions will accord common knowledge or understanding of the core research terms that featured in this research study.

**Access.** Service entry from the narrowest perspective, or broadly as multidimensional to include such dimensions as availability, affordability, accommodation, service uptake, the process of care and quality of care; and utilization modified by financial, socio-cultural and organizational barriers (Wilson, Alam, Latif, Knighting, Williamson, & Beaver, 2011). Manski, Hoffmann, and Rowthorn (2015) offered an example in which an effective access project would increase a target population’s access to oral health and medical services resulting in demonstrated improvements in the health of that population.

**Healthcare.** Badano (2016) defined healthcare generally as the total of both clinical care and public health.

**Health.** A state of complete physical, the mental and social well-being of an individual and not merely the absence of disease or infirmity” (World Health Organization, 1948, p. 100).

**Indirect cost factors.** The value of resources lost because of an illness and are often attributable to losses in productivity from mortality and morbidity as measured in lost earnings (Seuring, Archangelidi, & Suhrcke, 2015).

**Return on investment (ROI).** The relationship between the total economic return and the total investment in something, often expressed in a ratio format (Return on Investment, 2015).
**Technology.** The application of scientific knowledge for practical purposes; the application of scientific knowledge to the practical aims of human life or changing humans’ natural environment (Technology, 2014).

**Telehealth.** Telehealth is the use of technology to deliver healthcare, health information, or health education to a patient located at a distance from a healthcare provider (What is Telehealth? n.d.).

**Veteran.** Any person who has served honorably on active duty in the armed forces of the United States, and whose discharges are marked honorable or all other conditions except dishonorable (U.S. Department of Veterans Affairs, n.d.).

**Assumptions, Limitations, Delimitations**

This quantitative causal-comparative research study contained the following assumptions:

The number of participants sampled would provide a fair representation of the veterans’ population in the selected VISN 4 due to respondents expected truthfulness, openness, and expression of no bias regarding their telehealth experiences. Respondents voluntarily participated in the study and quite appreciated that failing, to be honest, would hinder the possible future application of the research findings to improve services to veterans.

The second assumption was that SurveyMonkey™, the online survey hosting the platform used for this study will allow each respondent to access the survey link only once in the respondent’s email account or Social Media (SM) site, which precludes the opportunity of skewing the data through duplicate responses.
The third assumption was that the online platform guarantees respondents.
Confidentiality and the survey instrument would generate accurate data about telehealth technology use among veterans. The chosen research instrument (PSQ-18) is a reliable, valid and adaptable one (Thayaparan & Mahdi, 2013) needing no further re-validation or re-testing for reliability.

The limitations of this quantitative causal-comparative study were: The data obtained was from a small population of veteran respondents. The relative naivety and inexperience of the researcher was a constant throughout the research process. Time, budgetary constraints, and other uncontrollable exigencies, including the researcher’s impending military deployment, were critical limiting factors. As a student researcher, and working with limited time to deliver without ready access to research grants, surmounting the numerous obstacles was challenging. Such limitations paralleled barriers Leedy and Ormrod (2010) emphasized.

Lack of anticipated support from the main agency tasked with taking care of the veterans that would have facilitated ease of access to study resources and participants constituted a major (almost defeating) limitation. Restrictions occurred through a sudden policy change in late 2014 that adversely affected student researchers’ previously unfettered opportunity to collect data from the study’s population. The sudden policy change prevented the conduct of the study in an earlier timeframe thereby hindering collection of more responses with a smaller margin of error as anticipated in this research. The final and most important limitation was the inability of this researcher to wield any control over the survey respondents’ biases or attitudes toward the survey items.
The following constitute delimitations of this study: the data obtained for the purpose of answering the posed research questions were tailored to only one out of 23 VISNs that make up the DVA’s VHA. Participant selection occurred within one geographic facility in a single VISN. Data collected from the study participants’ online survey responses formed the basis of testing the research hypotheses and proffering answers to the posed research questions.

Summary and Organization of the Remainder of the Study

The purpose of this non-experimental quantitative causal-comparative research study was to determine the differences in patient satisfaction with the use of telehealth technology as a means of delivering health care through Veterans Health Administration medical centers to that active duty, reserve and retired military veterans who live in rural areas remote from the VA facilities responsible for providing such care. The specific focus was examining the differences in patient satisfaction experiences between active duty, reserve, and retired military personnel about the VHA investment in telehealth modalities and patients’ indirect cost factors for obtaining VHA healthcare services, which Morland et al. (2013) identified as one of several research gaps in research on healthcare access. Analysis of survey data from a purposive or purposeful sample of veterans eligible for care in one VHA facility showed existence of differences in patient satisfaction experience of military personnel on active and reserve duty with telehealth technology in terms of overall satisfaction, patients’ access to, and indirect costs or ROI of receiving care from a geographically distant VHA facility. Chapter 2 consists of a literature review of relevant healthcare research concerning telehealth technology, rural patients’ healthcare access, and indirect costs or ROI at the patient level. Details of the
research method follow in Chapter 3, including sampling, data collection, and data analysis procedures. Chapter 4 contains results of data analysis using the non-parametric Mann-Whitney U test, followed by a concluding discussion constituting Chapter 5, which summarizes the findings, and presents various implications and recommendations for using telehealth technology to increase access to VHA health care for veterans living at a prohibitive distance from a VA Medical Center.
Chapter 2: Literature Review

Introduction to the Chapter

The purpose of this non-experimental quantitative causal-comparative research study was to examine the differences in patient satisfaction experiences of active duty, reserve and retired military personnel with telehealth technology and different dependent variables of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. Telehealth is one of the newest and rapidly growing 20th-century technological healthcare delivery advancement initiatives embraced by the VHA to meet veterans’ needs for health care (U.S. DVA, 2012). The objective is to reduce or eliminate the challenges posed by distance and other cost factors, direct and indirect, at both patient and societal or organizational levels of obtaining access to an array of healthcare services available from the VHA for these deserving military veterans.

Healthcare experts have described the federal government’s VHA as the most integrated healthcare system or network in the U.S. (Darkins, 2014). The VHA annually caters to several million military veterans across the nation through its 153 medical centers as of 2015 and over a thousand satellite facilities. Such facilities range from Community-Based Outpatient Clinics (CBOCs) and Community Living Centers (CLCs) formerly called Nursing Home Care Units (NHCUs), to Veterans’ Centers and Domiciliary Units. Each of these institutional healthcare layers caters to veterans’ multifaceted healthcare needs at different levels, whether physical, psychological, emotional, or behavioral, to the extent that other healthcare entities, public and private,
have adopted various technological innovations spearheaded by the VHA. For example, currently, renowned Electronic Health Record and the Bar Code Medication Administration systems were two of these reputable technological innovations (Goldschmidt, 2012; Hill et al., 2010).

The two most recent long, drawn-out foreign military combat ventures coined “Operations Enduring/Iraq Freedom” widened the challenges to healthcare access many of these military veterans faced, especially for those living in the remotest parts of America. Responding proactively, VHA has been creative and innovative in its efforts to remove impediments and improve ease of access to health care for many of these veterans over the years. Investment in Health Information Technology (HIT), as in the implementation of CVT, has formed an integral piece of the service delivery puzzle (Wennergren, Munshi, Fajardo, & George, 2014).

Despite the vast amount of literature on the evolution of telehealth technology, its adoption, utilization/implementation, and documented benefits, a few gaps in research persist. Researchers, such as Morland et.al. (2013), identified gaps requiring further exploration to maximize the attendant telehealth technology benefits, including cost-effectiveness, patient satisfaction, wider specialty offerings, and fairly-increased access to healthcare particularly targeting those veterans who presently live far away from many smaller VA Medical Centers. Many veterans have been constrained by some access-limiting indirect patient-level and societal factors preventing deserving veterans from taking advantage of the VAHCS healthcare benefits they sacrificially earned by their honorable military service.
Through a study that focused on using telemedicine as a cost-reducing means of psychotherapy delivery to rural combat veterans who suffered from PTSD. Morland et al. (2013) identified long-term healthcare costs, indirect cost factors at the patient/societal levels and the use of CVT in other regions of the U.S. as important study gaps in providing access to healthcare for the veterans by any of the telehealth modalities.

**Background of the problem.** Timely access to healthcare, either specialty or general services, is a very big challenge for many veterans who live in the remotest parts of America and any VHA-eligible patients who periodically strive to beat the accompanying odds of traveling to a distant facility to receive the desired level of services. Indirect cost factors, including travel, inconvenience, temporary hotel lodging, lost wages, and caregiver or family burdens associated with such endeavors could be quite daunting not only to these patients but to the society as a whole, represented in this case, by the VHA. Kehle et al. (2011) broadly defined access and included three pivotal characteristics:

> The timely use of personal health services to achieve the best health outcomes . . .

[consist of] three discrete steps: 1) gaining entry into the system, 2) getting access to sites of care where patients can receive needed services, and 3) finding providers who meet the needs of the patient and with whom a productive working relationship can form (Introduction section, para 1).

In applying this definition, indirect cost factors at both the patient and societal levels could exert influence upon access to needed health care services, but telehealth modalities have the potential to mitigate access problems for many veterans who have avoided seeking care from the VAHCS because of these indirect cost factors. Indirect cost factors at the patient/societal levels or ROI may well align with the degree of access
to quality healthcare or lack thereof. This supports the need to explore indirect cost factors at the patient level as one of the important gaps Morland et al. (2013) identified in connection with an investment in telehealth modalities in smaller VHA Medical Centers across the country.

U.S. has been engaged in several conflicts over the years until 2012 when it began to draw down the number of service members involved in those 2 major recent combats coined Operations Enduring Freedom and Iraqi Freedom (OEF/OIF), telehealth has been found helpful in meeting the psycho-emotional needs of many of these young veterans (Steinberg & Eisner, 2015). The drawdown, as famously described, led to a continuous surge in the number of veterans who utilize the available healthcare services that the VHA provides. This made it imperative for measures to be instituted for addressing the associated problem of impeded or limited access to quality healthcare services, especially for those veterans who dwell in the most remote and rural American areas. Hodson and Wells (2013) supported this position with evidence that when made available, no fewer than 50,000 U.S. veterans enrolled in the home telehealth service in a short space of time anchored largely upon patient satisfaction and the added benefit of significant personal cost savings.

**Search terms and sources.** The literature review for this study was conducted initially through an exploratory methodology involving a concise search of the Google Scholar search engine for scholarly works in the areas bordering on this research. Using the keywords telehealth technology, veterans’ health care access and indirect cost factors, the outcome of the initial search were an array of peer-reviewed articles on the subject of study that necessitated further database searches by combining core keywords as
identified. Databases searched further included ProQuest, ABI/Inform Complete, Academic Search Complete, Business Source Complete, Medscape, CSU doctoral dissertations, and EBSCO Host’s Academic Search Elite, Academic Search Premier, and Business Source Premier. This chapter is composed of discussions of the background of the problem, the theoretical foundation upon which the study was predicated, a synthesis of relevant literature about telehealth technology, and literature supporting the choice of a quantitative correlation method for the study. Research literature about telehealth is divided into discussions of (a) telehealth modalities and various healthcare conditions, (b) issues of access to healthcare, and (c) financial or indirect costs of obtaining health care located at a distance from the patient.

Theoretical Foundation and Conceptual Framework

The main theoretical underpinning for this descriptive quantitative causal-comparative study was the impact/value framework or IVF that Hammer and Mangurian developed in 1987. The theory has three critical value components and three impact components. Value components are efficiency, effectiveness, and innovation, and impact components are time, distance, and relationship. Impact and value interplay to form the bedrock of evaluating the possibilities that telehealth technology embody in widening access to efficient, effective and innovative cost-saving care for the veterans who live in remote, rural American locations. The impact/value framework solely functions to proffer good assessment and concise understanding of the impact/value of information technology as it pertains to any business, such as a healthcare business using telehealth technology modalities. Telehealth requires information technology, which makes the impact/value theoretical framework most relevant and applicable to the purpose of the
study. Cost-benefit analysis (CBA) is IVF’s supporting or adjunctive conceptual framework. Used interchangeably with the term *cost-effectiveness*.

Drawing upon the impact/value framework, Shields and Chapman (2013) used a technological model to assess the impact of telehealth technology in managing chronic diseases and found a potential for cost savings in a short period as patients reduced use of medical resources. Cruickshank and Harding (2013) corroborated the impact/value of technology through a study demonstrating the synergy between healthcare systems of the VHA in the U.S. and the National Health Service (NHS) in the United Kingdom as both systems increasingly have been using digital technologies in transforming healthcare delivery and maintenance. Table 1 shows the components and relationships of the two dimensions of the impact/value framework.

Table 1.

*Impact/Value Framework*

<table>
<thead>
<tr>
<th>Impact</th>
<th>Efficiency</th>
<th>Effectiveness</th>
<th>Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Accelerate business process</td>
<td>Reduce information float</td>
<td>Create service excellence</td>
</tr>
<tr>
<td>Distance</td>
<td>Increase market size</td>
<td>Ensure global management control</td>
<td>Penetrate new markets</td>
</tr>
<tr>
<td>Relationship</td>
<td>Bypass intermediaries</td>
<td>Replicate scarce knowledge</td>
<td>Build networks</td>
</tr>
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**Impact dimensions: Time compression, distance or geography, and relationships.** Time compression is an immediate impact that information systems (IS) or information technology (IT) may exert on an organization. Hammer and Mangurian (1987) showed time compression could decrease the time it takes for generating
productive and enduring effects that accelerate customer satisfaction or strategically position the business entity for desirable outcomes. Distance or geography can be leveraged well by communication or information technology. Hammer and Mangurian (1987) demonstrated that IS, IT can help organizations or business establishments overcome geographic or distance-imposed limitations. The distance dimension shares similitude with healthcare access challenges which telehealth technology will help mitigate for those veterans who are geographically disadvantaged. For relationship management, IS or IT plays a unique role in establishing new, favorable relationships or dissolving old, unproductive relationships.

**Value dimensions: Efficiency, effectiveness, and innovation.** Efficiency, or increased productivity, unquestionably can be enhanced by good IS or IT. Effectiveness is an ally of efficiency because it denotes management of available resources to achieve optimal outcomes or benefits. Concerning innovation, it is not an understatement or over-emphasis that IS or IT can elicit innovations that enhance or improve the quality of a product or service. Gonzalez and Chacon (2014) defined innovation as the process of applying new ideas or knowledge to new products, processes and/or services with a view to affecting better outcomes. Innovation bears a similitude to changes in products, technology, and/or different firms’ configurations that affect ways of accomplishing tasks or serving the clients.

**Review of the Literature**

**Research gaps and the problem of access to VHA health care.** The passage of the Patient Protection and Affordable Care Act (PPACA) in 2010 has effected an increase in the demands for health care utilization across many sectors and has weighed heavily on
an already burdened health care system plagued by reduced numbers of primary care providers. Bodenheimer and Smith (2013) wrote that there is a continued decline in the number of primary care providers entering medicine and much as the recruitment of new physicians seem to be the most logical remedy, it is impossible to produce qualified providers rapidly enough to avert the looming crisis. Henderson, Davis, Smith, and King (2014) provided a swift response to this concern by suggesting the use of nurse practitioners and telehealth technology in bridging the existing gaps in healthcare delivery.

The National Organization of State Offices of Rural Health (NOSORH, 2014) chronicled the following phenomena as some of the pressing challenges that will necessitate expanding telehealth services to meet the healthcare needs of U.S. veterans:

- Lack of access to a comprehensive spectrum of appropriate, quality health care services for veterans in rural communities
- The uniqueness of the rural healthcare needs of OEF/OIF veterans.
- Disparities for rural veterans in health status and healthcare services’ utilization.
- Prevalence of lower health-related quality of life scores; higher incidence of physical illnesses and more severe mental health disorders among rural veterans.
- Prohibitive travel distances and financial constraints remain access impediments that severely undermine care coordination and threatens veterans’ quality of care and quality of life.
The five most prevalent diagnoses among rural veterans consists of hypertension, diabetes mellitus type 2, hyperlipidemia, PTSD, and depression.

Many of those veterans who returned from combat are bedeviled with serious mental illnesses and amputation among other challenges.

With such barriers to healthcare, it is critical to evaluate the influence of telehealth modalities upon veterans’ health care access to services they are being provided through telehealth modalities in smaller VAHCS. Morland et al. (2013) suggested the need for further exploration of important research gaps related to telemedicine, a form of telehealth services for the delivery of healthcare. Such research gaps arose from a study of the roles played by use of telemedicine in providing psychotherapy to a group of veterans who lived far away from the Veterans Affairs Medical Centers. Out of the few gaps Morland et al. (2013) identified; indirect factors at the patient level, or what business analysts refer to as ROI, was the gap addressed in the quantitative causal-comparative study of VHA telehealth services in VISN 4. The other specific focus was the influence of telehealth technology on veterans’ healthcare access and overall patient satisfaction.

Understanding telehealth. From inception, telehealth has continued to gain an unassailable momentum as the latest 20th and 21st-century healthcare delivery vehicle. Inclusion of this healthcare phenomenon in the 2010 Patient Protection and Affordable Care Act (PPACA) signed into law by President Obama paved the way for additional consideration and appreciation of telehealth technology by numerous healthcare systems across the country to be able to accommodate the surge in the population of Americans seeking healthcare, whether general or specialty services. Telehealth is a form of
healthcare delivery involving the use of specialized sets of technology synchronously or asynchronously connecting healthcare recipients or patients and healthcare providers such as physicians, psychologists, and nurses (Moore et al., 2013). This interaction usually happens remotely without any need for direct physical contact or face-to-face encounter between the patient and the primary provider of that care. Technologies used for telehealth thus have been programmed such that distance will not, or should no longer be a barrier to healthcare delivery, termed access, especially for those who live in remote rural areas across America.

The terms telehealth and telemedicine have for long been used interchangeably, Doarn et al. (2014) recognized a need to define telehealth succinctly for good purpose and clarity. Telehealth, according to these authors, is much broader than telemedicine because telehealth equally addresses the use of information for the delivery of preventive healthcare services alongside other public health interventions remotely in addition to remote delivery of medical care. Telemonitoring is a subset of remote healthcare used primarily within telemedicine and consists of a singular node tasked with remotely transmitting patient inputs, either biologic or through manual data entry, to the provider of health care. In the 21st century’s second decade, analysts at the National Telehealth Technology Assessment Resource Center (2016) consider telehealth to comprise four distinct application domains: (a) synchronous or live video conferencing, (b) asynchronous Store-and-Forward, (c) Remote Patient Monitoring (RPM), and (d) Mobile Health (mHealth).

Researchers have continued to demonstrate the growth and positive impact of telehealth technology in the VHA on access, patient satisfaction, and cost savings related
to the expansion of the healthcare delivery method to many specialties since its adoption by the VHA. Documented utilization data indicate that almost 700,000 U.S. veterans were served through the different VHA telehealth modalities in the fiscal year 2014 as there existed over 44 clinical specialty offerings that the veterans can choose for managing their medical conditions. Darkins (2014) described the successful rapid growth of VHA telehealth services over a 10-year period, from 1994 to 2014. The VHA has shown strong resolve, according to Darkins, in ensuring wider access to different types of healthcare services being offered not only to veterans with immediate or easy access to the VA Medical Centers but also those in outlying rural areas. Broderick (2013) lent his voice to Darkins (2014) by extolling the VHA’s work since the 1990s in using information and communications technologies for providing coordinated, high-quality, and comprehensive primary and specialty care services to the U.S. veteran population. Hill et al. (2010) summed up the VHA’s telehealth efforts as early diagnosis facilitation, timely patient referral, ongoing monitoring, medical information interchange, and cost-offsetting interventions while working with those hard-to-access patients, namely people living in rural areas distant from VHA facilities.

The Department of Veterans Affairs’ healthcare arm, the VHA, has a mission to provide excellent healthcare to every veteran despite limitation posed by geographic and demographic challenges, especially among aging veterans and many others who reside in rural areas. Recognition of such barriers to care, according to the Office of Telehealth Services (OTS, 2014), informed the VHA’s decision to expand telehealth services, deemed as a transformational initiative, to areas beyond the fixed traditional care settings. In defining telehealth, VHA healthcare providers have emphasized the service is a
veteran-centric innovation that involves the use of health information and
telematic technologies in providing health care and patient education in and
situations where distance has constituted a major barrier between providers and their
military veteran patients (U.S. DVA, 2012). To reach the stated goal of reaching the
veterans wherever they are domiciled, six telehealth modalities were adopted: Home
Telehealth (HT), Clinical Video Telehealth (CVT), Store-and-Forward Telehealth (SFT),
Teleradiology (TR), Secure Messaging (SM), and Mobile Telehealth (MT). Each of these
modalities possesses unique capabilities in meeting the veteran’s general or specialty
health care service needs (U.S. DVA, 2012). The purpose of this literature review is to
describe the differences in patient satisfaction experiences of active duty, reserve, and
retired military personnel with telehealth in terms of overall satisfaction, veterans’
healthcare access as well as on the indirect cost factors at the patient level. The review
will also explore some other views that were somewhat dissenting or unfavorable to
telehealth’s positive ratings and rankings.

**Telehealth and veterans’ health care access.** Several researchers have identified
the limitations posed by the distance to many veterans’ ability in gaining timely access to
needed healthcare services and when access sometimes occurs eventually, at what cost
has this happened and how timely was such level of access? Considering such difficulty,
access to any level of healthcare service is integral in the life of an average veteran who
lives in a remote rural area. Many earlier researchers demonstrated the inherent values
attributable to telehealth adoption and implementation whereas some are still able to offer
cautious optimism that telehealth could improve access to healthcare and mitigate
indirect cost factors at both patient and societal levels.
Mishkind, Martin, Husky, Miyahira, and Gahm (2012) conducted an exploratory evaluation study on the use of deployable telehealth centers after having determined that some United States Military Health System beneficiaries are facing unique challenges getting timely access to available behavioral healthcare services. Behavioral healthcare is an invaluable type of care not only to service members but also to veterans alike. Mishkind et al. showed that challenges posed by the discontinuity of services, deployments to, and permanent duty stationing in, isolated geographies deprive beneficiaries of accessing much-needed behavioral services. These access challenges are said to be severely compounded by many returnees from the Iraq and Afghanistan conflicts (OEF/OIF), but Mishkind et al. (2012) cited the ingenuity of using deployable telehealth centers as offering the much-needed reprieve.

Problem-solving therapy (PST) is applicable to a wide range of physical and mental conditions, and deliverable by means of a telehealth service. Through qualitative interviews, Choi, Wilson, Sirranni, Marinucci, and Hegel (2013) found older adults reported a high approval rate for receiving PST offered to them through Home-Based Telehealth (HBTH) via a special program called Tele-PST. These participants were low-income and homebound adults with depression. The significance of such a finding is another pointer to how telehealth has come a long way and might have both tangible and intangible benefits for nearly every group of healthcare consumers regardless of age or gender and no matter where they are located.

Meyers, Gibbs, Thacker, and LaFile (2012) showed that telehealth offers many benefits that include increasing access to specialty care for patients dwelling in rural areas. Decreasing such patients' travel time consequently saving money for both the
patients and their caretakers; making room for earlier disease screening, detection/intervention, as well as enhancing clinical collaboration between primary and specialty care providers thereby serving as the bridge for optimal professional collaboration, education, and training. Each of these activities fosters promotion of good health and prevention of diseases that have the potential for lethality or gravely debilitating complications if they had been detected and not treated promptly.

**Illness, injury, and specialty care.** Several specialty practices in healthcare are being infiltrated by telehealth modalities across genders. For example, Tan et al. (2013) displayed the feasibility of providing treatment to rural-dwelling female veterans who were suffering from chronic pain alongside depression that was associated with trauma by the utilization of video-teleconferencing technology. The finding is similar to the CVT that Morland et al. (2013) identified in their study as an important study gap. For all veterans, numerous other core healthcare specialties have seen a greater impact from the use of telehealth modalities. Singh, Accursi, and Black (2015) applauded the roles played by CVT technology in rendering high-quality anti-coagulation services evidenced by improved patient satisfaction and optimization of clinical pharmacy resource allocation.

For veterans diagnosed with spinal cord injury (SCI), Woo, Seton, Washington, Tomlinson, Phrasavath et al. (2014) identified themselves with Choi et al.’s (2013) inference of telehealth’s wide applicability by demonstrating increased access to specialty care made possible through a uniquely innovative home telehealth-based SCI Disease Management Protocol (SCIDMP). This was an impressive pilot study that showed patients involved in the study reported SCIDMP-run home-based telehealth benefits particularly for patients with new injuries and living far from the few VAHCS specialty -
care facilities for SCI. The very important lessons from this study are increased access to specialty care with minimal challenges and the potential for cost saving for the patients as well as the VHA.

Persons with human immune virus infection (HIV) and others with related infectious diseases living far away from ID specialty clinics are very less likely to use specialty care available to them at many urban VA Medical Centers (Ohl, Richardson, Kaboli, Perencevith, & Vaughan-Sarrazin, 2014). The consequences of not using such specialty care are potentially serious as many of these veterans are prone to non-compliance with life-enhancing continuity of healthcare services. For this reason, Ohl et al. (2014) made a strong case for considering the use of telehealth in delivering care over such vast distances and coordinating other shared-care collaboration or partnership with distant primary care providers.

Pain has been known and reported as a serious concern for most patients in almost every care setting, and veterans are not left out in this area of healthcare delivery. In fact, major healthcare regulatory agencies including the Joint Commission (TJC) have made good pain assessment, pain management, and pain intervention/evaluation very essential inspection items for the purposes of ongoing healthcare institutional certification and credentialing. Because many veterans of all combat eras are dealing with chronic intractable pain physically and emotionally, the VHA has included this as an important patient vital sign with each veteran encounter. Desko and Nazario (2014) recognized this in their study and found that “Veterans saved 8,981 miles in travel distance, and the VA saved $2,317.51 due to averted travel reimbursement. There was a 90% satisfaction rate with the CVT pain management clinic services” (p. 359). Another important finding from
the study was the excitement participants showed, with 90% unequivocally stating they would recommend telehealth services to their veterans.

In another important area of health care, palliative care of cancer patients, Stern, Valaitis, Weir, and Jadad (2012) demonstrated the usefulness of home telehealth services through a mixed methods case study. Some of the documented benefits include increased access to needed care and opportunities for providing reassurance to both patients and caregivers. Telehealth does have the capacity to meet the emergent needs of clinically vulnerable, terminally ill, and dying patients in the timeliest fashion that might not have been readily accessible with traditional face-to-face clinical provider’s meeting. The researchers sounded a note of caution with addressing concerns like inappropriate intervention timing, technical malfunctions, and lack of service integration. Even the difficulties attest to the continuing growth of telehealth and justify the need for this type of mixed qualitative and quantitative case study.

Researchers found telehealth to occupy unique positions in so many once-unthinkable areas and has continued to expand its reach into several other human services over the years, one of which is an emergency response. Der-Martirosian, Yuan, Dalton, Dobalian, Griffin, and Chu (2014) demonstrated the potentials of telehealth in improving access to healthcare services in emergencies, such as the widespread destruction of Hurricane Sandy in 2012. From the foregoing, recognition is growing that telehealth has the propensity to mitigate numerous distance-orchestrated access challenges even in specialty medical practices. The sooner such relevant telehealth modalities are made operational in specialty areas, the better veterans’ quality of life will be, a life eventually
devoid of debility, disability, or the evolution of one or more associated co-morbid events.

**Mental health/behavioral health conditions.** Significant improvement in certain mental health benchmarks has been possible through delivery of mental health services to patients located at a distance from the provider using telemental health technology. Godleski, Darkins, and Peters (2012) discovered that through enrollment of many veterans in telemental health over a four-year period, from 2006 to 2010, enrollees’ mental health improved. For example, outcome data showed a 24.2% decrease in psychiatric admissions, a 26.6% decrease in patients’ hospitalization days and an 83.3% decrease in the number of admissions/patients’ hospitalization days. This study aligns with the intent of the telehealth study of access and indirect costs by attesting to the inherent capability of telemental health as one of several telehealth modalities in ensuring continuity of specialty care. Findings demonstrated the ability of telemental health service to reduce the frequency of relapse-induced re-hospitalizations with resultant huge cost savings compared to recurrent re-hospitalization of veterans lacking access to appropriate care.

Access to mobile technology and specially designed mHealth applications, particularly for PTSD, has assisted veterans to manage potentially debilitating psychological symptoms. In a 2014 study involving smartphone applications for telehealth, Erbes et al. (2014) concluded that between 56% and 76% of veterans surveyed who had access to mobile technology such as smartphones and different types of software applications popularly called Apps, expressed interest in or have used specially designed mHealth applications particularly for PTSD. The researchers implied that the use of these
miniature forms of telehealth modalities have the increasing tendency to widen access to some basic levels of protective evidence-based therapy services that do not involve travel or other indirect costs typically associated with the traditional face-to-face encounter with psychologists or other mental health professionals. After proper patient coaching, education, or requisite training, this type of simple self-administered telehealth service can go a long way in helping the veteran manage debilitating symptoms that could have prevented the individual from performing tasks as basic as activities of daily living (ADLs) or more advanced tasks like taking classes (professional or vocational). Luxton, Pruitt, O’Brien, and Kramer (2015) showed it is not only feasible and safe to use HBTMH in providing treatment for PTSD, but recorded high user satisfaction too.

Strachan et al. (2011) applauded the use of home-based telehealth in delivering very specialized, evidence-based therapies such as prolonged exposure (PE) to veterans suffering from PTSD. In the annals of many international combat experiences in which U.S. service members have been engaged ranging from Vietnam to Afghanistan and subsequently, Iraq, PTSD has to be a persistent and pervasive problem. This explains why it appears all hands have remained on deck to tame the hydra-headed monster that has maimed or killed many veterans. The usability of telehealth modalities in providing the required specialized therapies is a significant access-enhancing option with potential benefits to many the affected veterans.

For treating PTSD, Agha (2012) found no difference between in-person and telehealth treatment approaches. Through a non-inferiority, randomized clinical trial (RCT) of a group of patients suffering from PTSD, with almost half receiving in-person (IP) and the other half receiving telehealth services (TM) Agha found no significant
differences between those who received therapy through IP and TM in all the areas or sub-scales of the study including patient satisfaction and ease of access. This underscores the researcher’s theme that telehealth may be an important access-delimiter or enhancer for many veterans who are prevented by distance from taking advantage of such evidence-based therapy techniques like CPT in alleviating their chronic PTSD symptoms.

Yuen et al. (2015) were not left out of their argument just as many other researchers had posited that telehealth technology has been quite successful in helping veterans who live in distant locations enjoy access to different levels of care that would have been otherwise impossible to access. These researchers demonstrated through a randomized study that prolonged exposure, a unique and specialized form of therapy for PTSD could be safely delivered by home-based telehealth since study participants derived comparable levels of satisfaction as well as clinical outcomes just as those patients who were provided similar therapy face-to-face or in-person.

Veterans struggling with substance use disorders (SUD) is another important segment of the VHA patient population. No fewer than 11% of an estimated 25 million U.S. veterans exhibit dependence on alcohol or illicit drugs and of these, a variety of obstacles such as lack of transportation and less availability of treatment in most rural areas hamper access to specialty SUD care. Santa Ana, Stallings, Rounsaville, and Martino (2013) found that home telehealth technology might become an innovative and feasible approach to ensuring evidence-based SUD treatment as either an adjunctive treatment or a stand-alone intervention in primary care for reaching a vast number of veterans who otherwise would have lacked ready access to traditional SUD care.
Substance abuse and mental health services are other crucial areas where most veterans were reported to be lacking in getting access, getting limited or untimely access if they ever got it. This has resulted in untold hardships, and the news media has been much awash over the past years with several cases of suicides among service members and veterans of all service eras. Benavides-Vaello, Strode, and Sheeran (2013) demonstrated the potentials of telecommunication technology in reducing the disparities existing between the delivery of substance abuse and mental health services in rural and urban locations. Those who live in urban areas were said to fare much better than those in the rural areas did but this study is pointing to the possibility of widening access to various services through telehealth modalities. Torous, Staples, and Onnela (2015) wrote that the ubiquity of smartphones could easily be harnessed for offering psychiatry a wealth of real-time data that will lead to both patient and provider empowerments in ensuring quality symptom assessment and effective disease process management.

Battaglia, Benson, Cook, and Prochazka (2015) followed a similar path as Benavides-Vaello et al. (2013) by looking at the applicability of telehealth in managing another major addiction and public health problem of tobacco use. Many veterans are struggling with tobacco use disorder and are willing to try quitting using professionally moderated tobacco cessation programs, but the distance to trained providers has often been a major obstacle. The health dangers attributable to tobacco use in any form include emphysema, chronic obstructive lung diseases (COLD), exacerbation of asthma and all forms of cancer among others, according to the World Health Organization (WHO, 2012) and the Centers for Disease Prevention and Control (Asma et al., 2014). The team of researchers could show the feasibility of delivering motivationally enhanced, innovative
tobacco cessation programs via telehealth care management intervention with documented high treatment fidelity. Making tobacco use disorder or addiction treatment programs accessible to veterans by telehealth will help prevent the development or worsening of many other disease conditions, improve the veterans’ quality of life, reduce the burden of care costs both to the veterans and to the society. Chen et al. (2014) described the results of their pilot telehealth tobacco disease management protocol as promising because the protocol was a mechanism for both rural and/or disabled veterans to receive evidence-based, well-coordinated tobacco cessation care with some limitations. The limitations are likely not to be difficult to surmount in future studies.

Behavioral health care services again form an integral part of military service members and veterans' care that have gained national prominence due to an upsurge in veterans' and service members' incidence of suicide, homicide, substance use disorder, chronic mental illnesses, and post-traumatic stress disorder, among other conditions. Clearly such problems align with this study's stance that telehealth might wield a significant influence on veterans' access to quality specialty or general healthcare, just as Elnitsky et al. (2013) upheld existence of a 7-fold increase in the probability that geographic distance will prevent OEF/OIF combat returnees from seeking healthcare from the VA. Gros, Veronee, Strachan, Ruggiero, and Acierno (2011) demonstrated telehealth’s value in the identification and treatment of severe psychiatric symptoms while safely addressing suicidality in the process. Military members and veterans’ suicide rates have been a major concern nationally over the years and any additional intervention to stem this painfully ugly tide is a laudable one that must be attentively pursued with vibrant vigor.
Kasckow et al. (2015) investigated telehealth services in treating schizophrenia, another common mental illness that often involves suicidal ideation. After having deployed telehealth in monitoring this type of patient with a severe mental illness, the results are intriguing. The researchers found noteworthy improvements in reduced suicidal ideation scores thereby indicating the feasibility of telehealth monitoring among this unique patient population. Even though some other researchers have argued against the many positives of telehealth as a radical healthcare delivery phenomenon, studies like this that literally replicate or correlate similar studies will prove naysayers wrong or catalyze a much more rigorous analysis.

Another important area of application of telehealth is attention-deficit hyperactivity disorder (ADHD). Polanczyk, Willcut, Salum, Kieling, and Rohde (2014) reiterated the definition of ADHD as “a neuro-developmental disorder which is characterized by a consistent or persistent pattern of inattention, impulsivity and hyperactivity considered as very pervasive across settings leading to varying functional impairment degrees” (Background section, para. 1). This by no small means is a very serious disorder that presents the sufferer (mostly children) with very difficult growth and developmental challenges and every form of an intervention aimed at mitigating this associated ADHD difficult symptoms deserve priority. This is pertinent to the veterans whose children struggle with this on top of their own health challenges (physical or mental). The good news however is that Myers, Stoep, Zhou, McCarty, and Katon (2015) through a randomized controlled trial coined Children’s ADHD Telemental Health Treatment Study (CATTS), demonstrated the effectiveness of a telehealth service model
in offering treatment to patients in those communities with limited access to this type of specialty mental health service.

Depression is one of the five most prevalent conditions affecting veterans and their dependents in rural communities (NOSORH, 2014). In a randomized clinical trial of home-based telemental health (HBTMH) treatment for selected U.S. military personnel and veterans suffering from depression, Luxton, Pruitt, O’Brien, Stanfill et al. (2014) concluded HBTMH has a great potential for addressing their current and future needs. Sleep deprivation and different types of sleep disorders are associated with mental health illnesses like depression. There are so many fears elicited by sleep disorder sufferers who may refuse to try pharmacologic options after having tried several without getting the desirable lasting results. Lichstein et al. (2013) demonstrated that telehealth cognitive behavior therapy (CBT) could significantly alleviate the unpleasant symptoms associated with both insomnia and depression in older adults especially those who fall in underserved rural populations. In-home video telehealth serves as a veritable supplement to demanding routine office visits by providing increased comfort and convenience to patients diagnosed with dementia as well as their caregivers (Moo, Jafri, & Morin, 2013).

**Chronic conditions and caregiver support.** Traumatic brain injury (TBI) constitutes another major post-combat challenge facing many of the young veterans including those who live in rural, remote locations. These sufferers of TBI experience debilitating symptoms often requiring a designated and constant caregiver in order to deal with carrying out very basic ADLs effectively. Providing essential caregiving could put huge strains not only on the patients but also on caregivers. In a systematic review of TBI, caregivers, and telehealth, Rietdijk, Togher, and Power (2012) concluded there is a
great feasibility of using telehealth programs to effectively offer much-needed support to the TBI patients’ family members who take care of the injured veteran around the clock. Findings showed remarkable positive outcomes. Rietdijk et al. recommended further studies in the areas of effectively guiding clinical decision-making that will be worthwhile to enhance patient and caregiver support because telehealth use can decrease caregiver strain.

Obesity and its attendant complications have been associated with many cardiovascular diseases not only in the civilian population but among veterans as well. Concern about the problem led to a weight loss initiative started by the VHA entitled “teleMOVE!” Skoyen, Rutledge, Wiese, and Woods (2015) included teleMOVE! in an observational study concerning how telehealth can help in reaching unserved veterans. The researchers described TeleMOVE! as an inspiring intervention that could galvanize greater access to weight-reduction interventions, but called for further investigation into its efficacy.

The incursion of telehealth technology into specialty clinical practice continues to widen especially with life-long or chronic illnesses like multiple sclerosis. Through a longitudinal cohort study, Turner et al. (2012) asserted that home telehealth monitoring holds a big promise as a veritable tool in the management of multiple sclerosis. Fully 87.5% of the study participants provided a rating of good or better experience with home telehealth owing to the attendant infrequency of disabling symptoms characteristic of their illness and a 23.2% decrease in the accompanying depressive symptoms. Turner et al. considered the decrease in depression symptoms the greatest (2012). This is a pointer to the foreseeable benefits of telehealth technology. For example, in expanding access to
care for many of these types of veterans who may have jettisoned seeking care from the traditional VA Medical Centers due to barriers imposed by distance.

**Follow up care and rehabilitation.** Telehealth has been found as a beneficial application in following patients up after they have undergone surgical interventions, especially in ambulatory surgery settings. Documented evidence abounds regarding the associated benefits of such follow-up care post-operatively. Hwa and Wren (2013) confirmed this in their study with a conclusion that telehealth offers a safe and cost-effective alternative in the post-operative management of ambulatory surgical patients. Patients in the study expressed a high degree of satisfaction with the post-operative care they received free of complications like infections or intractable pain, and tangible benefits reported were a reduction in time and travel expenses plus the subsequent ability to utilize the freed-up time (several hours to days) in taking care of other prospective new surgical patients.

Complex healthcare services such as cochlear implant can also benefit greatly from using telehealth modalities in the areas of research and stipulated clinical measurements. This will ensure sustainability of device functioning and improved patients’ quality of life. Hughes et al. (2012) demonstrated that the inability of cochlear implant recipients to keep the required post-implant visits might lead to functional disadvantages like sub-optimal implant outcomes or device non-use often due to hardship associated with the patients living significant distances away from the Cochlear Implant Center. Their study further demonstrated that telehealth could help reduce this problem of not being able to get these clinical measurements and the added benefits of considerable
savings in travel time, expenses, less lost time from school and/or work and the ability to get timely access to an otherwise inaccessible array of clinical services.

Telehealth technology has found clinical utility in monitoring heart failure. For example, Riley, Gabe, and Cowie (2012) extolled the ability of study participants in a qualitative study in monitoring their heart failure after being telemonitored for 6 months. Nakamura, Koga, and Iseki (2014) conducted a meta-analysis study involving chronic heart failure patients knowing well that many of these patients are prone to frequent re-hospitalizations due to symptom worsening many times due to non-compliance with medication and lifestyle modification recommendations. The resultant effect of this is the poor quality of life for these patients and soaring healthcare costs. Evidence shows an innovative method called remote patient monitoring, a subset of telehealth, has helped lower mortality, enhanced medication regime compliance, and decreased overall re-hospitalizations.

Telehealth can offer useful value in rehabilitative healthcare services as portrayed in the study done by Lee and Harada (2011) provided certain measures were in places such as eliminating payment policy and licensure barriers for physical therapy services. Other healthcare systems have demonstrated the significance of what is now known as telerehabilitation in forging increased patient access to an array of rehabilitative services that were once inaccessible due to geographically induced obstacles. Cason (2015) lent credence to this by emphasizing the role of expanding telehealth technology into the field of occupational therapy as a corollary to achieving the triple aim of healthcare reform: providing stellar patient care experience, improving population health, and enhancing the affordability of care. Davidson, Simpson, Demiris, Sheikh, and McKinstry (2013) did a
qualitative study that showed a great likelihood of many providers’ reception of
telehealth owing to its documented benefits especially with electronic medical record
integration. The study, however, identified certain key challenges that must be overcome
to maximize fully, telehealth benefits. The significance of this study is that despite the
existence of telehealth over few decades, a lot more still needs to be done in filling the
several gaps that are prevalent in this new healthcare delivery arena.

*Critiques and concerns.* Despite the many studies attesting to the benefits accrual
to telehealth technology in the areas of access and cost-effectiveness, some other studies
presented dissenting or not-so-concordant inferences. For example, Polisena et al. (2009)
wrote after performing a systematic review and meta-analysis regarding the impact of
home telehealth on managing diabetes mellitus that more studies should be done. It was
concluded by these authors that home telehealth wielded a positive impact as far as the
use of numerous healthcare services including blood glucose control (glycemia), but there
is a need for more studies preferably of higher methodological quality in gauging precise
insights into home telehealth’s clinical effectiveness. This is in stark contrast to other
studies that have demonstrated significant positive impact in the management of not just
diabetes but also few other chronic illnesses like congestive heart failure. Carlisle and
Warren (2013) were similarly on board with Polisena et al. (2009) as they demonstrated
the value of telehealth adoption in improving the symptoms of type 2 diabetes; however,
with a caveat to garner more support to ensure widespread implementation and
sustainability.

Gilman and Stensland (2013) expressed some concerns about telehealth’s modest
adoption by most healthcare providers despite the increases in reimbursement especially
by Medicare towards telehealth services, availability of federal grants as incentives for telehealth growth, widening of covered telehealth services and reductions in provider requirements. This is quite concerning if more healthcare providers are not embracing this healthcare delivery modality. Wade et al. (2014) shared a similar sentiment through a qualitative study that demonstrated the importance of clinician acceptance as a key factor for telehealth services’ sustainability. Evidence of the value of telehealth technology may be insufficient. Elwyn et al. (2012) stated directly, after collecting qualitative data, that evidence is weak for the effectiveness of telemonitoring, and inconsistent because cost-effectiveness studies are few and inadequate. Cartwright et al. (2013) concluded that second-generation home-based telehealth was neither effective nor efficacious when compared with usual care. They showed that telehealth did not improve the quality of life or psychological outcomes for chronically ill patients diagnosed with diabetes mellitus, heart failure, and COPD.

Radhakrishnan, Xie, and Jacelon (2015) were concerned about the likelihood of not being able to sustain telehealth technology because of inability to attain desired patient-centric outcomes, difficulty with technology usability, communication-related challenges, demonstrable cost-effectiveness and a host of other issues judging from a Texas qualitative study. Fairbrother et al. (2012) went in the same direction by being cautiously optimistic about telemonitoring and heart failure management. The main caveats from their qualitative study hinged around proper case selection and ensuring training adequacy for both patients and the healthcare professionals that will deliver different types of services just as Perle and Nierenberg (2013) demonstrated via a literature review with a core emphasis on careful consideration plus training also.
There have been some reservations expressed regarding specialty telehealth services that appear to have been gaining momentum. French et al. (2013) through a systematic review and case study brought to light the sparseness of telestroke implementation information guide. Telestroke is one of the newest telehealth modalities that have the potential to positively affect patients who suffered a stroke and getting the right implementation guidance will herald care quality, reduce cost and widen prompt patient’s access to specialty care timely before they suffer irreversible complications. Sinha and Thankanchan (2012) examined the perception of nursing professionals regarding use eHealth applications and found out that a few groups of these nursing professionals still lack any opinion about these technological applications in direct patient care, clinical education or research. Nursing professionals play a significant role in healthcare delivery, and it is an established fact that they provide 24-hour patient care coverage so; it will be not just helpful but completely expedient as they are the closest companions to the patients. They must have a good understanding about all the telehealth technology domains, a failure of which they may become barriers to effective implementation of telehealth applications (Koivunen & Saranto, 2012).

Sanders et al. (2012) from a qualitative study explored the barriers to participation in and adoption of telehealth/telecare within the Whole System Demonstrator (WSD) trial. The study thematically laid out key findings like requirements for ensuring technical competence/smooth equipment operation, threats to patients’ identity, promoting independence/self-care and possibility of experiencing services’ disruption. These are all valid concerns that this study exposed and may constitute critical barriers that inadvertently may impede or restrict veterans’ access to care further once they have lost
interest in any given period due to any or a combination of these potential barriers.

Getting buying-in from those who have suffered disappointment because of any of these barriers might become such a herculean endeavor in the long haul due to the fact such experiences often make news headlines faster than the ones who have had good telehealth experiences. Wade, Eliott, and Hiller (2012) likened some of these barriers to clinical governance, ethical and medico-legal matters that pervade most telehealth services judging from the Australian perspective. Several salient factors must be in place for a successful implementation of any complex innovation or phenomenon like telehealth. Responsiveness and adaptability to the local health and/or social care systems that are driven by robust support from frontline staff and management will go a long way in ensuring an evidence-based scaling-up of the proposed telehealth venture (Hendy et al., 2012).

Critical care or intensive care areas are very well known in the healthcare world. The rapid populations of healthcare consumers’ growth alongside the soaring rate in adult longevity these days have heightened the demand for critical services that unfortunately cannot be provided by limited resources. Ellenby and Marcin (2015) described the benefits attributable to regionalization of specialty intensive or critical care services made realizable through telehealth as follows:

- The capabilities of telehealth technologies in addressing the varying disparities in access to care thereby permitting critical care providers an immediate presence at the critically ill child’s bedside no matter how remotely located;
• Telehealth technologies’ capabilities to improve remote diagnostic, therapeutic as well as critical transport decisions regarding children who are receiving care from non-pediatric referral healthcare centers or institutions;

• Telehealth technologies have been shown to exert positive influences in terms of care quality and cost-effectiveness in the intensive or critical care units

• The potentials of telehealth technologies in improving pediatric critical care workflows’ efficiency and addressing workplace shortages.

In a qualitative study, Moeckli, Cram, Cunningham, and Reisinger (2013) applauded the roles played by the tele-ICU program, just as Ellenby and Marcin (2015) did, but there were concerns in the areas of implementation complexity. Important consideration must be given to time and resource allocation regarding local tele-ICU coordination, ongoing needs assessment, staff training/education, interpersonal relationships, and systems’ design/evaluation aimed at eliciting rapid staff acceptance without which, successes that are considered possible might then become far-fetched. After conducting a randomized controlled trial (RCT) of telemonitoring, Takahashi et al. (2012) were rather frank and blunt concerning the efficacy of telehealth in averting frequent hospitalizations and emergency department (ED) visits by older adults with multiple health issues. The conclusion of this study was a bit scathing in that the authors stated telemonitoring had no effect on lowering hospitalizations or ED visits. On the other hand, the researchers did not intend to discount the potential benefits of telehealth modalities in other conditions or among different age groups. Similarly, Sharma and Clarke (2014) were somewhat less optimistic about telehealth following a longitudinal case study, which indicated that nurses and community support workers might see
telehealth’s introduction as both disruptive and threatening. These first-line users must feel comfortable adopting and working with the patients through various telehealth modalities.

It is no longer alien to even non-medical people to appreciate the value of early detection of any disease process for promptness and cost-effectiveness of treatment, but showing the efficacy of telehealth for early detection might be challenging. For example, in a prospective observational study of telehealth use in detecting early exacerbations of chronic obstructive pulmonary disease (COPD), Hamad, Crooks, and Morice (2016) showed standard telemonitoring modalities for COPD and alert algorithms were not sufficiently sensitive or specific to identifying true patient clinical deterioration. The researchers did not write off telehealth completely but viewed the results as an opportunity for further studies to determine how telehealth can be safely and productively employed in managing this type of patient group remotely. Gabrielian et al. (2013) sounded more encouraging in a study that looked at the homeless veterans’ population, and how they deal with chronic diseases’ management. It was a noteworthy demonstration by these researchers that health information technology (HIT) holds a big hope for these homeless veterans in managing their chronic health issues if the planners and implementers of telehealth usually in the form of Care Coordination Home Telehealth (CCHT) properly address enrollment and engagement barriers.

Shaw et al. (2013) utilized a mixed-method study design in their evaluation of organizational factors that are associated with staff readiness for implementing and translating a primary care-based telemedicine behavioral program aimed at improving patients’ blood pressure control. The import of this study was to elicit staff support
without which no meaningful outcomes can be ascertained. Foreseeable negative organizational characteristics with the likelihood of influencing organizational readiness to change from this study were competition with existing programs, additional staff workload, the length of implementation, and limited availability of nursing personnel time. Each of these is a logical concern that must be carefully addressed if telehealth implementation will happen and productively so. Brewster, Mountain, Wessels, Kelly, and Hawley (2013) similarly conducted a mixed-method systematic review and concluded that lack of telehealth technology acceptance by key stakeholders represents a very critical barrier that must be dealt with appropriately. In any business arrangement, part of the strategic organizational architecture is gaining key stakeholders’ support for effective leveraging on so many fronts. Kohnke, Cole, and Bush (2014) concurred. The research team employed the unified theory of acceptance and use of technology (UTAUT) for understanding the behavioral intention of patients and clinicians in using the Henry Ford e-Home Health Care Telehealth equipment. Increased adoption of telehealth in healthcare systems has significant implications for reduction of costs and unnecessary emergency room visits/hospital readmissions (Kohnke, et al., 2014), but the research team emphasized the necessity of clinicians becoming key stakeholders in telehealth adoption. Providers’ support is essential for greater equipment utility to improve customer satisfaction in the areas of access and cost.

In a related study demonstrating the feasibility and safety of CVT, Morland, Hynes, MacKintosh, Resick, and Chard (2011) indicated the study participants reportedly showed considerably meaningful clinical symptoms reduction in their PTSD diagnosis. Feasibility and safety are core considerations in either the use or deployment of any new
treatment modality and with this study’s findings; it is deducible that these two requirements are not going to limit the use of telehealth in bringing needed health care services to the veterans wherever they are domiciled. Healthcare providers or practitioners out there who are still somewhat skeptical or ambivalent about telehealth advantages can glean from the results of studies like this to allay their legitimate concerns for optimal patient/veteran benefits.

Telehealth used for some medical specialties may be more difficult to evaluate. In a systematic literature review of home-based telehealth for two distinct specialties, pediatric and palliative care, Bradford, Armfield, Young, and Smith (2013) found that the effectiveness of telehealth intervention in these specialty areas are not easily determinable due to ethical issues and logistical factors. Greenhalgh et al. (2015) attempted to define telehealth quality using the Anchored, Realistic, Co-creative, Human, Integrated and Evaluated (ARCHIE) framework. Greenhalgh et al. (2015) did not doubt the importance of technological advances such as telehealth but called for a user-centered approach to design and delivery. Cason and Brannon (2011), supported telehealth’s use in medical rehabilitation professions but would like many pertinent legal and regulatory questions answered so that telehealth can be fully maximized. Farrar (2015) echoed the similar sentiment in the areas of ethics and laws as did Cason and Brannon (2011), especially when supplementing mental health care with telehealth technology.

**Telehealth technology and indirect cost factors at patient levels.** Many indirect costs are associated with seeking any level of healthcare services, particularly if one must travel a significant distance from one’s geographical location. Kvamme, Lie, Kvien, and Kristiansen (2012) viewed indirect costs as synonymous with productivity loss from not
only work absenteeism, but also health-related absence from one's means of livelihood causing loss of income and other tangible fiscal losses attributable to hours/days of commuting for seeking/receiving healthcare services. Extensive travel to obtain health care has been a major challenge for the veterans who live in remote rural American cities. Telehealth modalities hold the promise to help alleviate the burden of such indirect costs at the patient or societal levels. From a return on investment analysis Moore et al. (2013) indicated that telehealth’s costs appear to outweigh its financial merits and used a multi-attribute analysis revealed the out-performance of telehealth’s qualitative benefits over its associated costs that justified recommending continued funding of telehealth.

*Complex chronic conditions.* For certain complex chronic conditions, the use of home telehealth can reduce cost as well as mortality/morbidity, as Darkins, et al. (2015) demonstrated through a case study. Veterans suffering from various complex conditions became competent in self-management through home telehealth modalities. Documented cost savings resulted from reduced re-admissions, infrequency of emergency room visits, decreased hospital length of stays, and medication compliance levels that lowered pharmacy costs. Similarly, implementation of CVT technology was cost-effective and well received by the veterans from a retrospective review of CVT use data between 2011 through 2014 (Wennergren et al., 2014). During this period, CVT use saved the federal government almost $332,000, or roughly, 771,000 miles in travel savings for the affected veterans, which are economically significant in both ways.

Diabetes mellitus is one of the several chronic illnesses with an immense economic impact, according to the American Diabetes Association (2013) and the Centers for Disease Control and Prevention (2014). Zavala and Millan (2014) showed
that the intervention made possible through telehealth for a Hispanic population resulted in patient motivation for better disease management thereby reducing the emergence of known debilitating and expensive health complications. Diabetes can be the root cause of cardiac, renal, neurovascular, and ophthalmologic diseases.

Chronic heart failure is reported to have been associated with frequent re-hospitalizations primarily due to patient’s non-compliance with a required regime of care involving lifestyle modification and medications. Such an individual’s quality of life is marginal, but with telemonitoring, kinks in their care are easily detectable and promptly remedied thus preventing re-hospitalization, which makes symptom management more attainable with relative ease. In the case of older patients with heart failure, Spinsante (2014) demonstrated the home telehealth benefits of reduced costs, treatment adherence, and good care outcomes. Hines, Yu, and Randall (2010) corroborated this position through a study that affirmed that unplanned re-admissions alone cost Medicare more than $17 billion annually. Citing heart failure as the major culprit, Hines et al. (2010) recommended several strategies for reducing heart failure re-admissions; remote monitoring, a subset of telehealth services, stands quite prominently.

McGeary, McGeary, and Gatchel (2012) did a literature search for evaluating how telehealth technology use can affect access to pain management as well as its cost-effectiveness. They determined that telehealth does offer novel opportunities in every core aspect of pain management (assessment, consultation, and treatment) with higher levels of patient satisfaction in comparison to in-person care services. It was also commendable that they emphasized a myriad of clinical outcomes, which contribute to telehealth savings. Morland et al. (2013) emphasized the need to examine such indirect
cost factors at the patient levels further to include family burden, time, lost wages, travel costs and quality of life after having shown that CVT is a cost-reducing means of psychotherapy delivery to rural combat veterans diagnosed with PTSD.

In a retrospective chart review of urology care, a rare specialty among U.S. veterans, 95% to 97% of patients who received services through telemedicine ranked their satisfaction from very good to excellent (Chu, Boxer, Madison, Kleinman, Skolarus, et al., 2015). The researchers noted the successful and safe utilization of telemedicine in both evaluation and treatment of a wide range of urologic conditions among these veterans. In the charts reviewed, Chu et al. (2015) reported savings accrual to the participating patients included 277 travel miles, 290 travel minutes, $67 in travel expenses and $126 attributable to lost opportunity cost. Overall, patients were reported to have been saved almost 5 hours and approximately $193 per visit. These tremendous savings could incentivize many other veterans who are averse to telehealth.

To deliver specialized neurologic care, Davis, Coleman, Harnar, and King (2014) used a telehealth modality called teleneurology for some veterans living in remote New Mexico, southern Colorado, eastern Arizona, and western Texas locations, with 90% expressing full satisfaction, 92% feeling that they saved both time and money. The most impressive tangible savings Davis et al. reported were mean time savings of 5 hours, 325 travel miles and nearly $48,000 in total cost savings. Following a similar trend in another uncommon medical specialty, Silva, Cavallerano, Tolls, Omar, Thakore, et al. (2014) demonstrated a high potential for ultrawide field retinal imaging to improve the efficiency of ocular telehealth programs that evaluate diabetic retinopathy and diabetic macular edema.
Cost savings for patients and society. Davalos, French, Burdick, and Simmons (2009) attempted to perform an economic evaluation of telemedicine by reviewing the literature focusing on the benefit-cost analysis to capture effectively, the range of economic costs and benefits associated with such services for providing credible and comparative evidence of each program's economic viability. The intent of all these was to carve out, adopt and expand the most successful of all telehealth programs. Spielberg et al. (2014) explored e-Services (eSTI) for the prevention, diagnosis, and treatment of sexually transmitted infections (STIs) and succeeded in showing that when fully integrated, an eSTI system will potentially increase diagnosis and treatment of STIs causing higher patient satisfaction at a much-reduced cost. The finding may be significant because “there are 20 million new STI cases per annum in the US costing a whopping $16 billion in direct medical care costs” (CDC, 2013, para. 2).

Newman and McMahon (2011) concluded that there is a high savings potential from telehealth use especially in the management of chronic diseases, which could also extend to the acute care arena over time. Analysts at the Center for Connected Health Policy (2014) collated some cost efficiencies attributable to telehealth technology between 2007 and 2014, and they were exponentially huge. Examples of the cost-efficiencies follow:

- A telephone disease management program for congestive heart failure (CHF) patients operated by Catholic Health West is known as Congestive Heart Active Management Program (CHAMP), cut hospital re-admission rates by up to 85% in 2011, as reported in The Sacramento Bee, January 30, 2011.
• According to the California Legislative Analyst's Office (2006), the California Department of Corrections and Rehabilitation offered a little over 9,000 telehealth inmate consultations thereby saving taxpayers roughly $4 million in both security and transportation costs.

• In North Dakota, approximately $12 million was contributed to the local economy just by having pharmacists supervise technicians in other locations provide medication dispensing by synchronous video teleconferencing. The source of the data was North Dakota State University, North Dakota Telepharmacy Project, 2012.

• An intensive care unit's telemedicine program at a California community hospital was reported in *Telemedicine Journal and e-Health*, (2004) to have generated a sum of $388,000 for the hospital just because they could keep the children rather than transport them elsewhere for care.

There is no doubt that telehealth carries the potential to offer decent direct and indirect cost savings at both patient and societal levels which must be explored at the rural veterans' domain as they influence access to quality healthcare services being provided by the VHA. Although, few dissenting researchers have argued that the cost savings attributable to telehealth might not be significant to justify its investment. Dinesen et al. (2012) concluded that a difference of 1115 Dutch Mark (DM) savings between intervention and control groups was not significant enough owing to several variables.

**Research instrument PSQ-18.** The PSQ-18 questionnaire was chosen to collect information on aspects of patient satisfaction from the sample population. Researchers
have used this instrument in other studies to gauge patient satisfaction. This instrument came out of prior research (Marshall & Hays, 1994), and had been abbreviated from a much larger questionnaire; however, maintains its internal consistency and reliability. Thayaparan and Mahdi (2013) described PSQ-18 as a valid, adaptable, reliable and reproducible questionnaire that possesses great potential for use in several different clinical settings. It has the added benefits of good reception by many patients due to its brevity. Chander et al. (2011) demonstrated the importance of patient satisfaction as the key driving treatment and care planning alongside formulating practice guidelines using PSQ-18 questionnaire. Ziaei, Katibeh, Eskandari, Mirzadeh and Rabbanikhah (2011) corroborated the validity of PSQ-18, as well and reported patients’ overall satisfaction with evaluating accessibility and technical quality to healthcare services.

**Quantitative causal-comparative methodology.** The best research methodology for testing objective theories when examining the relationship or interrelationship and differences between several variables needs consideration and quantitative causal-comparative design fits perfectly. Ingham-Broomfield (2012) provided insight into various aspects of conducting quantitative research. Through quantitative research, one may either accept or reject hypotheses involving theories, defining the differences and describing the relationship between direct and indirect variables. Furtado, Batista, and Silva (2011) used a quantitative, descriptive, inferential, and correlational method to assess leadership behaviors but the descriptive causal-comparative study will help delineate the differences among study variables. This lends credence to the choice of the latter research methodology by Al Shannag, Tairab, Dodeen and Abdel-Fattah (2013)
who attempted to determine the cause or reason for the existing differences in students’ achievements between two countries. Causal-comparative studies examine the differences between dependent and independent variables (Gharashi, Sarandi & Farid, 2012; Kahaki, Nazari & Khosravi, 2014; Allajegardi, Sarabian & Asgharipour, 2015).

**Summary**

The purpose of this non-experimental quantitative causal-comparative research study was to examine the differences in patient satisfaction experiences of active duty, reserve and retired military personnel with telehealth technology and different dependent variables of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. Using a purposive or purposeful non-probability sampling technique (van Hoeven, Janssen, Roes, & Koffijberg, 2015) that drew 103 responses from the PSQ-18 online survey hosted on www.SurveyMonkey.com between December 2015 and February 2016. Two hundred survey requests were sent out and with the use of PSQ-18 questionnaire; this researcher analyzed the data obtained and was able to demonstrate that there were varying degrees of differences in the patient satisfaction experiences reported by active-duty, reserve and retired military personnel and the indirect variables as identified in this research study. The demonstrated differences found a foundational basis in some of the literature reviewed for this study. The next chapter provides details of the research methodology, research design, study population, sampling technique, reliability, validity, data collection procedure/s, data analysis and finally, ethical considerations. The study's assumptions, limitations, and delimitations will be discussed in-depth.
Chapter 3: Methodology

Introduction

The purpose of this non-experimental quantitative causal-comparative research study was to examine the differences in patient satisfaction experiences of active duty, reserve and retired military personnel with telehealth technology and different dependent variables of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. The data collection instrument was a valid, reliable and adaptable, patient satisfaction questionnaire, PSQ-18 (Thayaparan & Mahdi, 2016; Vrijhoef et al. 2009; Chander et al. 2011) and obtained from RAND Health Corporation for the purpose of measuring the dependent variable of patient satisfaction of interested veterans within VAHCS telehealth services. The survey was administered online between December 2015 and February 2016.

The motivation for the study was to decrease the impact on U.S. military veterans’ limited healthcare access through the introduction of telehealth technology as an evolving method of healthcare delivery to patients living in remote rural American locations. The specific approach was to describe the differences in patient satisfaction experiences of active duty, reserve and retired military personnel with telehealth technology in terms of overall patient satisfaction, healthcare access, and indirect cost factors or return on investment at patient level as recommended by Morland et al. (2013). The economic advantages accruing to the veterans enrolled in telehealth services and society through institutional efficiencies could be realized by motivating use of telehealth
technology for those groups of veterans who have not been using any array of services available to them through the VHA’s different telehealth modalities.

The study was predicated on a core theoretical framework applicable to the value of information technology Hammer and Mangurian (1987) coined as “Impact/Value” and adjunctively, cost-benefit analysis (CBA). Owing to the complex nature of telehealth technology, the choice of study design reflects the inherent capability of correlation to offer a useful interpretation of the impact/value and cost-benefit of telehealth technology to the recipients and providers of this growing healthcare delivery phenomenon.

Examination of the differences in patient satisfaction experiences of active duty, reserve and retired military personnel with the use of telehealth technology in terms of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience was possible by performing parametric t-tests or non-parametric Mann-Whitney U test among identified variables.

**Statement of the Problem**

U.S. veterans living in remote rural areas are said to be having trouble getting access to healthcare (either regular or specialty services), and when they sometimes do get access or access any of the offered healthcare services, it has often come at a cost both for them and the DVA. It was unknown what differences existed between the patient satisfaction experiences of active duty, reserve and retired military personnel with telehealth technology in terms of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality,
interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience at patient level in smaller VAHCS.

Elnitsky et al. (2013) identified some of the barriers to veterans’ healthcare access as prolonged wait-times and distance to many of the DVA facilities or medical centers, as they are famously known, thereby suggesting further studies of actionable factors that may likely mitigate these barriers. Just as Morland et al. (2013) identified such research gaps as indirect cost factors at patient and societal levels, the focus of the study was on the potential of telehealth services to reduce or eliminate such barriers to healthcare access. Patient-level costs include quality of life, travel, time, family burden, incidental lodging, and increased stress. Societal or institutional levels include productivity, lost taxes/earnings, out-of-network service provider costs, and insurance, among other costs.

**Research Question(s)**

The researcher attempted to proffer answers to the following questions and test the corresponding hypotheses:

RQ1: What is the difference between the patient satisfaction experience of military personnel who were or have been on active duty longer (over 6 years) and those who served or have served for fewer years?

H10: Military personnel who were or have been on active duty longer (over 6 years) will report no more or less patient satisfaction with telehealth technology than those who served or have served for fewer years.

H1A: Military personnel who were or have been on active duty longer (over 6 years) will report more or less patient satisfaction with telehealth technology than those who served or have served for fewer years.
RQ2: What is the difference between the patient satisfaction experience of military personnel who were or have been on reserve duty longer (over 3 years) and those who have been on reserve for fewer years?

H20: Military personnel who were or have been on reserve duty longer (over 3 years) will report no more or less patient satisfaction with their healthcare access than those who have been on reserve for fewer years.

H2A: Military personnel who were or have been on reserve duty longer (over 3 years) will report more or less patient satisfaction with their healthcare access than those who have been on reserve for fewer years.

RQ3: What is the difference between the patient satisfaction experience of military personnel who are still on active duty with telehealth technology and those who are retired or separated from the military?

H30: Military personnel who are still on active duty will report no more or less patient satisfaction with their healthcare than those who are retired or separated from the military.

H3A: Military personnel who are still on active duty will report more or less patient satisfaction with their healthcare than those who are retired or separated from the military.

**Research Methodology**

Quantitative research methods or designs rely on collecting, measuring and analyzing numerical data objectively using statistical procedures (Leedy & Ormrod, 2010). The essential purpose of conducting a quantitative study is to examine the existence of relationships or determine differences between different variables. In the
study of access to VAHCS health care through telehealth technology, the capture of respondents’ demographic data and other research data occurred with the use of a PSQ-18 questionnaire as the validated quantitative research instrument. A quantitative causal-comparative research methodology about telehealth technology formed the groundwork for this study because this allowed the researcher to examine the differences between dependent and independent variables. The independent variables were years of activity in the military, years of reserve service, and separation situation and dependent variables were overall patient satisfaction as measured by the seven different subscales of the PSQ-18 which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience.

Yilmaz (2013) defined quantitative research as that type of research, which explains a phenomenon based upon derived numerical data analyzed through mathematically based methods. In a broader sense, quantitative research is a type of research conducted empirically into a given social phenomenon or human problem through testing a theory or theories that consist of variables which can be measured numerically and analyzed statistically to determine if the theory will explain or predict the phenomenon of interest. Cooper and Schindler (2011) defined quantitative research as any attempt to offer a precise measurement of something such as consumer behavior, knowledge, opinions, or attitudes. In causal-comparative quantitative research, one measures the extent to which differences in one study characteristic or variable are related to those in one or more other characteristics or variables (Leedy & Ormrod, 2010).
Singh et al. (2011) stressed the higher frequency and claimed superiority of quantitative studies in health services research despite the growth of qualitative methods for exploring emerging issues and events in a natural context. These authors examined how rural public health institutions can adopt telehealth innovations sustainably. In the VA health care access and indirect costs study, availability of a valid quantitative data measurement instrument was a consideration in choosing the quantitative causal-comparative research design. Considering the characteristics and benefits of the quantitative research method in health services research compared to qualitative and mixed methods, a descriptive causal-comparative study design became imperative.

Telehealth technology as a healthcare delivery phenomenon is still seen as an emerging modality in this relational context and thus can be best studied by a quantitative methodology rather than a qualitative method. Employing a mixed-method would not have sufficed because the phenomenon of telehealth technology alongside the required sample selection process would lack a balanced array of judgmental and analytical tools or techniques required of both quantitative and qualitative methods (Thamhain, 2014). Neither qualitative nor mixed-method would have been adequate for conducting this study owing to such factors as sampling procedures. In quantitative studies, researchers can use randomized sampling for selection bias control and generalizability, which seems to offer better validity than a nonrandomized sample and is a desirable attribute of any sound research endeavor by most standards. However, certain events will prevent the use of randomized probability sampling and at such times, purposive or purposeful sampling can offer similar benefits (van Hoeven et al. 2015).
In effect, there was no place for either qualitative or mixed-methods design because the intent of this study was to test two different hypotheses aimed at establishing facts or designating and distinguishing if any relationships exist between the study variables that are integral in this specific context. Leedy and Ormrod (2010) lent credence to applying a quantitative approach by stating that qualitative studies are exploratory and leave room for more than one view and interpretation of reality. This characteristic precludes conducting a qualitative or mixed method approach in a study to test discrete hypotheses (Leedy & Ormrod, 2010). What such distinctions summarily imply is that neither a qualitative method nor mixed-methods would have been appropriate for the VAHCS healthcare access and indirect costs’ study.

Research Design

This research study involved the use of a causal-comparative design, which investigated the differences in patient satisfaction experiences of active duty, reserve and retired military personnel with years of activity in the military, years of reserve service, and separation situation as the independent variables, and the different dependent variables of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. A causal-comparative design is a form of descriptive quantitative research for investigating possible differences existing among different variables (Leedy & Ormrod, 2010). This study consisted of using parametric statistical testing with t-tests or nonparametric statistical testing with Mann-Whitney $U$ test in analyzing numerically measurable survey data to assist in either accepting or rejecting the study’s hypotheses.
There is no doubt about the validity of this design since Leedy and Ormrod (2010) wrote that causal-comparative studies are valid statistical methods utilized in investigating variables in the natural sphere without the inclusion of the researcher’s imposed treatment. Oliver and Mahon (2005) wrote that parametric statistical methods are more stringent and a \( t \)-test is superior to a Mann-Whitney \( U \) test because it is a parametric statistic. With parametric statistics, researchers can make conclusions about the population from which the sample is drawn. In this case, it means one can make conclusions about all U.S. military personnel based on the results found in this study sample. With nonparametric statistics, such as the Mann-Whitney \( U \) test, researchers can only talk about differences that they find in their studies, but cannot say what they found has any bearing on what they might find in another sample of U.S. service personnel.

Hoskin (2013) supported the decision of this researcher in not choosing parametric \( t \)-tests over nonparametric tests like Mann-Whitney \( U \) test because nonparametric tests are often generally less statistically powerful than the analogous parametric procedure when working with truly approximately normal data. Similarly, nonparametric tests have an associated drawback of reduced ease of result interpretation when compared with parametric tests. Lastly, many nonparametric tests such as Mann-Whitney \( U \) test use mean rankings of the values in the research data rather than the actual data.

This researcher employed an electronic survey instrument that facilitated the collection of research data. SurveyMonkey.com was the data collection-hosting platform through which the survey instrument PSQ-18 obtained with permission from RAND Health was administered. SurveyMonkey™ is reputable for ensuring data security and
ease of collection because the online service provided the researcher with sole
administrative access to the survey website for timely monitoring, data tracking, and
control purposes. Marshall and Hays (1994) modified the originally developed PSQ-18©
to a 5-point Likert-type scale survey instrument, which was reprinted for this study from
the RAND Corporation, the copyright holder. RAND’s permission to reproduce the PSQ-18 survey is not an endorsement of the products, services, or other uses in which the
survey appears or is applied. All the RAND Health surveys and tools are public
documents available without charge, but require an appropriate citation for their use. No
further permissions are necessary, according to email correspondence from a RAND
Health representative (see Appendix A).

**Population and Sample Selection**

The researcher used non-probability purposive or purposeful sampling for this
research study because the participants were selected for a particular purpose (van
Hoeven et al., 2015). Purposive or purposeful non-probability sampling is a sampling
method that is appropriate when the research participants must meet the requirements of a
particular reason or purpose ensuring equal and representativeness of chosen sample
(Leedy & Ormrod, 2010). Although, probability randomized sampling is considered the
gold standard for quantitative research but certain exceptions will make it non-feasible
(van Hoeven et al. 2015). Therefore, a method of purposive or purposeful sampling that
allowed the recruitment of a specific target population with both equal chances of
selection and representativeness, which, in this case, is the U.S. veteran, serving or retired
was appropriate. Another criterion of the population is military members or veterans who
either have used or are using any of the telehealth technological modalities for receiving
health care services from any of the VHACS facilities located in VISN 4, which is comprised of facilities in Delaware, Pennsylvania, and West Virginia as of FY 2014.

To determine the appropriate sample size for inferential testing, a researcher must conduct a power analysis. Using a power analysis approach, a researcher evaluates three items: statistical significance, statistical power (β), and the effect size. Statistical significance, also known as the alpha (α), is normally set to .05 to avoid a Type 1 error (Cohen, 1988). Statistical power is normally in social science research to no less than four times the alpha (4 x .05 = .20). This value is then subtracted from 100, and identifies the risk a researcher is willing to take to avoid a Type II error. Finally, the effect size is based on prior research. However, due to the small population and expected low response rate, the researcher anticipated obtaining only 100 samples. Using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009), an α = .05, a β = .80, and an estimated N of 100 (50 for each group), a sensitivity analysis identified that the researcher could only identify an effect size of $d = .58$ (Cohen, 1988) (Figure 1).
Figure 1. G*Power Calculation of Sensitivity Analysis

Rejecting a null hypothesis with a lower effect size could result in Type II error.

Sources of Data

Data were collected from participants recruited using four sources. After sharing the SurveyMonkey.com survey link randomly with veterans that the researcher had had professional interaction, those individuals, in turn, shared the link with other veterans they knew who use telehealth technology. The researcher also sought and received
electronic permission from the owner of a veteran Social Media (SM) group, The Veteran’s Den operating on the LinkedIn professional networking website through which the survey link was shared broadly. Other sources of data for this research were local Veteran Service Organizations like the American Legion by sharing the research link with the key organization officials who in turn, helped with forwarding to their eligible members.

The PSQ-18 questionnaire measured the dependent variable of patient satisfaction with medical care. It measures seven different subscales:

- General satisfaction
- Technical quality
- Interpersonal manner
- Communication
- Financial aspects
- Time spent with the doctor, and
- Accessibility and convenience.

Each subscale is measured by specific questions; some of which are reverse scored to negate purposefully negatively worded questions. (Appendix D). Higher scores indicate greater patient satisfaction.

**Validity and Reliability**

Developers of the PSQ-18 questionnaire, the instrument used in conducting this quantitative causal-comparative research study, established the instrument’s validity and reliability (Marshall & Hays, 1994); and Thayaparan and Mahdi (2013) corroborated this. The sub-scale scores have been demonstrated to substantially correlate with their full-
scale counterparts by possessing generally adequate internal consistency reliability. Marshall and Hays (1994) showed that the magnitude of the correlation coefficients and the overall pattern of correlations among PSQ-18 sub-scales are highly similar to those observed for similar types of instruments, such as the PSQ-III, with proven validity and reliability. RAND Health is a reputable organization that has used this and other tools in conducting several patient satisfaction surveys for both private and public healthcare entities over the years such as the Zonal hospital, Hamirpur, India (Chander et al., 2011) and others across the U.S. to include the VHA (Rand Corporation, 2016). The researcher could match research instrument’s relevant subscales to the identified variables. Factor analysis is a collection of methods useful in the examination of how underlying constructs influence the responses on several measured variables (DeCoster, 1998). Since PSQ-18 is a validated, adaptable, and reliable instrument, there is no need for reproducing the results that had already been determined by the subscale structure of this instrument.

Data Collection Procedures

Survey Monkey™ is a popular online survey service provider for all kinds of consumer and academic research. Through this platform, the researcher developed a questionnaire that contained the survey instrument PSQ-18, a statement of participant’s consent and eligibility, and a description of the research study. The survey link was posted with permission to the LinkedIn professional networking website The Veterans Den. This group had 349 members at the time of participant recruitment, and each of the members eligible to participate in the study directly accessed the survey link from a computer after logging onto the website. The researcher also networked with veteran
service organizations like the American Legion and individual veterans with whom he has had professional interactions to share the survey link through their personally provided email addresses.

**Data Analysis Procedures**

The researcher downloaded the collected data from the Survey Monkey™ website into a Statistical Package for the Social Sciences (SPSS) file and performed a test of difference. Data provided by the validated 99 participants who successfully completed the PSQ-18 questionnaire were included in the sample. Participants’ data were carefully examined for any form of data corruption, omission, or loss.

Demographic data that included respondents’ branch of military service, years of active or reserve military services, education, race, and marital status also, were tabulated as appropriate and characterized in descriptive statistical format. Descriptive statistics were used to summarize the demographic information and the study variables. The study variable is the patient satisfaction experience of military personnel which has seven different subscales which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience. Central tendency measures of mean and standard deviation were obtained to summarize the data of the continuously measured study variables. Frequency and percentage summaries were used to summarize the categorically measured variables.

Reliability testing of the responses in the 18-item PSQ-18 survey instrument was tested using Cronbach’s alpha statistic. The Cronbach’s alpha statistic tests the internal consistency reliability of the data. The Cronbach’s alpha statistic should be at least 0.70 to show acceptable internal consistency reliability. The Cronbach’s alpha statistic of each
of the seven different subscales which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience to measure patient satisfaction experience were obtained and the overall reliability of the 18-item instrument. The entire instrument’s Cronbach alpha value was 0.928

The minimum and maximum values of the study variable were generated to investigate the presence of outliers in the data set. The minimum and maximum values represent the range of possible responses to the survey responses. Outliers should be removed in the data set prior to the actual statistical analysis. This has a negative effect on the results of the statistical analysis.

The quantitative data were analyzed using test of difference to determine whether there were significant differences in the patient satisfaction experience of military personnel based on their years of activity in the military, years of reserve service, and separation situation. Prior to the test of difference, normality testing was conducted on the data of the different study variables. It is a requirement of a parametric statistical test of an independent t-test of difference that the data should exhibit a normal distribution. Investigation of the normality distribution was conducted by running Kolmogorov-Smirnov test. If the data of the study variables are normally distributed, then the parametric statistical test of independent t-test was conducted. If the data of the study variables are not normally distributed, instead the nonparametric statistical test of Mann-Whitney U test was conducted.
Ethical Considerations

The researcher fulfilled all the requirements for obtaining approval of the Columbia Southern University Institutional Review Board before beginning to collect any research data. A sample of the online survey is attached, which contains consent provisions, a description of the study, and whom to contact in case the respondents had any concerns or questions about the research study. The anonymity of participants and their individual responses were carefully guarded in accordance with standard research protocols. Upon completion of this research study, the data collected remains secured and stored by the researcher for a period not less than 7 years. None of the respondents received any form of compensation or honorarium for participating in the study to prevent any kind of bias or skew their accurate responses to the survey.

Research integrity was made integral by ensuring privacy, safety, security and confidentiality of all participants while respecting the participants’ exclusive rights, needs, values, and desires. Under no guise were any of the participants coerced, induced, or threatened as each of them was constantly reminded that participation was voluntary. Results of the study will be disseminated in accordance with standard reporting guidelines. The three core ethical principles of respect for persons, beneficence, and justice, according to the Belmont Report, formed the ethical fulcrum of this study.

Limitations

Due to being a student researcher with very limited time to deliver without ready access to research grants, it was very challenging to surmount many obstacles that evolved during the research process; obstacles paralleling limitations Leedy and Ormrod
(2010) emphasized. Limitations of this quantitative causal-comparative study included the following:

- Data were obtained from a small population of veteran respondents.
- The relative naivety and inexperience of this researcher was a constant throughout the research process.
- Time, budgetary constraints, and other uncontrollable exigencies like the researcher’s impending military deployment were critical limiting factors.
- Lack of anticipated support for recruiting participants from the agency tasked with taking care of the veterans constituted a major and almost defeating limitation. Barriers to sampling and data collection arose from a sudden policy change in late 2014 severely curtailing student researchers’ ability to conduct research. The result was an inability to initiate the study much earlier and attract more participation with a smaller margin of error as anticipated in the original research plan.
- The final and most important limitation was the inability of this researcher to wield any control over the survey respondents’ biases or attitudes toward the survey items.

**Summary**

To measure patient satisfaction with telehealth services in the VAHCS, a quantitative causal-comparative design to test the three hypotheses was chosen. In contrast to qualitative or mixed method designs, determining differences with statistical analysis of numerical data from the PSQ-18 questionnaire could be applied to answering the three research questions. Neither qualitative approaches, which can account for
multiple interpretations of experience, nor mixed methods, which requires a qualitative component, was suitable to fulfill the purpose of the study.

The need was to statistically show the differences between the independent variables are years of activity in the military, years of reserve service, and separation situation and the different dependent variables of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which includes general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. The data collection plan involved recruitment of a purposive sample of 99 or more participants who were veterans or current service members eligible to receive VA health care services. Data collection occurred through the online administration of a RAND Health quantitative survey instrument entitled the Patient Satisfaction Questionnaire-18 (PSQ-18). Survey developers previously established the validity and reliability of the instrument (Marshall & Hays, 1994) and other users had demonstrated its reliability, validity, and adaptability.

The highest ethical standards for the protection of human subjects in research was followed in obtaining informed consent and maintaining the confidentiality of data, including secure storage of all research records for seven years after study completion. Data analysis involved descriptive statistics, and parametric t-test or nonparametric Mann-Whitney U test for determining the differences in patient satisfaction experiences of active duty, reserve, and retired military personnel with the independent variables and each of the different dependent variables. Limitations of the study stemmed from challenges to the recruitment of potential participants because of a VHA policy change that exacerbated time constraints and restricted resources.
Chapter 4: Data Analysis and Results

Introduction

Despite the growth of telehealth services for remote delivery of healthcare, it is unknown whether there are differences in patient satisfaction experience of active duty, reserve, and retired military personnel in terms of overall satisfaction, veterans’ health care access and offers VHA patients some economic benefits compared to physical presence to receive healthcare. Using a quantitative causal-comparative design, the purpose was to determine the differences in patient satisfaction experiences of active duty, reserve and retired military personnel with use of telehealth technology in terms of overall patient satisfaction, veterans’ health care access in the smaller VAHCS, and the indirect cost factors or ROI at patient level as perceived by veterans eligible for services. The final sample size was 102 representing 51% aggregate response rate, and the survey respondents were male and female U.S. military veterans, still serving in active duty, reserve and/or retired who were at least 18 years old. Chapter 4 describes the result and analysis using descriptive statistics and Mann-Whitney U test to address the research objectives of the study. The following research questions and hypotheses guided the study:

RQ1: What is the difference between the patient satisfaction experience of military personnel who were or have been on active duty longer (over 6 years) and those who served or have served for fewer years?

H1a: Military personnel who were or have been on active duty longer (over 6 years) will report more or less patient satisfaction with telehealth technology than those who served or have served for fewer years.
H1\(_0\): Military personnel who were or have been on active duty longer (over 6 years) will report no more or less patient satisfaction with telehealth technology than those who served or have served for fewer years.

R2: What is the difference between the patient satisfaction experience of military personnel who were or have been on reserve duty longer (over 3 years) and those who have been on reserve for fewer years?

H2\(_a\): Military personnel who were or have been on reserve duty longer (over 3 years) will report more or less patient satisfaction with their healthcare access than those who have been on reserve for fewer years.

H2\(_0\): Military personnel who were or have been on reserve duty longer (over 3 years) will report no more or less patient satisfaction with their healthcare access than those who have been on reserve for fewer years.

R3: What is the difference between the patient satisfaction experience of military personnel who are still on active duty with telehealth technology and those who are retired or separated from the military?

H3\(_a\): Military personnel who are still on active duty will report more or less patient satisfaction with their healthcare than those who are retired or separated from the military.

H3\(_0\): Military personnel who are still on active duty will report no more or less patient satisfaction with their healthcare than those who are retired or separated from the military.

The remainder of the chapter is organized by a discussion of the sample demographics, descriptive statistics, data screening and analysis, and a summary of the
research results related to each research question and hypothesis. IBM®SPSS® Statistics Version 22 was utilized to conduct the data analysis. This chapter presented the summary of the results of the analysis to address the different objectives of the study.

**Descriptive Data**

One hundred and three (103) participants completed the survey instrument. This represents a 50.5% response rate. Four participants’ responses were voided because the individuals failed to respond to the request for informed consent, leaving a sample of 99 records. After identifying those data that participants provided with accurate, informed consent, the researcher, being the only person with authority to access the data, downloaded all eligible data from the online hosting platform to the researcher’s personal computer for storage and security. The final step in data collection was immediately to purge the survey data from hosting site. Of the 99 records, seven were excluded because they did not contain responses to all survey items. As a result, 92 responses were used for this study.

Demographics consisted of a branch of military service, duty type, years in service; race, marital status, and education (see Tables 2 and 3). Respondents’ service membership showed a fair representation of each of the major service branches in this research study implying that the character of the veteran population nationwide was adequately represented. However, most the samples of military personnel were in the Airforce or Army. More than half of the current pay grade or pay grade at the separation of the samples of military personnel were in the range of E-4 to E7. For the separation situation, most the military personnel were retired or separated from the military. Among these samples of military personnel that was retired or separated from the military were
retired, and were on voluntary separation at the end of enlistment. More than half of the samples of military personnel have served or have served for fewer years (6 years or less). More than half of the samples of military personnel were or have been on reserve duty longer (over 3 years).

For ethnicity, the majority of the samples of military personnel were African-American. For marital status, more than half of the samples of military personnel were married. For highest education level completed at the time of separation, the highest frequencies were some college followed by Bachelor.

Table 2.

*Frequency and Percentage Summaries of Categorically Measured Demographic Information*

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<th>Service the respondent separating or have separated</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
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<td>AIR FORCE</td>
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<table>
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<th>Percent</th>
</tr>
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</tr>
<tr>
<td>E-2</td>
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<td>1</td>
</tr>
<tr>
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<td>------------</td>
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<td>1</td>
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<tr>
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<td>Missing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>AFRICAN-AMERICAN</td>
<td>42</td>
<td>41.2</td>
</tr>
<tr>
<td>ASIAN</td>
<td>10</td>
<td>9.8</td>
</tr>
<tr>
<td>HISPANIC / LATINO</td>
<td>9</td>
<td>8.8</td>
</tr>
<tr>
<td>NATIVE HAWAIIAN / PACIFIC ISLANDER</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>WHITE</td>
<td>36</td>
<td>35.3</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Black- non-African American</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Multiracial</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>DIVORCED</td>
<td>9</td>
<td>8.8</td>
</tr>
<tr>
<td>MARRIED</td>
<td>62</td>
<td>60.8</td>
</tr>
<tr>
<td>NEVER MARRIED</td>
<td>27</td>
<td>26.5</td>
</tr>
<tr>
<td>SEPARATED</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 3.

Descriptive Statistics of Continuous Variables

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total years of active duty service</td>
<td>100</td>
<td>0</td>
<td>32</td>
<td>7.95</td>
<td>7.54</td>
</tr>
<tr>
<td>Total years of reserve service</td>
<td>99</td>
<td>0</td>
<td>30</td>
<td>7.10</td>
<td>8.15</td>
</tr>
</tbody>
</table>

Data Collection and Analysis Procedures

The period of data collection was from December 2015 through early February 2016, and once the researcher reached the recommended data milestone, further data collection was halted. The researcher collected data from 102 out of 200 participants through the online hosting platform Survey Monkey™ and verified for receipt of respondents’ informed consent to participate. The next steps were downloading and exporting the collected data from Survey Monkey™ and transferring data into SPSS file
used in performing parametric statistical t-test analysis or nonparametric Mann-Whitney U test.

The data collection instrument was the Patient Satisfaction Questionnaire-18, which the researcher obtained with permission from RAND Health Corporation. Selected for its direct relevance to the research questions and hypotheses, the PSQ-18 contained items measured on a 5-point Likert-type scale that facilitated analysis of (a) technical quality of telehealth technology, and (b) financial aspects, accessibility/convenience for access, and indirect cost factors at the patient level. These subscales identified with all the variables under study.

Descriptive Statistics Analysis of Study Variables

This section describes the descriptive statistics of the scores on the study variables of the dependent variables of patient satisfaction experience of military personnel which has seven different subscales which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience. The descriptive statistics include the mean and standard deviation (Table 4).

Table 4.

Descriptive Statistics of Study Variables

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Satisfaction</td>
<td>102</td>
<td>2.94</td>
<td>0.52</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>102</td>
<td>2.94</td>
<td>0.46</td>
</tr>
<tr>
<td>Interpersonal Manner</td>
<td>102</td>
<td>2.76</td>
<td>0.47</td>
</tr>
<tr>
<td>Communication</td>
<td>102</td>
<td>2.90</td>
<td>0.65</td>
</tr>
<tr>
<td>Financial Aspects</td>
<td>102</td>
<td>2.99</td>
<td>0.56</td>
</tr>
<tr>
<td>Time Spent with Doctor</td>
<td>102</td>
<td>3.02</td>
<td>0.48</td>
</tr>
<tr>
<td>Accessibility and Convenience</td>
<td>102</td>
<td>2.87</td>
<td>0.50</td>
</tr>
</tbody>
</table>
Reliability Analysis

The first step in the data analysis process is to evaluate the reliability of the survey instrument. Before this could happen, the researcher needed to reverse code several questions. Reverse coding is necessary when a question is negatively worded (Weems & Onwuegbuzie, 2001). Appendix D provides a list of which questions were reverse coded by instrument subscale.

Once reverse coding was completed, the researcher calculated the Cronbach’s alpha as $\alpha (N = 92) = .930$. This value exceeds the normally acceptable value for social research as described in Chapter 3. As a result, the instrument was considered reliable. Since subscales would be used for inferential testing, a reliability analysis was also conducted of these values (Table 5).

Table 5.

Reliability Results of PSQ-18 by Subscale

<table>
<thead>
<tr>
<th>Subscale</th>
<th>$\alpha/n$</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Satisfaction</td>
<td>0.58 (98)</td>
<td>2</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>0.74 (97)</td>
<td>4</td>
</tr>
<tr>
<td>Interpersonal Manner</td>
<td>0.69 (99)</td>
<td>2</td>
</tr>
<tr>
<td>Communication</td>
<td>0.38 (98)</td>
<td>2</td>
</tr>
<tr>
<td>Financial Aspects</td>
<td>0.56 (99)</td>
<td>2</td>
</tr>
<tr>
<td>Time Spent with Doctor</td>
<td>0.73 (99)</td>
<td>2</td>
</tr>
<tr>
<td>Accessibility and Convenience</td>
<td>0.68 (99)</td>
<td>4</td>
</tr>
</tbody>
</table>

As shown in the table, only two subscales met the minimum level for acceptable reliability: Technical Quality and Time Spent with Doctor. The remaining scales were below the threshold for reliability and could influence inferential testing.

Test of Outliers

Outliers can influence the mean and dispersion of the distribution (Liu, Jezek, &
O’Kelly, 2015). A boxplot was used to identify potential outliers for each subscale (Figure 2).

![Boxplot of PSQ-18 Subscales](image)

**Figure 2. Boxplot of PSQ-18 Subscales**

As shown in Figure 2, three records were identified as potential outliers. After investigation of each record, no pattern of participants’ fatigue or disinterest could be discerned, and these records remained in the study for subsequent evaluation.

**Test of Normality**

The Kolmogorov-Smirnov (K-S) test for normality was used to evaluate the continuous variables. The implied null hypothesis for this test is that a distribution of a
variable will follow a normal distribution if the $p$-value is $> .05$. The resulting K-S test statistic ($D$) for each subscale showed that none of the values followed a normal distribution ($p < .01$) (Table 6).

Table 6.

Results of K-S Test of Normality

<table>
<thead>
<tr>
<th>Subscale</th>
<th>$D$</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Satisfaction</td>
<td>0.26</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>0.22</td>
</tr>
<tr>
<td>Interpersonal Manner</td>
<td>0.18</td>
</tr>
<tr>
<td>Communication</td>
<td>0.24</td>
</tr>
<tr>
<td>Financial Aspects</td>
<td>0.20</td>
</tr>
<tr>
<td>Time Spent with Doctor</td>
<td>0.30</td>
</tr>
<tr>
<td>Accessibility and Convenience</td>
<td>0.22</td>
</tr>
</tbody>
</table>

$df = 99$, Sig. $< .01$

As a result, the non-parametric Mann-Whitney $U$ test would be used for inferential testing.

Results

Active Duty and Patient Satisfaction. The first research question focused on whether military personnel who were or have been on active duty longer than six years would report more satisfaction with their healthcare than those who served or have served for less than six years. A Mann-Whitney $U$ test was conducted to examine the difference in patient satisfaction for these two groups. With the exception of the subscale Interpersonal Manner, the remaining subscales were significantly different (Table 7).
Table 7.

Mann-Whitney U Test of Differences of Overall Patient Satisfaction by Years of Activity

<table>
<thead>
<tr>
<th>Duty in Service</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
<th>Bonferroni Adj (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Satisfaction</td>
<td>915.50</td>
<td>1861.50</td>
<td>-1.991</td>
<td>.046*</td>
<td>.325</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>763.00</td>
<td>1709.00</td>
<td>-3.031</td>
<td>.002**</td>
<td>.017*</td>
</tr>
<tr>
<td>Interpersonal Manner</td>
<td>952.50</td>
<td>1898.50</td>
<td>-1.681</td>
<td>.093</td>
<td>.649</td>
</tr>
<tr>
<td>Communication</td>
<td>905.50</td>
<td>1851.50</td>
<td>-2.866</td>
<td>.041*</td>
<td>.287</td>
</tr>
<tr>
<td>Financial Aspects</td>
<td>791.00</td>
<td>1737.00</td>
<td>-2.866</td>
<td>.004**</td>
<td>.029*</td>
</tr>
<tr>
<td>Time Spent with Doctor</td>
<td>813.00</td>
<td>1759.00</td>
<td>-2.773</td>
<td>.006**</td>
<td>.039*</td>
</tr>
<tr>
<td>Accessibility and Convenience</td>
<td>900.50</td>
<td>1846.50</td>
<td>-2.053</td>
<td>.040*</td>
<td>.280</td>
</tr>
</tbody>
</table>

a. Grouping Variable: Years of Active Duty Service

However, when a researcher performs multiple comparison within a hypothesis test, there is an increased chance in identifying a rare event. As a result, researchers employ a Bonferroni adjustment by multiplying the p-value for each test by the number of isolated tests performed (seven, in this case). If the Bonferroni adjusted p-value is below .05, then a researcher can reject the null hypothesis. In this situation, three patient satisfaction aspects were significant, Technical Quality ($r = .34$), Financial Aspect ($r = .32$), and Time Spent with Doctor ($r = .31$). As represented by $r$, these three differences represent medium effect sizes (Cohen, 1992). As a result, the null hypothesis ($H_{10}$) is partially rejected, and the alternative hypothesis that military personnel who were or have been on active duty longer than six years report more satisfaction with their healthcare than those who served or have served for less than six years is partially accepted.

**Reserve Duty and Patient Satisfaction.** The second research question focused on whether military personnel who were or have been on reserve duty longer than three
years would report more satisfaction with their healthcare than those who served or have served for less than three years. A Mann-Whitney U test was conducted to examine the difference between the patient satisfaction in these two groups. Except for the subscale Interpersonal Manner, the remaining subscales were significantly different (Table 8).

Table 8.

Mann-Whitney U Test of Difference of Overall Patient Satisfaction by Years of Reserve Service

<table>
<thead>
<tr>
<th></th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Satisfaction</td>
<td>611.00</td>
<td>1646.50</td>
<td>-4.205</td>
<td>.000**</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>765.50</td>
<td>1800.50</td>
<td>-2.952</td>
<td>.003**</td>
</tr>
<tr>
<td>Interpersonal Manner</td>
<td>719.50</td>
<td>1754.50</td>
<td>-3.324</td>
<td>.001**</td>
</tr>
<tr>
<td>Communication</td>
<td>769.50</td>
<td>1804.50</td>
<td>-2.979</td>
<td>.003**</td>
</tr>
<tr>
<td>Financial Aspects</td>
<td>606.00</td>
<td>1641.00</td>
<td>-4.171</td>
<td>.000**</td>
</tr>
<tr>
<td>Time Spent with Doctor</td>
<td>870.50</td>
<td>1905.50</td>
<td>-2.267</td>
<td>.023*</td>
</tr>
<tr>
<td>Accessibility and Convenience</td>
<td>780.00</td>
<td>1815.00</td>
<td>-2.863.</td>
<td>.004**</td>
</tr>
</tbody>
</table>

a. Grouping Variable: Years of reserve service (Grouping)

* p < 0.05, ** p < 0.01

As in RQ1, a Bonferroni adjustment was used to evaluate each scale. Only Time Spent with Doctor failed to have a Bonferroni adjusted p-value of less than .05 (.023 * 7 = .161). The remaining patient satisfaction aspects were significant, General Satisfaction ($r = .47$), Technical Quality ($r = .33$), Interpersonal Manner ($r = .37$), Communication ($r = .33$) Financial Aspect ($r = .46$), and Accessibility and Convenience ($r = .32$). As represented by $r$, these three differences represent medium effect sizes, with General Satisfaction and Financial Aspect nearing a large effect size, as defined by Cohen (1992). As a result, the null hypothesis ($H_{0}$) is partially rejected, and the alternative hypothesis that military personnel who were or have been on reserve duty longer than three years
would report more satisfaction with their healthcare than those who served or have served for less than three years is partially accepted.

**Duty Status and Patient Satisfaction.** The final research question focused on whether military personnel who are currently on active duty would report more satisfaction with their healthcare than those who are no longer on active duty. A Mann-Whitney $U$ test was conducted to examine the difference in patient satisfaction for these two groups. With the exception of the subscale Interpersonal Manner, the remaining subscales were significantly different (Table 9).

Table 9.

*Results of Mann-Whitney U Test of Difference of Overall Patient Satisfaction by Separation Situation*

<table>
<thead>
<tr>
<th>subscale</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Satisfaction</td>
<td>559.00</td>
<td>3334.00</td>
<td>-2.833</td>
<td>.005**</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>742.00</td>
<td>3.517.00</td>
<td>-1.217</td>
<td>.224</td>
</tr>
<tr>
<td>Interpersonal Manner</td>
<td>677.50</td>
<td>6452.50</td>
<td>-1.776</td>
<td>.076</td>
</tr>
<tr>
<td>Communication</td>
<td>640.00</td>
<td>3415.00</td>
<td>-2.110</td>
<td>.035*</td>
</tr>
<tr>
<td>Financial Aspects</td>
<td>616.50</td>
<td>3391.50</td>
<td>-2.292</td>
<td>.022*</td>
</tr>
<tr>
<td>Time Spent with Doctor</td>
<td>656.50</td>
<td>3431.50</td>
<td>-2.004</td>
<td>.045*</td>
</tr>
<tr>
<td>Accessibility and Convenience</td>
<td>786.50</td>
<td>3561.50</td>
<td>-.853</td>
<td>.394</td>
</tr>
</tbody>
</table>

a. Grouping Variable: Separation situation (Grouping)

As in RQ1 and RQ2, a Bonferroni adjustment was used to evaluate each scale.

Only General Satisfaction was statistically significant, $Z (98) = -2.833$, $p = .005$, $r = 32$.

This represents a medium effect size (Cohen, 1992). As a result, the null hypothesis ($H_3$) is partially rejected, and the alternative hypothesis that active military personnel report more satisfaction with their healthcare than former military is partially accepted.
Summary

The purpose of this non-experimental quantitative causal-comparative research study was to examine the differences in patient satisfaction of active duty, reserve and retired military personnel with telehealth technology and the different categories of these military veterans – active duty, reserve duty and retired or separated by years as independent variables. This chapter presented the results and analysis of the statistical analysis to address the different research questions of the study. The researcher tested three research hypotheses using the nonparametric statistical Mann-Whitney U test to address the research questions of the study. For research question one, the results showed that there were statistically-significant differences in three of seven components of the research instrument. Technical quality, financial aspects and time spent with doctor were those three identified components causing the researcher to partially reject the first null hypothesis as well as partially accepting the first alternative hypothesis citing medium effect size (Cohen, 1992). There is a significant difference in patient satisfaction experience between active duty members with more than or less than six years of service.

For research question two, the results showed that six of seven components identified statistically-significant differences namely general satisfaction and quality; interpersonal manners and communication; financial aspects, accessibility and convenience. Again citing medium effect size (Cohen, 1992), the second null hypothesis was rejected partially while second alternative hypothesis was partially accepted implying there is a significant difference in patient satisfaction experience between reserve duty members with more than or less than three years of service.
For research question three, the results showed that there is a statistically-significant difference in only general satisfaction component thus partially rejecting the third null hypothesis while partially accepting the third alternative hypothesis based on medium effect size as well (Cohen, 1992). There is a significant difference in patient satisfaction experience between active duty members and former military members (retired or separated).

The results, as statistically analyzed, therefore supported the existing body of knowledge that there exist differences in patient satisfaction experiences from telehealth technology use by active duty, reserve, and retired or separated military personnel. Conclusions and recommendations drawn from the results follow a summary of the study in its entirety in the next, and last, chapter. Chapter 5 includes further discussion of the results presented in this chapter.
Chapter 5: Summary, Conclusions, and Recommendations

Introduction

The purpose of this non-experimental quantitative causal-comparative research study was to examine the differences in patient satisfaction experiences (dependent variable) of active duty, reserve and retired military personnel with telehealth technology and independent variables by categories (active duty, reserve and retired or separated) of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. The researcher used a purposive or purposeful nonrandomized, non-probability sampling technique that involved 99 U.S. veterans who have used or are using telehealth technology to receive healthcare services from the VISN 4 of VHA. The purpose of this study was to determine how smaller VAHCSs, like VISN 4 of VHA, could harness telehealth technology’s inherent potentials to expand veterans’ access to healthcare services and minimize patients’ indirect costs of seeking health care through traditional approaches. Darkins (2014) and Darkins et al. (2015) have documented in various studies the significant relationship between telehealth technology, overall patient satisfaction, veterans’ health care access, and cost reduction at the VAHCS as a large organization, but the research focusing on VISN 4 extended the work done by Morland et al. (2013). Morland et al. (2013) identified research gaps and called for further studies in the patient satisfaction in the areas of general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. For the VISN 4 causal-comparative study, limited time, and resources
prevented exploration of the societal component of indirect cost factors as Morland et al. (2013) recommended.

Summary of the Study

The study included 103 U.S. military personnel respondents with varying levels of education, membership in different branches of U.S. military services, marital status, and racial/ethnic background participated in this research study. The researcher recruited the study participants from veteran service organizations consisting of notably the American Legion, direct approach by the researcher, approach to individuals by other veterans, and through a veteran group’s professional social networking site on LinkedIn. The LinkedIn veteran group is “Veterans Den,” whose founder granted the researcher emailed permission to post the survey link to the organization’s site.

The researcher collected data from 103 participants using a demographic survey and a patient satisfaction survey, the PSQ-18. Out of this sample, the researcher voided data from four respondents for lack of proper consent and statistically analyzed the remaining 99 as being valid. The instrument the researcher used was previously validated in several U.S. populations, so there was no need to conduct a validation study of this instrument again. Marshall and Hays (1994) described the significance of RAND Health Corporation’s PSQ-18 as a validated satisfaction instrument used in gauging patient’s evaluation of the care they received from providers and healthcare institutions. Seven different subscales make up this survey instrument, namely general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience.
Statistical procedures consisted of nonparametric Mann-Whitney U analyses that the researcher used to test the stated overarching research hypotheses. The results for research question one showed that there is a significant difference in patient satisfaction experience between active duty members with more than or less than six years of service. The results of research question two showed that there is a significant difference in patient satisfaction experience between reserve duty members with more than or less than three years of service. The results for research question three showed that there is a significant difference in patient satisfaction experience between active duty members and former military members (retired or separated).

Results of these statistical analyses were quite indicative of varying differences in patient satisfaction experiences of active duty, reserve and retiree military personnel with telehealth technology in terms of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience.

The researcher could not ascertain if any of the other descriptive statistical factors like education, a branch of service, the length of service, marital status and race, have anything to do with these research findings. It would be worthwhile if future researchers could delineate the impact of these demographics on both the independent and dependent variables. These findings will call for future exploration of the causes of these differences in a greater scope.
Summary of Findings and Conclusion

Telehealth technology served as the dependent variable or construct for this research study while the independent variables were the service member categories using the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. Because of the researcher’s analysis of the survey responses, the three null hypotheses were partially rejected, and the three alternative hypotheses were equally partially accepted. Survey data from the 102 respondents supported evidence accumulated over the years that patient satisfaction experiences of active duty, reserve, and retired military personnel with telehealth technology in relationship with the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience differ. Put differently; telehealth technology is likely to offer patient satisfaction experience for active duty, reserve, and retired military personnel at varying degrees with increased investment in telehealth technology. More studies will be helpful in shedding greater light in examining these perspectives that could drive the future of investment in telehealth technology.

Recommendations

The relevant agency and the population served can use the results of this study to build upon the existing body of knowledge to seek avenues for improving telehealth technology. This becomes increasingly crucial as many nations continue to engage in one
form of conflict or another with the ultimate involvement of U.S. military personnel, thereby widening the veteran population. The proportion of returning young veterans from combat far outweighs the available resources in health care system personnel, and with a view to ensuring, that no veteran was left behind in the process of obtaining access to quality healthcare, studies like this should be replicated.

**Recommendations for future research.** The most important recommendation for future research endeavors is to explore the relationship between telehealth technology, and indirect cost factors at societal levels. Doing a more comprehensive CBA might also be valuable. The current study was restricted to patient-level factors and could not address the complete range of gaps Morland et al. (2013) identified due to far-reaching limitations imposed by time and limited resources. The other recommendation will be targeting more veterans across the component medical facilities within VISN 4 by promptly seeking collaboration with the VA IRB earlier on to forestall any last minute policy changes that could pose insurmountable challenges at reaching the veterans from the primary source. The smallness of this study’s sample size affected some of the research instrument’s Cronbach’s Alpha values thereby preventing the researcher from doing a succinct discussion of all the subsets in the research instrument. This then informed the decision to just evaluate overall patient satisfaction. Gliem and Gliem (2003) wrote that Cronbach’s Alpha reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach’s Alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. George and Mallery (2003) provide the following rules of thumb: “> .9 – Excellent, > .8 – Good, > .7 – Acceptable, > .6 – Questionable, > .5 – Poor, and < .5 –
Unacceptable” (p. 231). While increasing the value of alpha is partially dependent upon the number of items in the scale, it should be noted that this has diminishing returns. It should also be noted that an alpha of .8 is probably a reasonable goal. It should be noted that while a high value for Cronbach’s Alpha indicates good internal consistency of the items in the scale, it does not mean that the scale is unidimensional. Therefore, considering the above statement, the researcher advanced an argument that for the sub-scales with Cronbach's Alpha values that are > .6 (questionable but not unacceptable) or > .5 (poor but not unacceptable) a bigger sample could have mitigated the possibility of errors (type I or II). Anyone conducting future studies in this area should consider utilizing bigger sample size and evaluate if any of the identified demographics in the present study have any effect/s on the study variables.

**Recommendations for practice.** This research study has demonstrated some differences in the patient satisfaction experiences of active duty, reserve, and retired military personnel with telehealth technology in terms of the seven different subscales of the PSQ-18 to measure patient satisfaction experience which include general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with doctor, and accessibility and convenience. To this end, there should be greater investment in telehealth technologies to enhance veterans’ health care services or mitigate challenges often posed by access to needed health care services by these veterans, especially for those who live in rural America. A randomized study with larger study sample might also offer different findings.
Conclusion

Telehealth technology is a critical new millennium healthcare delivery vehicle; its effective leverage within the DVA’s VHA will go a long way in helping veterans get access to needed health care in the most cost-efficient manner. Future research in the areas of indirect cost factors at societal level might shed more light on how telehealth technology can become a veritable game-changer for these American heroes of different wars.

Implications

Theoretical implications. This study of 102 U.S. veterans did support the evidence accumulated over the decades that there are some differences in patient satisfaction experiences of active duty, reserve, and retired military personnel with telehealth technology in relation to overall satisfaction, veterans’ healthcare access as well as to indirect cost factors or ROI at the patient level. Based on these findings, it can be inferred that continued investment in telehealth technology modalities in the smaller VAHCS will help expand veterans’ health care access and has the potential to reduce indirect costs of seeking and obtaining relevant and appropriate healthcare for these veterans.

Practical implications. Practically speaking, this current study’s findings have the potential to motivate a huge number of U.S. veterans who have been limited by geographical distance from seeking health care from the VHA. This growing population of rural veterans will likely begin to take advantage of an array of general or specialty healthcare services offered by the VHACS in smaller VISNs like VISN 4.
**Future implication.** The greatest implication of this study was the re-affirmation that patient satisfaction experiences of active duty, reserve, and retired military personnel vary with telehealth technology and the three indirect variables. This means that there is a potential for increased level of patient satisfaction with continued investment in telehealth technology modalities across many VAHCS, regardless of whether they are located within large urban or smaller rural areas.
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Appendix A

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Appendix B

Permission Letter from “The Veterans Den”

RE: "Vets Den"

From: Old Nikko <oldnikko@gmail.com>  
Subject: RE: "Vets Den"  
To: fembuk1123@comcast.net

Feel free to post it Captain. I wouldn’t expect you’ll get much response since we are not generally recent vets or are retired military, though some few are recent vets or are still on active duty.

Good luck on your doctoral program!

~Nick, SO, USN-retired (1986)  
Vet’s Den founder

From: fembuk1123@comcast.net [mailto:fembuk1123@comcast.net]  
Sent: Tuesday, December 29, 2015 12:15  
To: oldnikko@gmail.com  
Subject: "Vets Den"

Good afternoon Sir,  
I feel greatly honored to have been accepted into your revered group. May I ask your permission to share the survey link below with the group?  

https://www.surveymonkey.com/r/YDC2RN9

As the researcher, I will contribute a sum of $5:00 to the Wounded Warrior Project for each online survey completed. 376 people have been asked to participate in this < 2-minute-survey. Thanks.

Very respectfully,  
Olufemi Olatunji, Capt., USAFR, NC  
Doctoral Student, Columbia Southern University, Orange Beach, AL
Appendix C
Patient Satisfaction Questionnaire (PSQ-18)

**SHORT-FORM PATIENT SATISFACTION QUESTIONNAIRE (PSQ-18)**
These questions are about how you feel about the medical care you receive.

On the following pages are some things people say about medical care. Please read each one carefully, keeping in mind the medical care you are receiving now. (If you have not received care recently, think about what you would expect if you needed care today.) We are interested in your feelings, **good** or **bad**, about the medical care you have received.

How strongly do you **AGREE** or **DISAGREE** with each of the following statements?

(Circle one number on each line.)

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Doctors are good about explaining the reason for medical tests.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I think my doctor's office has everything needed to provide complete medical care.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. The medical care I have been receiving is just about perfect.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Sometimes doctors make me wonder if their diagnosis is correct.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I feel confident that I can get the medical care I need without being set back financially.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. When I go for medical care, they are careful to check everything when treating and examining me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I have to pay for more of my medical care than I can afford.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I have easy access to the medical specialists I need.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
How strongly do you AGREE or DISAGREE with each of the following statements?

(Circle one number on each line.)

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Where I get medical care, people have to wait too long for emergency treatment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Doctors act too businesslike and impersonal toward me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. My doctors treat me in a very friendly and courteous manner.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Those who provide my medical care sometimes hurry too much when they treat me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. Doctors sometimes ignore what I tell them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. I have some doubts about the ability of the doctors who treat me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. Doctors usually spend plenty of time with me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. I find it hard to get an appointment for medical care right away.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. I am dissatisfied with some things about the medical care I receive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. I am able to get medical care whenever I need it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
## Appendix D

**PSQ-18 Scales and Related Items**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Average These Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Satisfaction</td>
<td>3, 17</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>2, 4, 6, 14</td>
</tr>
<tr>
<td>Interpersonal Manner</td>
<td>10, 11</td>
</tr>
<tr>
<td>Communication</td>
<td>1, 13</td>
</tr>
<tr>
<td>Financial Aspects</td>
<td>5, 7</td>
</tr>
<tr>
<td>Time Spent with Doctor</td>
<td>12, 15</td>
</tr>
<tr>
<td>Accessibility and Convenience</td>
<td>8, 9, 16, 18</td>
</tr>
</tbody>
</table>

*Note. Items within each scale are averaged after scoring as shown in Table 1.*
Appendix E

Scoring Items

<table>
<thead>
<tr>
<th>Item Numbers</th>
<th>Original Response Value</th>
<th>Scored Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, 5, 6, 8, 11, 15, 18</td>
<td>1 ——&gt;</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2 ——&gt;</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3 ——&gt;</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4 ——&gt;</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>5 ——&gt;</td>
<td>1</td>
</tr>
<tr>
<td>4, 7, 9, 10, 12, 13, 14, 16, 17</td>
<td>1 ——&gt;</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2 ——&gt;</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3 ——&gt;</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4 ——&gt;</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5 ——&gt;</td>
<td>5</td>
</tr>
</tbody>
</table>