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Association Between Adaptive Sports Programs and Quality of Life Among Amputee Veterans

Sean V. Seay
Walden University

Walden University

College of Health Sciences

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Sean Seay

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Dr. Gudeta Fufaa, Committee Member, Public Health Faculty
Dr. Daniel Okenu, University Reviewer, Public Health Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
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Abstract

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Among Amputee Veterans

by

Sean V. Seay

MS, Trident University, 2008

BS, Lincoln University, 1994

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health—Epidemiology

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Abstract

Adaptive sports programs (ASPs) are important for enhancing the physical, psychological, and social aspects of life for amputee combat veterans while reducing the risk of depression and anger. Although the role of ASPs in improving quality of life (QoL) has been researched in relation to amputee combat veterans of World War II, the Korean War, and the Vietnam War, there has been limited examination of the role of ASPs in improving QoL among veterans of Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation Noble Eagle (OND). Therefore, the purpose of this study was to assess the effects of ASPs on the QoL of amputee veterans of OEF, OIF, and OND using logistic regression as well as 3 surveys assessing QoL and life satisfaction in combat veterans who suffered traumatic amputations between 2003 and 2013. The dependent and independent variables included psychosocial and behavioral factors for those amputees who participated in an ASP versus those amputees who did not. There was a statistically significant association ($\chi^2_{(4)} = 13.44$, $p < 0.003$) between gender and perception of overall health. Likewise, there was a statistically significant association ($\chi^2_{(2)} = 15.63$, $p < 0.000$) between enjoying life and having a meaningful life and participation in an ASP. The findings indicate that participation in ASPs may help improve QoL and overall health for amputee veterans. Public health programs and policies aimed at improving the overall health and wellbeing of amputee veterans should consider ASPs as essential therapeutic interventions for promoting health in amputee veteran populations.

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Dedication

This body of work is dedicated to my parents, who instilled in me the dedication, hard work, and means to make all of my dreams achievable. It is also dedicated to the men and women of the U.S. Armed Forces who have given the ultimate sacrifice for their country.

Acknowledgments

I would like to thank the faculty at Walden University for their guidance through this endeavor. I would like to thank my lovely wife LaLeche, my kids Vincent and Izabel, as well as my extended family, friends, and coworkers who gave their love and undeniable support to help me achieve this milestone in my academic and professional career.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Background

According to Magee (1998), the practice of amputation has been used for punitive, ritualistic, and therapeutic reasons. It has been used in military conflicts dating back to ancient times. Through the ages, amputation techniques have advanced as new weapons have emerged. In terms of mortality, most deaths related to amputation have occurred due to infection following amputation, probably due to the nonsterile environment where the amputation was performed.

At one time, amputation was a common surgical procedure; it was considered the trademark of Civil War surgery (Magee, 1998). With the development of sterile procedures, anesthesia, and refinements to amputation technique, the surgery has become more tolerable. Further, with advances in rehabilitation and prosthetic devices, amputation has become more acceptable, with veterans able to return to civilian life following the procedure. This research addressed a gap in existing knowledge by comparing military veteran amputees who participated in an adaptive sports program (ASP) with those who did not, based upon a standardized scored and scaled quality of life (QoL) assessment.

Since the Civil War, traumatic injuries have played a significant role in soldiers' postwar QoL. Many soldiers, while being forced to adapt to the loss of fallen comrades and fight disease, have contended with amputation due to war injuries. Following amputation, soldiers must find ways to live with the loss and overcome QoL obstacles. According to the Civil War Society (1997), soldiers in the Federal and Confederacy

armies suffered a combined total of 175,000 wounds to the extremities, with approximately 30,000 resulting in amputation. Though research is limited on these soldiers' QoL after the Civil War, one would assume that their QoL decreased due to their injuries. This would also seem true for soldiers of Operation Iraqi Freedom and Operation Enduring Freedom (OIF/OEF), which resulted in 1,599 individuals undergoing an amputation as of May 2012 (Fischer, 2012).

The remainder of this chapter contains a summary of the problem explored in this study, the research design, and the methodology that was used. The nature of the study and the research questions are presented. The theoretical and conceptual frameworks within which this study was conducted were Andersen's behavioral model and Pender's health promotion model. The psychosocial and behavioral aspects as well as the individual characteristics and experiences of the behavior-specific cognitions of the amputee can be described using these models. Key phrases are defined. The significance of the study, limitations of the study, and the study's potential impact on social change are explored.

Statement of the Problem

In recent and current military conflicts, soldiers have faced difficult obstacles. Some veterans suffer posttraumatic stress disorder (PTSD) or traumatic brain injury (TBI) while others have a hard time dealing with the loss of fallen comrades. Meanwhile, those who have undergone an amputation must find ways to fit into everyday life. These soldiers can receive care for their injuries by participating in either local or national ASPs. Through the use of these programs, veterans can become more comfortable in

living with their disability, feel more willing to go out, and be accepted by their communities. Providing physical activity, education, and support to individuals with chronic disabilities through adaptive sports has shown to result in improvement in QoL and life satisfaction scores for those who participate (Yazicioglu, Yavuz, Goktepe, & Tan, 2012). Studies have also shown that both therapeutic and recreational participation in adaptive sports helps to facilitate psychological health, improve socialization ability, and allow individuals to focus on their abilities rather than their disabilities (Wetterhahn, Hanson, & Levy, 2002). According to Yazicioglu, et al., (2012), individuals with an amputation who participated in an ASP had higher QoL and life satisfaction scores compared to those who did not. Although QoL benefits of ASPs had been studied, my rationale for conducting this research was that there was a need to examine the role of adaptive sports for the veteran population of OIF/OEF, in order to investigate whether these veterans have achieved the same improvements in QoL that have been noted in previous studies of ASPs. This research surveyed OIF/OEF amputee service members within the U.S. Army Warrior Transition Command (WTC) and Department of Defense who were injured from January 2003 to December 2013 and had the opportunity to participate in an ASPs 2 years post-amputation. Surveying amputee veterans 2 years post-amputation made it possible to assess individuals who had experienced recovery from surgical injuries, prosthetic fitting, and rehabilitation program initiation with prosthetics. The research also investigated the psychosocial and behavioral characteristics of amputees who participated in ASPs versus amputees who did not participate in ASPs during the same period. The research also examined whether amputees who participated

in ASPs had better life experiences in terms of education, employment, and income. According to Zabriskie, Lundberg, and Groff (2005), there are eight key pillars of life that some individuals fall far behind in accomplishing because of their disabilities. Each of these pillars interacts with the others; for example, if an individual is limited in the areas of employment and/or education, the individual will experience a decrease in income, health care, transportation, entertainment, socializing, and politics. The research may help in developing and implementing rehabilitation platforms such as ASPs that can be integrated with the various therapeutic interventions for combat veterans, which in turn would help them to better integrate with their community socially and professionally.

Theoretical Framework

Andersen's behavioral model and Pender's health promotion model provided a framework to examine the benefits associated with amputee participation in ASPs, along with the psychosocial and behavioral aspects of participation in ASPs in regard to QoL. Each of these models provided opportunities to examine individual characteristics and experiences as well as behavior-specific cognitions and behavioral outcomes of study subjects.

Andersen's Behavioral Model

Andersen's behavioral model, according to Andersen (1995), was initially developed to aid in understanding why families use health services, as well as to define and measure access to health care and to develop policies to promote access. Today, it is

considered a multilevel model that incorporates both individual and contextual determinants of health-services use (Babitsch, Gohl, & von Lengerke, 2012).

From a community benefits perspective, if veterans have access to healthcare, are comfortable with the use of their prostheses, and participate in adaptive sports, they may experience increased QoL. According to Sinha, van den Heuvel, and Aroklasamy (2014), unemployed amputees were found to be less social and less adjusted to their amputation than those who had a better chance for employment, who were better adjusted to living with their amputation.

Andersen's model was helpful in focusing on the use of health services by veterans, whether within the Veterans Administration or in referral agencies that provide healthcare to veterans. This model helped with assessing the behavioral aspects of veterans' involvement with adaptive sports to determine whether the three components of the model—predisposing, enabling, and/or need factors—affected their quality of life through participation.

Pender's Health Promotion Model

Pender's health promotion model focuses on individual characteristics and experiences of behavior-specific cognitions to assess whether they have an effect on behavioral outcomes. The model's theoretical roots are in expectant value theory, which indicates that individuals will engage in activities to achieve goals that are perceived as achievable, along with social cognitive theory, which blends one's individual thoughts, and apply their behavior within their environment (Pender, Murdaugh, & Parsons, 2011). This model may encourage amputee veterans to evaluate their health care goals and seek

out avenues of care that will help them achieve these goals, whether personal or professional. In this study, the health promotion model informed the development of survey questions that were used to ask participants about their individual experiences; the effect, if any, of their participation in adaptive sports; and whether their participation increased or enhanced their acceptance of their disability. It also helped to explain how participants overcame negative behavior or the stigma of living with their disability.

Nature of the Study

The study involved quantitative research using the following instruments: Health-Related Quality of Life (HRQOL; Centers for Disease Control and Prevention, 2000), WHO Quality of Life—BREF (WHOQOL-BREF; WHOQOL Group, 1998), and the Trinity Amputation and Prosthesis Experience Scales—Revised (TAPES-R; Sinha, et al., 2014). Using Anderson's behavioral model and the Pender's health promotion model, I focused on examining veterans' lived experiences as well as their utilization of ASPs and their thoughts having participated in ASPs or not. To clarify how ASPs, promote recovery for veterans, the quantitative analysis used a combination of QoL scales from the WHOQOL-BREF and the TAPES-R to assess why veterans participate in ASPs and identify the benefits associated with participation.

The quantitative part of the study facilitated an understanding of the importance of adaptive sports in the recovery of veterans and surveyed two study groups:

1. OIF/OEF amputee service members within the U.S. Army Warrior Transition Command (WTC) and the Department of Defense from January 2003 to

December 2013 as well as 2 years post amputation. These service members had the opportunity to participate in an ASP.

2. Nonamputees who participated in ASPs for other disabilities. I sought to ascertain the benefits of these individuals' participation in ASPs in comparison to the experiences of nonamputees who did not participate. This enabled investigation of the psychosocial and behavioral aspects of participation in an ASP.

Research Questions

1. What are the differences in the psychosocial and behavioral factors that encourage or discourage participation in adaptive sports programs (ASPs) for amputee U.S. war veterans using Health-Related Quality of Life (HRQOL) scores?

   H_0: There is no significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

   H_1: There is significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

2. Are there differences in quality of life (QoL) and life satisfaction of amputee U.S. war veterans who do or do not participate in ASPs based on World Health Organization Quality of Life—BREF (WHOQOL-BREF) scores?

   H_0: There is no significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

H_1: There is significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

3. How does duration of participation in ASPs by U.S. war veterans affect their physical, psychological, and social wellbeing based on scores from the Trinity Amputation and Prosthesis Experience Scales—Revised (TAPES-R) questionnaire?

   H_0: There are no significant associations between participation time length (greater than three years versus less than or equal to 3 years) in an ASP and physical, psychological, and social wellbeing scores in OIF/OEF veterans.

   H_1: There are significant associations between participation time length (greater than three years versus less than or equal to 3 years) in an ASP and physical, psychological, and social wellbeing scores in OIF/OEF veterans.

Glossary

Various descriptions and terms are used within the literature on adaptive sports and veterans. These terms are clarified below for the purpose of this paper.

Adaptive sports: "Sports for people with disabilities" (Bullock & Mahon, 2001, p. 303). Fitness and sports are integral to healthy lifestyles. Unfortunately, those who live with a disability may not be able to perform exercises that nondisabled people can perform. Therefore, the concept of using adaptive strategies in sports has been developed.

Amputation: The oldest major operation, has been practiced for thousands of years (Magee, 1998). People who have undergone this operation are called *amputees*.

Behavioral factors: This research examined behavioral factors of amputee veterans who participated in adaptive sports. *Behavioral* may refer to overt actions that expose underlying psychological processes, including cognition, emotion, temperament, and motivation, as well as to biobehavioral interactions (U.S. Department of Health and Human Services, 2010).

Life satisfaction: Buetell (2006) defined life satisfaction as an overall assessment of feelings and attitudes about one's life at a particular point in time, ranging from negative to positive. The term is used in connection with QoL to address the positive and negative effects of adaptive sports on veteran amputees.

Posttraumatic stress disorder (PTSD): The American Psychiatric Association (2013) described PTSD as the development of characteristic symptoms following exposure to one or more traumatic events. Among combatants, PTSD is one of the most commonly diagnosed mental illnesses.

Psychosocial factors: Relating to the psychological and social aspects of how one adjusts in society. Psychosocial factors for the amputee veterans included well-being, optimism, resilience, hope, and self-efficacy (Wagstaff, Hanton, & Fletcher, 2013).

Quality of life (QoL): Karami, Ahmadi, Nejati, and Masumo (2012) defined QoL as the interaction between the external conditions of an individual's life and the internal perception of those conditions. It is determined on the basis of such factors as health, physical environment, security, natural resources, and personal growth. QoL was determined by the scales used to measure QoL described in Chapter 3.

Traumatic brain injury (TBI): Used as another confounding factor in participation or nonparticipation in ASPs. TBI, as defined by the American Psychiatric Association (2013), is caused by an impact to the head or other mechanisms of rapid movement of the brain within the skull.

Significance of the Study

In this research, I sought to gain a better understanding of the psychosocial and behavioral aspects of amputee U.S. veterans' participation in ASPs in regard to the QoL of veteran amputees of OIF and OEF and the veterans impact at the community level. The results of this study may help in assessing the benefits that adapted sports offer in treating military veterans. Insights from this study may encourage staff of the Veterans Administration (VA) and other medical professionals to use adaptive sports as part of rehabilitation and treatment plans for amputee soldiers. Sports have been shown to be important in bringing people together and positively affecting society. A systemic review conducted by Eime, Young, Harvey, Charity, and Payne (2013) found that sports improved psychosocial health, and that participation in club-based or team-based sports increased positive health outcomes when compared to individual activities. Countering the stigma of not fitting in because of their injury or disability, ASPs help affected soldiers to focus not on their disability, but on their ability to do things as a person (Yazicioglu et al., 2012).

Limitations of the Study

Limitations of this research included the following:

1. Self-reported data from participants. I made sure that outcome indicators from interviews were objectively measurable and accountable.
2. Potential confounding variables such as PTSD and TBI, which may affect an individual's interest in participating in adaptive sports in the first place and can also influence QoL. These factors could generate an artificial association between exposure and outcome. I made sure that this could be accounted for in the design, in the analysis, or in both.

Importance for Social Change

The study's implications for positive social change include assessment of the benefits of implementing an adaptive sports rehabilitation platform for veteran amputees by VA services. If healthcare professionals integrate various adaptive therapeutic interventions for combat veterans, they may provide veterans with opportunities to accept their disability. In this way, it may be possible to increase avenues for veterans to improve QoL and life satisfaction for themselves and their families, in addition to helping them to become productive members of their communities.

Chapter 2: Literature Review

Introduction

Since the Civil War, traumatic injuries have played a significant role in QoL for soldiers after a war ends. Soldiers must adapt to the loss of fallen comrades, fight disease, and, in some cases, contend with the results of amputation due to war injuries. Soldiers who have undergone amputation must find ways to live with their loss and overcome QoL obstacles. According to the Civil War Society (1997), both the Federal and Confederacy armies had 175,000 wounds suffered to the extremities, and approximately 30,000 resulted in amputation. Though research is limited as to their quality of life after the Civil War, one would believe that their quality of life was decreased due to their injuries suffered.

Following involvement in recent and current military conflicts, soldiers have faced difficult obstacles. Some have struggled with PTSD, while others have suffered from the loss of fallen comrades. Those who have undergone an amputation must find ways to fit into everyday life. These soldiers are in need of ways to overcome daily challenges and become comfortable living with their injuries in society.

Providing physical activity, education, and support to individuals with chronic disabilities through adaptive sports has been shown to lead to higher QoL and life satisfaction scores in those who participate (Yazicioglu, Yavuz, Goktepe, & Tan, 2012). With both therapeutic and recreational characteristics, participation in adaptive sports helps to facilitate psychological health, improve socialization ability, and allow individuals to focus on their abilities rather than their disabilities (Wetterhahn, Hanson, &

Levy, 2002). Yazicioglu, et al., (2012) reported that individuals with an amputation who participated in an adapted sports program had higher QoL and satisfaction scores compared to those who did not participate.

Although the QoL benefits associated with ASPs have been addressed in previous research, the rationale for this study was that there remains a need to address ASP involvement specifically in relation to the veteran population of the OIF/OEF, in order to ascertain whether these veterans have experienced the same improvements in QoL described in previous studies. This research surveyed OIF/OEF amputee service members within the U.S. Army Warrior Transition Command (WTC) from January 2003 to January 2012 who, 2 years postamputation, began participation in an ASP. This study investigated the psychosocial and behavioral aspects of their experience in comparison with service members who did not participate in an ASP during the same period. This study may promote further research toward developing a rehabilitation platform for ASPs to be implemented at all levels of care for service members who have given immensely to their country.

The purpose of this research was to gain a better understanding of the psychosocial and behavioral aspects of amputee U.S. veterans' participation in ASPs in regard to QoL, specifically in relation to veterans of OIF and OEF. The results of this study are intended to indicate the benefits that adapted sports offer in treating amputee veterans. Insights from this study may encourage the VA, the Department of Defense (DoD), and other medical institutions to use adaptive sports as part of rehabilitation and treatment plans for amputee soldiers. Sports have always been means of bringing people

together and affecting society. A systemic review conducted by Eime et al. (2013) indicated that sports improved psychosocial health and that participation in club-based or team-based sports improved health outcomes more than individual activities did. Countering the stigma of not fitting in because of injury or disability, ASPs allow soldiers the opportunity not to focus on their disability (Yazicioglu, et al., 2012).

Current literature provides insight into how adaptive sports have been beneficial within civilian society. Zabriskie, Lundberg, and Groff (2005) and Yazicioglu, et al. (2012) provided information on how ASPs play a key role in QoL for those with amputations. However, there is little existing research literature indicating how veterans explain the benefits of ASPs for them, as well as the impact that ASPs have on veterans' QoL and life satisfaction. It is understood that PTSD may be prevalent among veterans with amputations, but there is exiguous literature documenting PTSD's impact on participation or nonparticipation in ASPs. Furthermore, there is a paucity of literature showing the impact that these programs have on veterans in regard to their acceptance within the community, ability to find employment, educational attainment, and access to opportunities for a productive life post injury.

In the remainder of Chapter 2, I present my literature search strategy, including a list of the library databases I accessed and key search terms and combinations of terms I used. I describe the scope of literature investigated, which included conference proceedings and government resources addressing the importance of ASPs for veterans. The chapter also provides insight into theoretical propositions and assumptions pertaining to the topic. It provides the rationale for using Andersen's behavioral model (Andersen,

1995) and Pender's health model (Pender, Murdaugh, & Parsons, 2011) examining the relationship use and perception of health had to the present study. I then provide an exhaustive review of current literature, including studies related to the constructs of interest and the methodology of the study, as well as previous researchers' approaches to the problem and the strengths and weakness of their work. From a quantitative standpoint, I offer a review and synthesis of studies related to the key independent, dependent, and covariate variables to produce a description and explanation of what is known about the variables, what is controversial, and what remains to be studied in regard to adaptive sports and their benefits for amputee veterans. Finally, I present a concise summary of the major themes of the literature, what is known and not known in relationship to the topic of study, and how the study fills at least one of the gaps in the literature and extends knowledge concerning the benefits of participation in ASPs for military veterans.

Literature Search Strategy

This literature review on ASPs and participation by military veterans started with Internet searches for credible, peer-reviewed sources. Review of secondary sources led to primary sources. There was also a review on the topic of amputations found in recommended peer-reviewed articles and books. This established a foundation concerning the history of amputations, veterans, surgery recovery and rehabilitation, and initiation of ASPs. Further examination into the topic broadened the research to amputee veterans with PTSD and the community benefits of ASPs. I began this scholarly research at Walden University Library using multidisciplinary databases including ProQuest

Central and Science Direct; these databases provided minimal literature reviews. PubMed databases became the most consistent and concurrent primary databases used for each topic searched with the parameters of peer-reviewed articles written between 2004 and 2014. Additionally, Google Scholar was used to find grounded theory analysis of theoretical frameworks to be used, as well as surveys and scales that would assist in developing the methodology for the current research. A Google search was used to assist in finding procedures and policies related to healthcare and rehabilitation associated with ASPs within the VA and DoD.

History of Amputations

The treatment of injuries sustained during battle can be traced back throughout the history of warfare. As war technology has evolved, so have ways of treating resulting injuries. Most of the time, disease was the culprit to death more so than combat wounds. This led to the medical practice as (Manring, Hawk, Calhoun, & Andersen, 2009) suggest the misconception of the best timing in medical treatment combined with mode of treatment for injuries that often resulted in more harm than good. Manring et al. (2009) also noted that the history of military trauma care is twofold, in that it needs to be understood in terms of the wounding power of the weapons as well as the surgeon's understanding of the healing process. One such trauma surgery was amputation, which during early wars, though barbaric, helped to reduce morbidity and mortality, along with offering rapid access to care. In all known wars, including the Civil War, amputations were prevalent. However, opportunities to bring the wounded to medical platforms to perform this surgery were very limited. Dr. Norman T. Kirk is noted as a writer of

transportation guidelines for amputations as well as rehabilitation. In some cases, this platform is still used today, along with the technique for performing amputations.

During the Civil War, when amputation was the most common surgical procedure, mortality was 33% for lower limb amputations and 54% for above-the-knee amputations (Manring, et al., 2009). Manring, et al. (2009) also noted that Samuel Gross, a professor of surgery, discovered that the success of amputation and subsequent survival increased if the surgical procedure was performed within 12 to 24 hours after injury. After this, the member must hope they survive their surgery worry free of infection and if they do how will they be accepted in society. In OIF/OEF, veterans who underwent amputation were less worried about dying from an infection than about how they would be accepted in society while living with a disability. Are there rehabilitation programs that can help such veterans feel that they are productive members of society?

History of Adapted Sports Programs

Adapted sports began as a means to rehabilitate veterans of World War II, the Korean War, and the Vietnam War (Disabled Sports USA, 2014). The first sport used in this context was skiing, with veterans learning how to ski with crutches (O'Leary, 1995). Burke (2010) defined adaptive sports as a way to promote change in an individual and in the community. ASPs "offer avenues for the healthy development of both identity and quality of life" (Zabriskie, et al., 2005, p. 180). Today, because of technology as well as national and local ASPs, many amputees can play a host of sports that were believed to be only for the able bodied. With the implementation of the Paralympic Military Program by the U.S. Olympic Committee, injured military members can participate on many

levels to improve QoL of active duty members as well as during the transition to the civil world.

Amputee Medical Care

Potter and Scoville (2006) explained that rates of amputation following combat-related injuries have increased in current conflicts and that there is a complicated treatment and rehabilitation process for amputees that must be addressed. The U.S. Army has developed an Amputee Patient Care Program with the support of other government agencies and private organizations to meet the needs of military amputees. Reports showed that as of December 2013, there were 1,558 amputations associated with OIF/OEF (Fischer, 2014). With amputations come large medical costs that the American taxpayer must be willing to absorb. Additionally, the VA must be willing to develop and maintain programs that will meet the medical, psychological, rehabilitative, social, and community needs of amputees and their families. As Geiling, Rosen, and Edwards (2012) observed,

> War-related medical cost for U.S. veterans of Iraq and Afghanistan may be enormous because of the differences between these wars and previous conflicts: 1. Many veterans survive injuries that would have killed them in past wars, and 2. Improvised explosive device attacks have caused polytraumatic injuries that will require decades of costly rehabilitation. (p. 1235)

To meet this need, the VA assessed the psychosocial adjustments and activity limitations of OIF/OEF veterans with amputations and their prosthetic needs. A review conducted

by the VA Office of Inspector General (2012) assessed future care by credentialing providers, and building prosthetic services for the need of the OIF/OEF veterans.

In regard to ASPs, Rep. Marlin Stutzman, Chairman of the Subcommittee on Economic Opportunity, stated,

> There was a good reason to direct VA to partner with U.S. Paralympics and that was to use the Olympic spotlight to attract local and national organizations to help our wounded veterans around the country overcome their injuries through adaptive sports. (as cited in VA, 2011, p. 1).

Currently, there are over 200 adaptive sports clubs throughout the country assisting amputee veterans, and these programs will benefit from government funding through 2018.

PTSD and Amputee Veterans

PTSD is one of the most prevalent mental illnesses among veterans of OIF/OEF who have suffered a traumatic injury (Abeyasinghe, de Zoysa, Bandara, Bartholameuz, & Bandara, 2012). Research conducted by Abeyasinghe, et al. (2012) indicated the prevalence of PTSD in Sri Lankan soldiers who had amputations of the lower or upper limbs or had sustained a spinal cord injury. Their research was conducted to evaluate the awareness of providers who would be treating these veterans and making treatment choices for them. Of the 96 soldiers studied, 41.7% were compatible in being diagnosed with PTSD. Of those, 42.5 % suffered lower amputations, and 33.3% underwent upper amputations (Abeyasinghe, et al., 2012). Brooks, et al. (2012) revealed that veterans with PTSD who served in OIF/OEF had 21% fewer hospital visits than veterans of prior wars.

Fischer (2012) reported that year totals from 2002-2012 equaled 118,829 service members who had been diagnosed with PTSD. Unfortunately, the report did not correlate those members (1,558) who also suffered amputations during the same timeframe or indicate whether PTSD was a result of their injuries. Fischer called for attention to the need to provide holistic psychological care to veterans, including screening and management during rehabilitation.

Research conducted by da Silva et al. (2011), Eime et al. (2013), and others has addressed the psychological-care aspect of amputees' rehabilitation process. Melcer, Walker, Galarneau, Belnap, and Konoske (2010) found that within the 382 participants with major limb amputations resulting from combat in OIF/OEF. PTSD was prevalent in two-thirds of the soldiers with a major disorder between 18-25%. Further, Melcer et al. remarked that "over 80% of the patients used physical and occupational therapy, prosthetic services and psychiatric care" (p. 147). Gajewski and Granville (2006) and Potter and Scoville (2006) called for support for military amputee care programs such as those at Walter Reed Army Medical Center in Washington, DC, and Brooke Army Medical Center in Fort Sam Houston, TX. Those programs used a multidisciplinary team approach to provide comprehensive medical and supportive care addressing the psychological, social, vocational, and spiritual needs of military members in order to optimize patient outcomes (Gajewski & Granville, 2006).

Community Benefits of Adapted Sports Programs

One of the main concerns with amputee veterans is that they feel unaccepted within their communities. Since World War I, the use of sports and recreation to

challenge injured soldiers and refocus them on returning to active duty or reintegrating into civilian society. Cooper (2013) suggested that in order to help injured soldiers build resilience and successfully reintegrate for continued military service or a transition to civilian life, ASPs must be developed with the goal of restoring healthy self-perception. Chun, Lee, Lundberg, McCormick, and Heo, (2008) showed that there is a connection between community integration and QoL for civilians who participate in ASPs. However, research is needed to determine if this impact is the same for amputee veterans of OIF/OEF. Physical rehabilitation is not sufficient by itself to meet the needs of veteran amputees; there must be a comprehensive treatment plan that encompasses psychological and social support. Ferguson, Richie, and Gomez (2004), addressing the recovery needs of landmine survivors, suggested a comprehensive and coordinated treatment plan addressing individuals' physical, psychological, economic, and social needs within the context of family, community, and the sociocultural environment in which they live. Thompson and Fisher (2010) contended that peer support, whether provided through face-to-face contact or the virtual world, helps amputees integrate back into society. They therefore advocated the development of the Amputee Virtual Environment Support Space (AVESS), a virtual environment for amputee peer support groups (Thompson & Fisher, 2010). With any rehabilitation program for amputee veterans, the main concern should be the veterans' need to be accepted regardless of what they look like. Experiencing acceptance within communities should be a main objective.

Theoretical Framework

Andersen's Behavioral Model

Over 25 years ago the Behavioral Model of Health Services Use was developed to help understand why people use health services: to measure the equitable access to health care and to assist in developing policies that will promote access, by Dr. Ronald M Anderson. Originally use to be focused on the family as a unit it has over time shifted to the individual, as well as explain their use of personal health services, more so than their health outcomes (Andersen, 1995). Andersen and Newman (2005) outlined that the framework of this model views health services utilization should take into account both societal and individual elements. In this proposed study examination of how and why an amputee veterans' utilization of adaptive sports programs will be the focus, as well as does their participation increase their quality of life. Kurichi, et al., (2013) researched 1,536 veterans with lower extremity amputations, from October 2002 to September 2003 on identifying patient and facility level factors associated with inpatient costs and length of stay. Their study helped evaluate hospital level program evaluation, quality improvement, and developing testing programs to help reduce inpatient costs and increase efficiency of care, but also satisfaction amongst the veterans and their care. It also helped increase awareness for future health care costs. As the costs for amputee veterans will rise in the coming years, understanding the need of the veteran in terms of access and use of care, will help determine "interventions for primary illness and preserve veterans' functional status, ensure quality clinical care, and reduce the potentially enormous cost burden of their future health care" (Geiling, et al., 2012, pg.1235). To use

this model for this research the goal is to understand if current policies need to be addressed and possibly changed to meet not only the physical needs of the veteran, but also incorporating the approach of addressing their psychological and social needs of blending into their communities.

Pender's Health Promotion Model

Pender's Health Promotion Model (HPM) designed by Nola J. Pender was developed to focus on health from three specific areas. It takes into account individual characteristics and experiences, the behavior-specific thoughts and affect, and behavioral outcomes from a nurse's point of view in delivering care, but can be used for all providers. Pender, Murdaugh, and Parsons (2011) explained the theoretical roots in two theories: 1. Expected value theory, where individuals engage in actions to achieve goals they perceive as attainable and have valued outcomes. 2. Social cognitive theory, where the individual thoughts, behavior, and environment interact. In a study by Keegan, Chan, Ditchman, and Chiu (2012), the HPM was used to validate the exercise and physical active self management of people with spinal cord injuries. Of the 126 individuals studied results showed that preinjury activity and exercise level, severity of spinal injury, and commitment to exercise were predictive of post injury exercise and activity level, along with family support, self efficacy, and perceived benefits led to a commitment to a plan of action (Keegan, et al., 2012). In the context of this research, being able to understand the determinants of health behaviors of the amputee veterans will enable the understanding of the motivational factors that promote the use of an adaptive sports program to meet their individual goals. By including the HPM clinical assessment into

my research questions, the research can see what physical activities the veteran was involved in before injury, what limitations they have with their amputations, and what individual goals they would like to attain, i.e. just normal daily function all the way to competitive sports. Literature review showed that this model has not been used to study amputee veterans and it would be virtuous to see if it could be used for medical providers development of rehabilitation treatment plans, guidance on policy development for future veteran's care programs and funding, and finally future research.

Scales and Surveys

Health Related Quality of Life (HRQOL)

Since 1980, the concept of health-related quality of life (HRQOL) try to encompass the aspects of overall quality of life in regards to physical and mental health (Centers for Disease Control and Prevention, 2011). The definition relates the QoL on the individual as well as the community level allowing the health agencies to adequately address public policy and build partnerships with outside agencies. The importance of tracking HRQOL is that it can help determine preventable diseases, injuries and disabilities and provide the proper response for interventions. Karami et al. (2012) used HRQOL to assess the quality of life in comparing 38 lower limb amputee veterans with 50 normal subjects, determining that the veterans had a lower score in the physical aspect of their lives compared to normal participants. However, they fared better in terms of vitality and mental health. Rahimi, Mousavi, Soroush, Masumi, and Montazeri (2012) used HRQOL to study the relationship of the pain amputees might be having and its relationship to their QoL. The study revealed that depending on the type of pain lower

limb amputee sustained will determine their view of their quality of life. This phenomenon will be addressed in the TAPES survey that encompasses satisfaction with prosthetics devices and the pain associated with proper fit.

WHO Quality of Life—BREF (WHOQOL-BREF)

The WHOQOL-BREF is a quality of life assessment tool developed to assess the quality of life and its cross-cultural aspects (World Health Organization, 2014). It has been used in other studies to test the physical health, psychological, social relations, and environment domains of the participant enhancing the measurement of health beyond basic health indicators.

Deans, McFadyen, and Rowe (2008) used a cross-sectional descriptive study to investigate the physical and QoL relationship in lower limb amputees. The goal was to find which aspects of physical activity are strongly linked to QoL in this patient group. The authors results concluded that there was a less than expected relationship between the two factors, and that medical providers must understand what values an amputee has in regards to their social support group. This proposed research plans to bridge the gap by assessing whether there is an increase in QoL through involvement in an adaptive sports program.

Trinity Amputation and Prosthesis Experience Scales—Revised (TAPES-R)

The Trinity Amputation and Prosthesis Experience Scale-Revised (TAPES_R) is a multidimensional assessment designed to exam the psychosocial process in the adjustment of prosthetic wear, comprised of subscales that address general adjustment, social adjustment, and adjustment to limitation (Gallagher, Desmond, & MacLachlan,

2011). Gallagher and MacLachlan (2004) explain that the questionnaire is meant to facilitate the relationship variables within the psychosocial, activity restriction and prosthetic satisfaction variables to promote a rehabilitation and allow for planning of future care programs to be effective. Gallagher, Horgan, Franchignoni, Giordano, and MacLachlan (2007) also conducted a study that combined the TAPES-R with the Amputee Body Image Scale (ABIS) to provide reliability and validity in studying lower-limb amputation satisfaction with their body image, which in turn contribute to their QoL, and success in their rehabilitation.

Using these scales and surveys in this current research will allow for a true evaluation of the veteran amputee and enables the evaluation of their QOL within adaptive sports programs, and as these authors believed encourage further research.

Review of Variables and Concepts

In conducting this literature review multiple research was conducted in regards to amputees and their use of adaptive sports programs. Most of the peer reviews discovered the authors conducted literature reviews on non-veteran population. Those authors that did use veterans did not use a relationship with QoL with adaptive sports program, and most mentioned that further research needed to be done. Deans, Burns, McGarry, Murray, and Mutire (2012) studied the amputee UK lower limb amputations decreased levels of physical activity. Their research discovered that people with limb amputations are not participating in physical activity, and four areas were identified as to why: rehabilitation outcomes, body image, motivations and barriers to participation (Deans, et al., 2012). Chockalingam, Thomas, and Duval (2012) literature review consisted of

understanding veteran's participation in sport and exercise training, to aid in the reintegration and confidence building. Their results suggest that further development of rehabilitation services (adaptive sports) are necessary to provide the care for both mental and physical injuries. As well as the development of specific protocols that will identify individuals that may be able to participate in elite paralympic sport.

In a systematic review of literature by Bragaru, Dekker, Geertzen, and Dijkstra (2011) identifying 3689 articles, however only including 47 in their study. The authors were able to determine that sports participation or regular physical activity appeared to benefit those civilian amputees both physically and psychologically, and also suggest that sports should be included in rehabilitation programs during hospital stays but also highly encourage post discharge. Hill, Scruggs, and Caveney (2011) further reviewed the objective of measuring working age amputees and apply a criterion to enable fitness for duty. Although there is currently a process to evaluate amputees for specific job tasks and employment, there are no set guidelines for those amputees who can perform at a high level, and want to perform more physically demanding jobs. The authors call for a way to develop non-task based criteria that would allow providers to certify that an amputee can perform high level more physical jobs. This allows for more accommodations into society and provides a wider scope of opportunities within the community for the amputee to function. This can coincide with Murray and Fox (2002) research that examined the relationship of body image and lower limb prosthetics wear and satisfaction. Their research concluded that there is a relationship and must be kept in mind when thinking about how one is perceived in society. However, if veterans have

accepted their disability and learn to use adaptive sports as a mean to fit into society this study will assess whether QoL and life satisfaction score will increase for those that do participate and encourage those that do not to get involved in an adaptive sports program.. The goal of rehabilitation programs for veteran amputees is to restore and provide a high QoL (Epstein, Heinemann, & McFarland, 2010). The authors were able to compare both groups and found that by improving prosthetic device, mental health care, and treating other combat related injuries a significant improvement in QoL can be observed. Can adaptive sports programs gear towards the OIF/OEF populations have the same benefits for military veteran amputees as has been found when these programs are used by amputee civilians? Understanding the importance adaptive sports program plays in the QoL of amputee veterans has not been accomplished, and can adaptive sports programs be sustainable in years to come to be an integral part of highly functional veterans living with amputations.

Chapter 3: Research Method

Introduction

In this chapter, I discuss the research design, the population studied, and the sampling procedures used. Procedures for recruitment, participation, and data collection are described, and threats to external and internal validity are addressed. Additionally, ethical procedures are described to address the concerns of access to participants and their treatment and use within the study.

Research Design and Rationale

I applied a case control research design to assess psychosocial and behavioral aspects of amputee U.S. veterans' participation in ASPs in regard to the QoL of veteran amputees of OIF and OEF and to quantify the positive effects of participation in ASPs. The study made use of several surveys to measure QoL in participants. The subjects used for the study were amputee veterans from OIF/OEF who were 2 years post amputation and had been afforded the opportunity to participate in an ASP. The goal was to investigate whether those members who participated in an ASP had better QoL and life satisfaction than those who did not take advantage of the opportunity to participate in an ASP. Understanding derived from this study may encourage the VA, the DoD, and other medical institutions to use adaptive sports as part of rehabilitation and treatment plans for amputee soldiers.

Zabriskie, et al. (2005) and Yazicioglu, et al. (2012) provided information on how ASPs play a key role in enhancing QoL for those with amputations. However, most studies of ASPs have not examined the benefits of these programs for the veteran

population specifically. Often struggling with other medical problems such as PTSD and TBI, veteran amputees have multiple concerns that need to be addressed in their treatment plans. My hope in this study was to identify those concerns and advance knowledge of the benefits of ASPs for the whole person.

Methodology

Population

The defined target population for this study was OIF/OEF amputee service members who sustained injury during the height of these conflicts (Fischer, 2014) from January 2003 to December 2013, and who were eligible to begin participating in an ASP 2 years post amputation (see Appendix A).

Sample Size and Procedures

The procedure for obtaining the sample for this study involved contacting amputee veterans who were registered with VA amputee services and local Wounded Warrior programs. Additionally, outreach was made to the alumni of all services of the Warrior Transition Center with information about the study. These community partners were asked to help contact amputees through their websites and/or newsletters and to provide a survey website link that would enable veterans to register for and take part in the survey. By reaching out to multiple services, I sought to include veterans who were not registered with VA patient services in this study of participation and nonparticipation in ASPs.

Once a database of potential participants had been established, I determined inclusion criteria involving when veterans had sustained their injury. According to

Fischer (2014), from 2003-2013, 1,558 U.S. service members underwent an amputation (see Appendix A). I relied on my community partners to contact amputee veterans to solicit their participation in the study and provide the survey link (surveymonkey.com). Using the link, prospective participants accessed a consent form explaining that they would be provided a Study ID number that would allow them to submit responses anonymously.

Determination of Sample Size

G*Power was used to determine the optimum sample size for the study. G*Power allows the determination of sample size when relevant input parameters such as direction of the hypothesis (two-tailed vs. one-tailed), type I error rate, and power are provided. An optimum sample size of 824 was estimated by specifying logistic regression as the statistical test to be used, along with other relevant parameters as indicated in Figure 1.

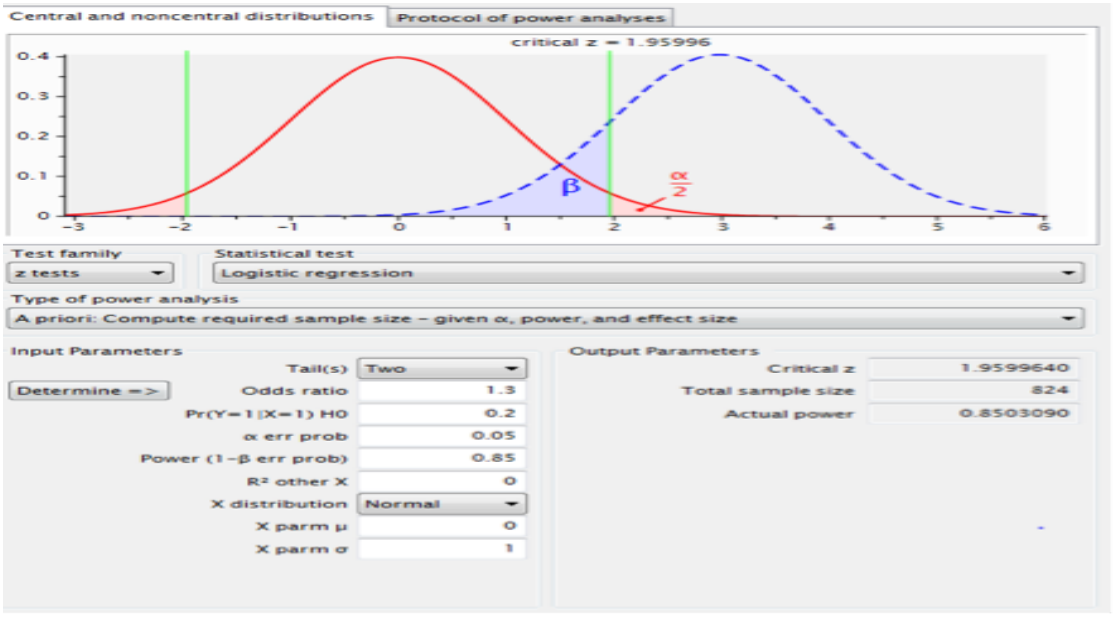

Figure 1. A G*Power screen showing the detailed input parameters used for estimating sample size.

Procedures for Recruitment, Participation, and Data Collection

The process to recruit participants for this study involved multiple avenues. The first avenue was seeking access to the VA Patient Service Database to acquire contact information for amputee veterans registered with the VA. Another resource used was the Wounded Warrior Project home offices, which I contacted to obtain contact information for registered amputee veterans. I also reached out to each Warrior Transition Center to inquire about veterans' contact information.

Upon making contact with community partners, I asked if they would include a brief description of the project in their routine communications with amputees to let them know about the study and provide online access instructions for participation. Within the survey link, I offered a detailed description of the study as well as a letter outlining participation and how to access the surveys. I assured participants that all information provided through the online survey would be totally anonymous. This letter also provided information on how the data collected would be used to promote further research and to develop policies and guidelines for future amputee veteran services.

Once the study is completed, the participants will be able to view the results as a 1-2-page summary that I will provide to the community partners. The community partners will be invited to disseminate the results by direct contact with amputee veterans, by posting links on their websites, or by publishing them within their newsletters. The study results will also be provided to multiple journals of military medicine. Additionally, I will submit abstracts to medical conferences, both civilian and military, and propose an oral presentation to the American Public Health Association (APHA) annual conference.

For those participants in this study who were not actively engaged in an ASP within their community, information about area programs was provided. Within the study, there were exit questions to ask permission for contact for future studies and follow-up.

Instrumentation and Operationalization of Constructs

I used three well-established and verified questionnaires in this study, in addition to developing basic demographic questions. Additionally, for those who participated in adaptive sports, I developed questions pertaining to their chosen sport and the level at which they were participating (i.e., local, state, or national). These questions afforded insights that may be useful for the development of Paralympic programs as well as future studies on amputee veterans.

The following subsections describe the instruments used for the study. With each of these surveys, I obtained demographic data from participants. Additionally, I developed some basic demographic items for the combined survey that may be used for future studies.

Health Related Quality of Life (HRQOL) Survey

The Health-Related Quality of Life (HRQOL) survey (Appendix B) is an open-source, public-access, multidimensional instrument that includes self-reported measures for physical and mental health. Developed by the Centers for Disease Control and Prevention (CDC), this survey can be used to assess and validate numerous health, job, and family issues. It helped in assessing whether veterans who participated in adaptive

sports had higher levels of QoL and life satisfaction and were more productive at work, at school, and within their communities than those who did not participate in ASPs.

This survey has been used in multiple clinical studies. Additionally, it has been used in the specific context of amputees. Taghipour, et al. (2009) used the HRQOL to determine the long-term health related issues of Iranian veterans who had undergone an amputation. The authors concluded that poor physical HRQOL was associated with amputation and that poor mental HRQOL was associated with obtaining education and finding work. This study suggested that appropriate medical management and rehabilitation were needed to increase the HRQOL scores of amputee veterans. No previous studies were found assessing HRQOL among U.S. amputee veterans.

World Health Organization Quality of Life—BREF (WHOQOL-BREF)

The World Health Organization Quality of Life—BREF (WHOQOL-BREF) instrument was introduced in 1991 with the goal of developing an international cross-cultural QoL assessment. The WHOQOL-BREF (Appendix C) consists of 26 questions that measure physical health, psychological health, social relationships, and environment. Within this study, it allowed for assessment of veterans' perceptions related to their culture, personal goals, standards, and concerns.

The WHOQOL-BREF has been used in multiple studies of QoL. In one recent study, Katon and Reiber (2013) researched physical and mental health conditions among female and male veteran members with major traumatic limb loss during OIF/OEF as well as the comorbid health conditions of service members. The authors concluded that there was a high level of success in regards to physical and mental health conditions

being addressed. They suggested that their findings highlighted issues affecting female veterans with amputations and their limitations. Their study could be useful for future qualitative studies aimed toward understanding veterans' experiences and needs related to amputations.

Trinity Amputation and Prosthesis Experience Scales—Revised (TAPES-R)

The Trinity Amputation and Prosthesis Experience Scales—Revised (TAPES-R; Appendix D) was developed by the Dublin Psychoprosthetics Group to examine the psychological processes involved in adjusting to amputation and prosthesis. It can be freely used for clinical and research purposes; however, a request was made and permission granted to obtain a copy of the evaluation for those amputees who do not have or use a prosthesis. In this study, I used it to help determine whether a participant had adjusted to a prosthesis while participating in an adaptive sport, thereby increasing QoL.

The survey has been used in multiple research studies examining adjustment to the use of prostheses. Coffey, Gallagher, and Desmond (2014) used the survey, along with the WHOQOL-BREF, in a prospective study examining participants at three time points: (a) during admission to rehabilitation, (b) 6 weeks post rehabilitation discharge, and (c) 6 months post discharge. Their results showed that QoL increased or was maintained in regard to a functioning prosthesis and goal pursuit, leading to higher QoL 6 months post rehabilitation discharge.

Data Analysis Plan

The software used for this study was OpenEpi, which allowed the creation of an electronic survey combining the HRQOL, WHOQOL-BREF, and TAPES-R, in addition

to affording me the ability to perform data entry and to use SPSS to assist with the analysis, performing multiple calculations to test the matched case-control analysis, test count data, and develop independent *t*-test and one-way ANOVA. Sample size for proportions and power calculations for proportions in this case-control study was developed for the comparison of two means.

Before proceeding into the data analysis, proper cleaning and screening of the data were conducted. I determine the following: That the data from the amputee veterans' responses would accurately reflect the purpose of the study. All data would be accounted for and not missing, and if data is missing, there is a plan to mitigate the missing data. Additionally, it was important that the responses not be unusual or extreme, in that such data might distort the findings. To prevent the above from happening, I examined data, focusing on code and value cleaning; the distribution of the data; and the identification of missing values, if any. I then made the appropriate adjustments for missing data, understanding that there might be outliers to consider and decreasing the statistical assumptions.

Research Questions and Hypotheses

1. What are the differences in the psychosocial and behavioral factors that encourage or discourage participation in adaptive sports programs (ASPs) for amputee U.S. war veterans using Health-Related Quality of Life scores?

   H_0: There is no significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

H_1: There is significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

2. Are there differences in quality of life (QoL) and life satisfaction of amputee U.S war veterans who do or do not participate in ASPs based on World Health Organization Quality of Life—BREF (WHOQOL-BREF) scores?

   H_0: There is no significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

   H_1: There is significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

3. How does duration of participation in ASPs by U.S. war veterans affect their physical, psychological, and social wellbeing based scores from the Trinity Amputation and Prosthesis Experience Scales—Revised (TAPES-R) questionnaire?

   H0: There are no significant associations between participation time length (greater than three years versus less than or equal to 3 years) in an ASP and physical, psychological, and social wellbeing scores in OIF/OEF veterans.

   H1: There are significant associations between participation time length (greater than three years versus less than or equal to 3 years) in an ASP and physical, psychological, and social wellbeing scores in OIF/OEF veterans.

Statistical Protocol

Logistic Regression

The use of logistic regression describes the predictability of a dependent variable and determines which independent variable may have a major effect on the dependent variable. In regard to this research, what effect does participation or nonparticipation in an ASP have on the QoL and life satisfaction scores of OIF/OEF amputee veterans? The goal of logistic regression is to find what will help predict the probability of the value of Y variable as a function of the X variable.

Chi-Square Test

Using chi-square test within this research enabled the examination of the benefits of an ASP. It allowed the observation of two variables: participation versus nonparticipation in an ASP. It also assisted in determining whether satisfaction with prosthesis determined participation or nonparticipation.

Validity

External Validity

> Within this research, there may be threats to external validity, defined as the degree to which results of a study may apply, be relevant, or be generalized to populations or groups that did not participate in the study. A study is externally valid, or generalizable, if it allows unbiased inferences regarding some other specific target population beyond the subjects in the study. (Porta, 2008, p. 252)

I tried to minimize these threats in the development as well as the collection phase of the study. One threat was *selection bias*, defined as "error due to systematic differences in

past exposures and other characteristics between subjects who take part in a study and those who do not may or may not" (Porta, 2008, p. 225). Because the research involved looking at a certain group, amputee veterans during OIF/OEF, there can be an assumption that all members of this group were equal. However, they had differences in terms of age, race, gender, attitude, mental status, as well as many other factors. The key was to be able to assess the similarities/differences between those who took part in adapted sports and those who did not. Another external threat that the research had to minimize was the way in which the research was constructed. I was careful in the definition of the concepts of QoL and/or life satisfaction. This issue was addressed by using three standardized and well-validated scales to assess the outcomes of interest.

Lastly, in terms of an external threat, are the effects due to recall bias. The research may also need to take into account that those who suffered their injury in 2004 or 2005 may have a different sense of quality of life than amputee veterans who suffered more recent injury (e.g. in 2012 or 2013).

Internal Validity

The threat to internal validity defined as, "the index and comparison groups must be selected and compared in such a manner that the observed differences between their effect on the outcome variables under study may, apart from sampling error, be attributed only to the hypothesized effect under investigation" (Porta, 2008, p. 252), will also have to be taken into account within this study. Will the conclusion that adaptive sports program having a benefit on quality of life and life satisfaction truly reflect what the research is studying. The research will have to say with much certainty adaptive sports

benefits quality of life for amputee veterans of OIF/OEF and should be a part of the rehabilitation treatment plan. The study will account for the type of research design used, and the potential threats within those designs that can influence of the results.

Ethical Procedures

In terms of ethics the research will benefit the study population through its support of positive social change, while ensuring no harm to the study participants. The study will definitely take into account ensuring each participant understands informed consent, that they understand the proposed study and the purpose of the study, and finally that they fully consent to the study. They will be informed of the IRB process that was taken to allow the research. They must also understand that their participation will be kept confidential and no repercussion from their answers can or will be used against them. Being an anonymous survey the study will not use names and once each participant agrees to participate they will be given a random participant number in lieu of personal information, only demographic information will be collected to enable an aggregated profile of study participants. The research will make sure to avoid deceptive practices, by informing the participants of the reasons for this study examining the benefits of adaptive sports programs for amputee veterans. Lastly, even after the participant has given informed consent to participate, if they choose they will be allowed to withdraw from the study and that their results will not be used as well as no adverse actions will be taken if they decide to withdraw.

Summary

Chapter 1 introduced the history of the use of amputation among soldiers affected in military conflicts including the recent OIF/OEF conflict. It introduced how adaptive sports can positively impact amputee quality of life and life satisfaction, and how veterans of OIF/OEF can benefit from involvement in adaptive sports both at the local and national levels. The purpose of this study will be to examine the understanding of the importance of adaptive sports in the recovery of veterans from their point of view derived from their experiences with being involved in adaptive sports programs and how the adaptive sports program benefits the amputee's quality of life and life satisfaction which ultimately impacts their involvement within their communities.

In Chapter 2, a review of the primary published literature regarding the assessment of quality of life and life satisfaction amongst military veterans and the benefits of adaptive sports on the quality of life and life satisfaction of amputees was made. Chapter 2 ended by summarizing the identified gap(s) in knowledge that supported the need to conduct the proposed research.

Chapter 3 presented the methodology of the proposed study. The use of a combination of quality of life scales such as HRQOL, the WHOQOL-BREF and the TAPES-R was described for examining the associations between veteran's participation in ASP and physical, psychological, and behavioral wellbeing. The statistical methods used to test the stated hypotheses, procedures used for estimating sample size, and description of study population and study design were provided. In Chapter 4, descriptions of the results of analyses of the collected data are provided.

Chapter 4: Results

Introduction

The purpose of this research was to gain a better understanding of the psychosocial and behavioral aspects of amputee U.S. veterans' participation in ASPs in regard to the QoL of veteran amputees of OIF and OEF. The results of this study are intended to address the benefits of adapted sports in treatment/rehabilitation of amputee veterans. Insights derived from this study may encourage the VA, the DoD, and other medical institutions/agencies to use adaptive sports as part of rehabilitation and treatment plans for amputee soldiers. The research also examined whether amputee veterans who participated in ASPs had better life experiences in terms of medical/personal care, education, employment, and income. The results may help in developing and implementing rehabilitation platforms such as ASPs that can be integrated with various therapeutic interventions for combat veterans, which in turn might help them to better integrate with their communities socially and professionally.

The remainder of Chapter 4 provides information on the setting and the results obtained from this study, including the demographic characteristics of the participants. Forty-four participants answered three well-known QoL surveys in regard to their health in relation to their participation or nonparticipation in an ASP. The study was strictly voluntary; veterans were provided a link to the survey, and if they chose to take the survey after reading the participation criteria, they did so voluntarily.

Chapter 4 provides information on the analysis performed on data gathered through the three surveys used for this study. I address the report process, describe the specific codes and categories used, identify themes that emerged from the data, and

address any discrepant cases and how they were factored into the analysis. The results are presented by reporting descriptive statistics that characterize the study participants. Statistical analyses have been organized by research question/hypothesis. I report statistical tests of hypotheses that emerged from the analysis of main hypotheses for the study. Finally, I present tables and figures to illustrate the results. To close Chapter 4, I offer evidence of the trustworthiness of the study in terms of credibility, transferability, dependability, and confirmability, as described in Chapter 3. Finally, I summarize the findings in relation to the research questions and present a transition into Chapter 5.

Setting

The survey used in this research was conducted solely through surveymonkey.com. The majority of the participants were solicited to participate through multiple forms of social media, including Facebook and LinkedIn. Contact was also made with amputee groups associated with the U.S. Army Warrior Transition Command, the Wounded Warrior Project, the Army and Air Force Wounded Warrior Program, and the Amputee VA Support Team to recruit potential study participants. However, minimal help was given by these entities to reach out to veteran amputees. Additionally, solicitation for participants occurred through local and state Disabled American Veterans organizations, Veteran Service Offices, the Amputee Coalition organization, and networking opportunities with the Extremity Trauma and Amputation Center of Excellence (EACE). Finally, I was able to solicit veterans through their association with the Valor Games Far West, the Tampa Adaptive Golf Academy associated with the Amputee VA Support Team, the Adaptive Golf Association, prosthetic designers, and

multiple adaptive sports organizations. There were no personal or organizational conditions that influenced participants or their experience at the time of the study that might affect interpretation of the information provided by the 44 amputee veterans who volunteered for this research effort. The recruitment of study participants was in line with the Walden University IRB-approved protocol. The Statistical Package for the Social Sciences (SPSS) was used to perform statistical analyses of the results.

Demographics

Study participants represented a subset of the 1,558 OIF/OEF/OND amputee service members within the U.S. Army Warrior Transition Command (WTC), VA, and DoD whose amputations occurred during the period from January 2003 through December 2013. Demographic profiles of the 44 participants are given in the figures and tables that follow, including sociodemographic of gender, age, military branch, race/ethnicity, marital status, education, and employment.

In regard to gender (Figure 2), 15 (34.1%) participants were female and 29 (65.9%) were male. In the responses for age (Table 1), five participants (11.4%) were 18-29 years of age, 21 (47.7%) were 30-39 years of age, nine (20.5%) were 40-49 years of age, and nine (20.5%) were 50 years of age or older. Data for military branch of service (Figure 3) revealed that participants represented the Army (n = 29, 65.9%), Army Reserve (n = 2, 4.5%), Army National Guard (n = 1, 2.3%), Marine Corps (n = 5, 11.4%), Navy (n = 2, 4.5%), Air Force (n = 4, 9.1%), and Coast Guard (n = 1, 2.3%).

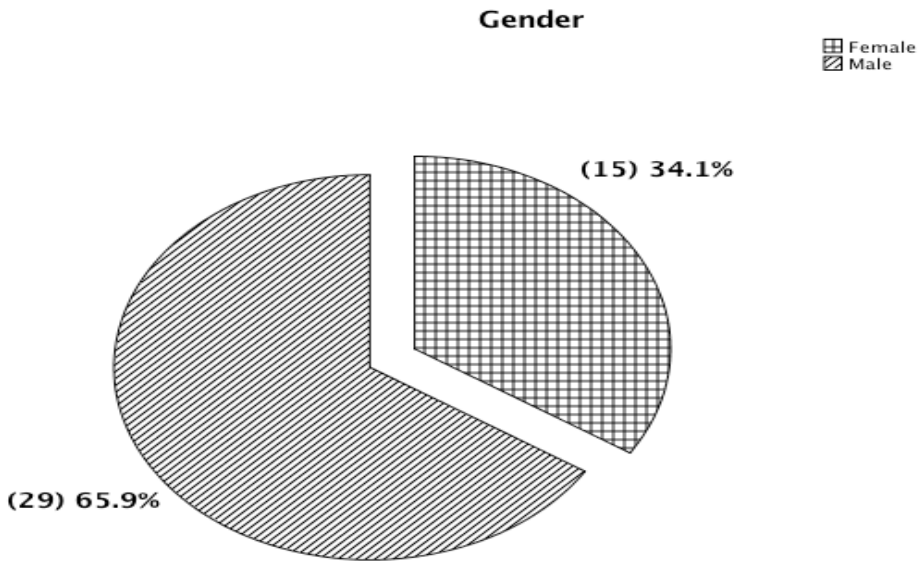

Figure 2. The proportion of research participants by gender ($N = 44$).

Table 1

The Number and Proportion of Research Participants by Age Group.

	Frequency	Percent
18-29	5	11.4
30-39	21	47.7
40-49	9	20.5
50 above	9	20.5
Total	44	100.0

$N = 44$.

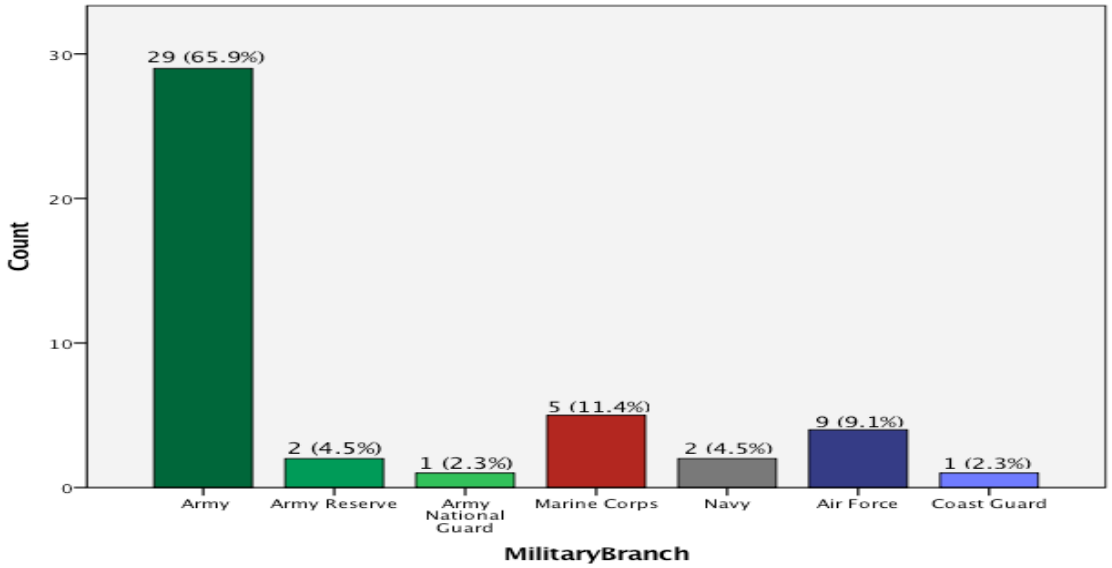

Figure 3. The number and proportion of research participants according to military branch of service ($N = 44$).

Due to limited comparison data from previous studies, it was difficult to compare the demographics of participants in this study with those reported in past research. However, information obtained from previous qualitative research conducted by the Department of Veterans Affairs Office of Inspector General indicated that of 1,228 service members suffering a major traumatic amputation during OIF/OEF/OND from 2001-2011, most were under 30 years of age, male, and in the Army (Department of Veterans Affairs Office of Inspector General, 2012). These data were consistent with the findings of the current study.

In terms of race/ethnicity (Figure 4), the majority of the participants were White/Caucasian ($n = 36$, 81.8%), with Black or African American ($n = 5$, 11.4%) being the second most common response. Other groups represented in the sample were Asian/Pacific ($n = 1$, 2.3%) and Hispanic ($n = 2$, 4.5%). These data were consistent with

data from the Defense Casualty Analysis System that indicated that White/Caucasian individuals were injured in greater numbers than other groups during these conflicts.

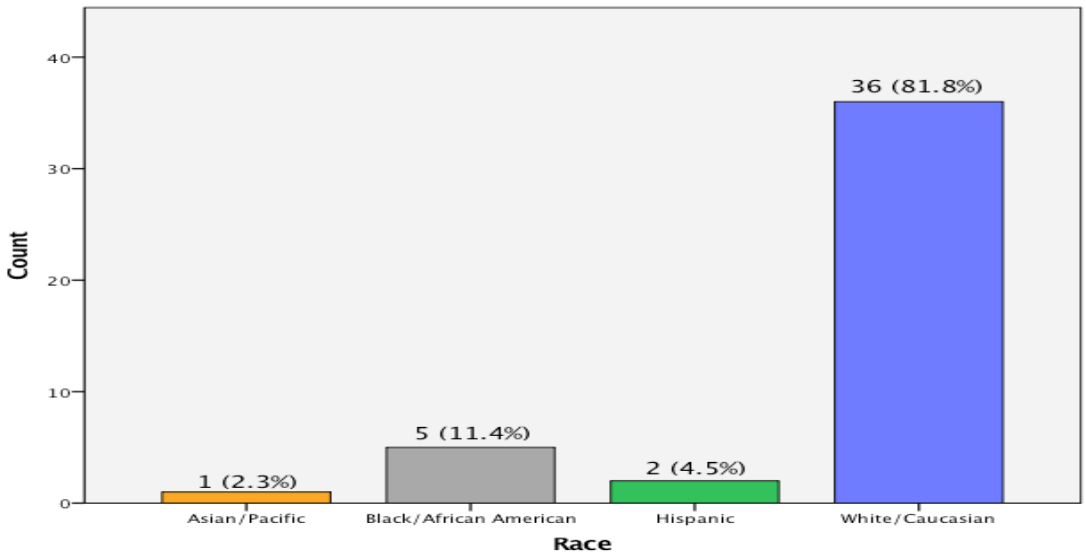

Figure 4. The number and proportion of research participants based on race ($N = 44$).

In terms of marital status (Table 2), 24 (54.5%) participants indicated that they were married, two (4.5%) indicated that they had a significant other, and 18 (40.9%) responded that they were widowed, divorced, single, or separated.

Table 2

The Number and Proportion of Research Participants Based on Marital Status

	Frequency	Percent
Married	24	54.6
Significant other	2	4.5
Widowed/divorced/separated	18	40.9
Total	44	100.0

For educational level (Table 3), 17 (38.6%) respondents indicated some college education, 14 (31.8%) indicated that they were college graduates, three (6.8%) indicated that they had completed some postgraduate study, and seven (15.9%) indicated that they had a postgraduate degree.

Table 3

The Number and Proportion of Research Participants Based on Education Level

	Frequency	Percent
High school	3	6.8
Some college	17	38.6
College graduate	14	31.8
Some postgraduate	3	6.8
Postgraduate	7	15.9
Total	44	100.0

Analysis of employment data (Table 4) indicated that 12 (27.3%) participants reported that they worked full time, four (9.1%) stated that they worked part time, 13 (29.5%) reported that they were unemployed due to being retired, and nine (20.5%) reported that they were disabled and not able to work. Unfortunately, no data were available for comparison in regard to marital status, education, and employment.

Table 4

The Number and Proportion of Research Participants Based on Employment Status

	Frequency	Percent
Working full time	12	27.3
Working part time	4	9.1
Retired	13	29.5
Disabled, not able to work	9	20.5
Student	5	11.4
Self-employed	1	2.3
Total	44	100.0

Comparison of the participants' who responded showed a relationship to the overall total of military amputees inclusive to this study period. It established the representation of the participants with the overall community of military amputees of OIF/OEF/ONF amputee service members from January 2003 through December 2013.

Subject Recruitment & Data Collection

Data collection was based on voluntary participation by individuals who were provided a link to a survey on "The Association Between Adaptive Sports Programs and Quality of Life Among Amputee U.S. War Veterans" (https://www.surveymonkey.com/r/AmpVets2Achieve2015) by the ASPs with which they were associated. Some participants received the survey link in an email message from the manager of their ASP. I also printed and handed out business cards to veteran amputees that provided the survey link, along with a request that they pass the information regarding the survey to other veterans. In an effort to use social media to reach veteran amputees, I created a Facebook page titled "Amputee Quality of Life Study," from which I made posts on multiple

amputee pages and groups on Facebook. Use of these avenues yielded a total of 230 views of the survey page. Subsequently, 44 individuals volunteered to participate in the study, for a response rate of 19%.

The survey for data collection was developed on surveymonkey.com and was available to participants for 10 months. Data were collected within the surveymonkey.com database and were only viewable by me. Minor variations were made from the data collection plan presented in Chapter 3. Specifically, I made direct contact with organizations other than the U.S. Army WTC and the VA to solicit participants. These additional contacts included ASP coordinators, prosthetic companies, and rehabilitation specialists. As I contacted these organizations, I explained the research purpose, provided IRB approval documents, and described the potential benefits of amputee participation in the survey. On many occasions, these agencies guided me to other networks they knew to provide assistance in soliciting research participants. Most of the agencies that I communicated with had direct contact with amputee veterans, including current active duty amputees. Of the 44 participants who decided to participate in the study, only 31 completed all three surveys (see Table 5).

Table 5

Response Rate for Each of the Surveys Used

	Demographics	HRQOL	WHOQOL-BREF	TAPES-R
Responses	44 completed (100%)	43 completed (98%)	34 completed (77%)	31 completed (70%)

Data Analysis

Data analysis was conducted online using survey monkey. Survey responses are provided dependent upon types of questions presented within the survey, whether closed-ended or open ended. Data for closed-ended questions were calculated by percentages of participant responses and presented in charts that I developed. The analysis of data for matrix questions involved the use of a weighted average to allow for examination of the most selected responses. Open-ended questions allowed me to solicit participant comments to be provided for certain questions that had the response of "Other" allowing for detail of nonselection of developed responses. Data from the three distinctive QoL and life satisfaction surveys provided the input used to conduct the analysis.

Descriptive Epidemiology

This study involved the collection of data using QoL scales from the HRQOL, the WHOQOL-BREF, and the TAPES-R, with which I sought to answer the research questions.

Research Question 1

Research Question 1 addressed the psychosocial and behavioral factors that encourage participation in ASPs for amputee U.S. war veterans through comparison of HRQOL scores. Allowing for the analysis of the HRQOL survey in terms of overall health in comparison by gender, participation in ASP, and military branch. Forty-three of the 44 participants (97.7%) provided responses, with 30 amputees (69.7%) reporting participation in an ASP, whereas 13 (30.2%) did not (see Table 6). Due to data sparsity,

Fisher's exact test was used for testing the hypothesis as related to associations. Tables 6 to 8 indicate the veteran amputees' feelings about their "overall health."

Table 6

Cross-Tabulation of Participants' Overall Health by Gender

		Gender		Total
		Female	Male	
Overall health	Excellent	4	1	5
	Very good	7	10	17
	Good	1	16	17
	Fair	2	1	3
	Poor	0	1	1
Total		14	29	43

Fisher's exact test

	Value	*df*	Exact sig. (2-sided)
Fisher's exact test	13.436		.003
N of valid cases	43		

Initially, 44 amputated veterans volunteered to participate in the benefits of adaptive sports program study. However, a total of 43 completed the Health Quality of Life portion of the survey. One participant did not complete this section of the survey reasons unknown, and was not retained for this portion of the study results. Of the male volunteers 29/43 (67.44%) provided input on their perception about their overall health. For females, 14/43 (32.56%) provided input on their perception about their overall health. There was a statistically significant association between gender and perception of their overall health as assessed by Fisher's exact test, $p = .003$. Therefore, we can reject the

null hypothesis and accept the alternative hypothesis of the HRQOL results, that in regards to gender OIF/OEF veterans who participate in an adaptive sports program have stronger psychological and behavioral factors that encourage participation.

Table 7

Cross-Tabulation of Participants' Overall Health With Participation in an Adaptive Sports Program

		Participation in ASP		Total
		Yes	No	
Overall health	Excellent	4	1	5
	Very good	14	3	17
	Good	10	7	17
	Poor	2	2	4
Total		30	13	43

Fisher's exact test

	Value	*df*	Exact sig. (2-sided)
Fisher's exact test	3.302	3	.353
N of valid cases	43		

Of the 43 who completed the Health Quality of Life portion of the survey in regards to overall health and participation in an adaptive sports program, results yielded, that 30 or 69.7% participated in an adaptive sports program whereas 13 or 30.2% did do not. There was no statistically significant association between participation or non-participation in an adaptive sports program and perception of their overall health as assessed by Fisher's exact test, p = .353. Therefore, I fail to reject the null hypothesis that OIF/OEF veterans who participate in an adaptive sports program have no difference in their self-assessment of their overall health.

Table 8

Cross-Tabulation of Self-Assessment of Overall Health by Branch of Service

		Military branch							
		Army	Army Reserve	Army National Guard	Marine Corps	Navy	Air Force	Coast Guard	Total
Overall health	Excellent	4	0	0	1	0	0	0	5
	Very good	10	1	0	2	1	2	1	17
	Good	14	0	0	1	1	1	0	17
	Poor	1	1	1	1	0	0	0	4
Total		29	2	1	5	2	3	1	43

Fisher's exact test

	Value	*df*	Exact sig. (2-sided)
Fisher's exact test	18.502	18	.362
N of valid cases	43		

In regards to overall health associated with military branch, 43 participants provided responses on their military branch and their perception about their overall health. There was no statistically significant association between military branch and perception of their overall health as assessed by Fisher's exact test, p = .362.

There was no association between the two variables. Therefore, we cannot reject the null hypothesis and cannot accept the alternative hypothesis of the HRQOL results, in regards to association with military branch. That OIF/OEF veterans who participate in an adaptive sports program have stronger psychological and behavioral factors that encourage participation.

Research Question 2

Are there differences in quality of life and life satisfaction of amputee U.S war veterans who do/ or do not participate in adaptive sports programs based on comparing results from WHOQOL-BREF scores? Of the 34/44 (77.2%) amputees that decided to complete the WHOQOL-BREF section of the study to provide their perception of their quality of life due their participation or non-participation in an adaptive sports program. Due to data sparsity issues, the Fisher's Exact test was used for testing the hypothesis as related to associations. The WHOQOL-BREF was able to compare enjoyment of life, participation in adaptive sports program of the 34 (77%) amputees who completed this section. In terms of enjoyment of life, 24/34 (70.5%) stated that they do participate in an adaptive sports program versus 10/34 (29.4%) that do not (Table 9). A comparison was also conducted to analyze enjoyment of life by gender (Table 10). The participants were also asked about having a meaningful life or life satisfaction within the WHOQOL-BREF survey. A comparison was conducted relative to participation in an adaptive sports program (Table 11) and gender (Table 12).

Table 9

Cross-Tabulation of Enjoying Life With Participation in an Adaptive Sports Program

		Participation in ASP		
		Yes	No	Total
Enjoy life				
	A moderate amount	2	8	10
	Very much	17	2	19
	An extreme amount	5	0	5
Total		24	10	34

Fisher's exact test

	Value	*df*	Exact sig. (2-sided)
Fisher's exact test	15.625	2	.000
N of valid cases	34		

The participation response to this portion of the survey, resulted in a total of 34 (77.2%) who completed the World Health Organization-BREF Quality of Life survey portion of the survey. Ten participants did not complete this section of the survey for reasons unknown. Of the 34 participants that provided input on their participation (24; 70.5%) or non-participation (10; 29.4%) in an adaptive sports program and their perception about enjoying life, there was a statistically significant association between participation or non-participation in an adaptive sports program and perception of enjoying life assessed by Fisher's exact test, $p = 0.000$. There was an association between the two variables. Therefore, we can reject the null hypothesis and accept the alternative hypothesis. That in regards to enjoying life, OIF/OEF veteran amputees who participate in an adaptive sports program have a better quality of life and life satisfaction.

Table 10

Cross-Tabulation of Participants Who Enjoy Life in Relationship to Gender

		Gender		
		Female	Male	Total
Enjoy life				
	A moderate amount	2	8	10
	Very much	8	11	19
	An extreme amount	1	4	5
Total		11	23	34

Fisher's exact test

	Value	*df*	Exact sig. (2-sided)
Fisher's exact test	1.678	2	.516
N of valid cases	34		

In reference to their enjoyment of life, of the 34 participants, males 23 (67.6%) provided input on their perception about enjoying life. Whereas, females, 11 (32.3%) provided input on their perception about their perception about enjoying life. There was no statistically significant difference between genders perception of their enjoying life as assessed by Fisher's exact test, p =.516. There was no association between the two variables. Therefore, we cannot reject the null hypothesis, which is that OIF/OEF veteran amputees who do not participate in an adaptive sports program have a better quality of life and life satisfaction, in terms of their gender.

Table 11

Cross-Tabulation of Meaningful Life by Participation in Adaptive Sports Program

		Participation in ASP		
		Yes	No	Total
Meaningful life				
	A moderate amount	2	7	9
	Very much	18	2	20
	An extreme amount	4	1	5
Total		24	10	34

Fisher's exact test

	Value	*df*	Exact sig. (2-sided)
Fisher's exact test	12.696	2	.002
N of valid cases	34		

In comparing having a meaningful life and participation in an adaptive sports program. The 34 (77.2%) who completed the meaningful life area of the World Health Organization-BREF Quality of Life survey, yielded 24; 70.5% participate, whereas 10; 29.4% are non-participants in an adaptive sports program. There was a statistically significant association between meaningful life and participation in an adaptive sports program, as assessed by Fisher's exact test, $p = 0.002$. There was an association between the two variables. Therefore, we can reject the null hypothesis and accept the alternative hypothesis. That in regards to having a meaningful life, OIF/OEF veteran amputees who responded that they participate in an adaptive sports program (PASPY) have a better quality of life and life satisfaction.

Table 12

Cross-Tabulation of Meaningful Life in Regard to Gender

		Gender		
		Female	Male	Total
Meaningful life				
	A moderate amount	2	7	9
	Very much	8	12	20
	An extreme amount	1	4	5
Total		11	23	34

Fisher's exact test

	Value	*df*	Exact sig. (2-sided)
Fisher's exact test	1.347	2	.590
N of valid cases	34		

Of the 34 participants, 23 (67.6%) were male and provided input on their perception about having a meaningful life. Whereas, 11 (32.3%) were female and provided input on their perception about their perception about having a meaningful life. There was no statistically significant difference between genders based upon perception of having a meaningful life as assessed by Fisher's exact test, $p = .590$. Overall, there was a statistically significant association found between enjoying life as well as having a meaningful life and participation in an adaptive sports program, and this finding applies to both male and female military amputees.

Research Question 3

For the third research question, how does duration of participation in adaptive sports programs by U.S. war veterans affect the physical, psychological, and social aspects as assessed using the TAPES(R) survey? An ordinal regression analysis was

conducted to again ask that amputee about overall health in association with how long they have lived with their amputation, as well as consideration with current prosthesis. Also, to see if Gender, Age, and Military Branch had an effect on acceptance living with their amputee status. Table 12-13 shows analysis of these considerations.

Table 13

Summary of Health and Years Since Amputation

		N	Marginal percentage
Health	Fair	3	9.7%
	Good	26	83.9%
	Very good	2	6.5%
Years since amputation	2.00	1	3.2%
	3.00	2	6.5%
	4.00	2	6.5%
	5.00	1	3.2%
	6.00	2	6.5%
	7.00	1	3.2%
	8.00	6	19.4%
	9.00	2	6.5%
	10.00	7	22.6%
	11.00	3	9.7%
	12.00	2	6.5%
	14.00	1	3.2%
	15.00	1	3.2%
Valid		31	100.0%
Missing		13	
Total		44	

Note. It is not known why 13 participants did not complete this portion of the survey.

The final model -2 Log Likelihood, statistically significantly predicted the dependent variable over and above the intercept-only model. A Fisher's Exact test of independence was conducted between health and years since amputation. All expected

cell frequencies were greater than five. There was no statistically significant association between health and years since amputation, $\chi 2(3) = 0.827$, p =1.

Table 14

The association between overall health and time since amputation

		Time		Total
		≤ 3 years	≥ 3 years	
Health	Fair	0	3	3
	Good	2	12	14
	Very Good	1	13	14
Total		3	28	31

Time ≤ 3 = Time since amputation less than or equal to three years

Time ≥ 3 = Time since amputation greater than three years.

Fisher's exact test

	Value	df	Exact Sig. (2-sided)
Fisher's Exact Test	1.599		1.000
N of Valid Cases	31		

The Deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $X^2(33) = .007$, p = 1.000. The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $X^2(33) = .003$, p = 1.000. Therefore, each produce a chi-square test of independence was conducted between health and years since amputation. All expected cell frequencies were greater than five. There was no statistically significant association between health and years since amputation.

Table 15

Goodness of Fit, Health and Years Since Amputation

Goodness-of-fit			
	Chi-square	*df*	Sig.
Pearson	.003	33	1.000
Deviance	.007	33	1.000

Table 16

Parameter Estimates of Health, Gender, Age, Military Branch, and Years Since Amputation

						95% confidence interval	
	Estimate	Std. error	Wald	*df*	Sig.	Lower bound	Upper bound
Fair	-26.375	909.310	.001	1	.977	-1808.589	1755.839
Very good	2.249	906.722	.000	1	.998	-1774.893	1779.392
Gender	-21.507	58.214	.136	1	.712	-135.603	92.590
Age	7.212	34.787	.043	1	.836	-60.968	75.393
Military branch	.592	33.189	.000	1	.986	-64.458	65.642
Years since amputation							
2.00	1.777	1263.218	.000	1	.999	-2474.084	2477.638
3.00	3.738	943.329	.000	1	.997	-1845.154	1852.629
4.00	-12.804	896.696	.000	1	.989	-1770.295	1744.688
5.00	-18.440	1282.376	.000	1	.989	-2531.850	2494.971
6.00	1.907	1098.084	.000	1	.999	-2150.297	2154.112

7.00	16.201	1265.109	.000	1	.990	-2463.366	2495.768
8.00	1.621	897.827	.000	1	.999	-1758.087	1761.330
9.00	-2.933	932.003	.000	1	.997	-1829.626	1823.760
10.00	15.870	897.598	.000	1	.986	-1743.390	1775.129
11.00	18.542	899.617	.000	1	.984	-1744.676	1781.759
12.00	-1.998	909.487	.000	1	.998	-1784.560	1780.565
14.00	1.777	1263.218	.000	1	.999	-2474.084	2477.638
15.00	0[a]	.	.	0	.	.	.

Pseudo *R*-square	
Cox and Snell	.636
Nagelkerke	.953
McFadden	.919

Table 17

Summary of Health, Gender, Age, and Military Branch

		N	Marginal percentage
Health	Fair	3	9.7%
	Good	26	83.9%
	Very good	2	6.5%
Gender	Female	9	29.0%
	Male	22	71.0%
Age	18-29	4	12.9%
	30-39	15	48.4%
	40-49	5	16.1%
	50+	7	22.6%
Military Branch	Army	25	80.6%
	Marine Corps	3	9.7%
	Navy	1	3.2%
	Air Force	1	3.2%
	Coast Guard	1	3.2%
Valid		31	100.0%

Missing	13
Total	44

The final model -2 Log Likelihood, statistically significantly predicted the dependent variable over and above the intercept-only model, A chi-square test of independence was conducted between health, gender, age, and military branch. All expected cell frequencies were greater than five. There was a statistically significant association between health, gender, age, and military branch $\chi 2(9) = 31.349$, $p <. 001$.The final model statistically significantly predicted the dependent variable over and above the intercept-only model.

Table 18

Logistic Regression Between Health, Gender, Age, and Military Branch

Model fitting information

Model	-2 log likelihood	Chi-square	*df*	Sig.
Intercept only	31.349			
Final	.000	31.349	9	0.001

Table 19

Goodness of Fit Between Health, Gender, Age, and Military Branch

Goodness-of-fit

	Chi-square	*df*	Sig.
Pearson	9.556	39	1.000
Deviance	11.685	39	1.000

Under the null hypothesis, both the Pearson and Deviance goodness of fit measures are asymptomatically chi-squared distributed with $m\,(J-1)-p$ degrees of freedom, where m = number of covariate patterns, J = number of categories of the dependent variable, and p = number of non-redundant parameters in the model. The Deviance goodness-of-fit test indicated that the model was a good fit to the observed data, $X^2(39) = 11.685$, p = 1.000. The Pearson goodness-of-fit test indicated that the model was a good fit to the observed data, $X^2(39) = 9.556$, p = 1.000. Therefore, each produce a chi-square test of independence was conducted between health, gender, age, and military branch. All expected cell frequencies were greater than five. There was a statistically significant association between health gender, age, and military branch.

Table 20

Parameter Estimates of Health, Gender, Age, and Military Branch

Parameter Estimates

							95% confidence interval	
		Estimate	Std. error	Wald	*df*	Sig.	Lower bound	Upper bound
Threshold	Fair	22.773	763.469	.001	1	.976	-1473.598	1519.144
	Very good	49.649	897.124	.003	1	.956	-1708.682	1807.979
Location	Years since amputation	.247	.306	.655	1	.418	-.352	.846
	Female	24.287	272.013	.008	1	.929	-508.849	557.424
	Male	0[a]	.	.	0	.	.	.
	18-29	-14.160	241.410	.003	1	.953	-487.314	458.995

30-39	-.827	2.389	.120	1	.729	-5.509	3.855
40-49	10.699	430.322	.001	1	.980	-832.716	854.114
50+	0[a]	.	.	0	.	.	.
Army	23.298	763.468	.001	1	.976	-1473.073	1519.668
Marine Corps	33.748	869.099	.002	1	.969	-1669.655	1737.151
Navy	24.782	871.412	.001	1	.977	-1683.154	1732.718
Air Force	23.545	871.411	.001	1	.978	-1684.389	1731.480
Coast Guard	0[a]	.	.	0	.	.	.

[a]This parameter is set to zero because it is redundant.

Pseudo *R*-square	
Cox and Snell	.636
Nagelkerke	.953
McFadden	.919

Overall Results

Of the 44 total responses, one participant response was not completed by an amputee, however by their spouse who only completed demographics portion of the survey but did allude to amputee member participation within cycling program, in a comments section. All incomplete responses were factored into the analysis in terms of what area of the survey that was completed. With the survey having three distinct surveys, The Health-Related Quality of Life (HRQOL), World Health Organization Quality of Life –BREF (WHOQOL-BREF), and the Trinity Amputation and Prosthesis Experience Scales –Revised (TAPES-R) responses from each helped answer the research questions. Analysis of the developed survey from each of the surveys, enabled me to identify concerns and advance the knowledge of the benefits of adaptive sports program, on the whole person concept by analyzing the HRQOL and WHOQOL_BREF surveys. And further research in developing a rehabilitation treatment platform for adaptive sports programs to be implemented at all levels of care, and the benefits that enable the veteran to feel accepted within their community from the TAPES survey responses.

Evidence of Trustworthiness

All participants who participated in taking the Amputee Quality of Life survey were volunteers with no outside influence to participate, therefore evidence of trustworthiness was concluded by the me. The strategy described in Chapter 3 to primarily contact veteran amputees through the Warrior Transition Center and the Veterans Administration proved unproductive, so I utilized networking amongst the amputated community on social media for recruiting participants. In using social media, I

was able to reach a participant pool that was truly voluntary. In regards to previous sample size calculations determined in Chapter 3, based on these calculations of the 1558 veterans a sample size of 62 would yield a 95% confidence level for participation in study. Whereas the study actual sample size was 44 the confidence interval provides a 90% for the reflection of the proposed study on the use of adaptive sports by amputee veterans and the benefits if any to their quality of life and life satisfaction. However, the reliability was impacted by the limitations imposed by the small number of participants, which documents the need for further research in support of military veteran needs, as well as increase the value of the ancillary health care services (i.e. adapted sports programs) that will encourage veterans to participate for further research.

In terms of transferability strategies, all information was easily transferred to SPSS with the use of the surveymonkey.com data analysis creation link. I was able to use already established surveys and transposed the questions to the survey without or minimal adjustments. Survey could be presented in the same manner as if the three surveys used were being mailed to the participants to fill out without burdening me with having to computerize and enter in the survey responses. Participants were able to provide unbiased feedback and their experience living with their amputation.

Validity

Minimizing the threat to external validity of selection bias was limited by allowing amputees to preview the survey and then make decision to participate. If they met the study entry criteria of being an OIF/OEF veteran who suffered an amputation whether in combat or due to complication from combat, they were able to participate in

the study. The 31 of the participants that completed the whole survey were given the opportunity to provide their participation status within some adapted sports programs; and, the 13 that did not complete the whole survey were still be able to provide valuable responses into their quality of life and life satisfaction within some portion of the three surveys provided. The use of three well validated survey/scales helped minimize the definition of the concept of quality of life and/or life satisfaction. It also allowed, minimizing recall bias regarding when amputation was suffered and enable each participant to recall their present feeling on their quality of life and life satisfaction.

Limitations

I encountered several limitations within in this study. Though those limitations did not influence my attempts to acquire pertinent data to support their hypothesis, it must be noted that the limitations did hinder the results. One limitation that occurred was access to participants. I reached out to multiple associations to acquire participants for their survey. Many times, I received no response for those contacted, other times I was told by the association that they were not interested. Figure 5 shows the associations and entities that were contacted, an asterisk identifies those who decided to assist in getting participants for the study. To mitigate the lack of assistance I resorted to using the means of social media and direct contact to acquire participants.

Adaptive Sports Programs:	**Personal Contacts:**	**Amputee Prosthetic Companies/Apparel or Blogs**
US Institute of Surgical Research*	Anjali Forber Pratt*	Ottobock USA*
National Amputee Boxing Association (NABA)*	Kortney Clemons*	Amputee Life Clothing*
US Army Warrior Transition Command	William Reynolds*	Amputee Dating*
Texas Rowing Center*		
Air Force Wounded Warrior		
US Army Center for the Intrepid*		

American Association of adaptedSports Program*		
National Amputation Foundation*		
Assisting Veterans of America Support Team (AVAST)*		
Valor Games Far West*		
Adaptive Golf Academy*		
Adaptive Golf Association*		
Team River Runner*		
Adaptive Sports Center*		
South Texas Regional Adaptive and Paralympic Sports (STRAPS)*		
Veteran Amputee Golf Association*		
Amputee Fitness Disability*		
San Antonio Amputee Support Group*		
Brooks Adaptive Sports and Recreation-Jacksonville*		
DoD & VA Extremity Trauma and Amputation Center of Excellence (EACE)*		
San Antonio Phoenix Fencers Club	Gregory D. Gadson	
US Paralympics (USOC)	Gary Sinise Foundation	
DoD Warrior Games		
VA Adaptive Sports		
Amputee Coalition of America		
Disabled Sports USA		
Disabled American Veterans (DAV)		
Real Warriors		
Wounded Warrior Project (WWP)		
Veterans of Foreign Wars (VFW)		
Invictus Games		
RISE Adaptive Sports		
Wounded Warrior Amputee Softball		
Amputee Blade Runners		
Veterans Yoga Project		
US Paralympics Track and Field		
Adaptive Sports Foundation		
Endeavor Games		
Adaptive Sports Partners of North Country		
Wasatch Adaptive Sports		
Armed Forces Health Surveillance Branch		
Midwestern Amputee Golf Association		
Amputee Golf Charities		
Michigan Amputee Golf Association		
COP Amputee Association (COPAA)		
Wisconsin Amputee Golf Association		
Advanced Amputee Solutions		
Orthotic and Prosthetic Activities Foundation OPAF		

Figure 5. Organizations contacted to assist with soliciting participants. An asterisk [*] identifies those organizations/agencies and people that supported the research and promoted the solicitation of participants.

Another limitation I encountered was participant response to taking surveys. In targeting the veteran population, I learned in talking to amputee veterans in response to my Facebook page "Amputee Quality of Life Study" majority feel that the research

surveys request to participate in, do not make a difference. Their disbelief in surveys assisting in making changes, stem from either their participation during their active duty time to past surveys taken as a veteran. I understand that this research may be limited in making an overall change to the whole process of veteran amputee care, but may add insight to the limited research previously conducted in regards to research exclusively for veteran amputees and participation in adaptive sports programs. It may also assist in future VA research efforts, as well as help with the rehabilitation program used for amputee veterans and provide a resource for once the veteran is integrated back into their communities. In doing this research, I discovered future research endeavors that look at amputees that have been returned to active duty, as well as veteran amputation in elite sports. Chockalingam (2012) believe future research is needed to examine the development of protocols that veteran amputees could compete at elite levels in sports (p. 275). Finally, due to limited research done on this particular population and the participation in adapted sports, there is limited comparison data to support data collected during this study. However, past research conducted by Edwards, Phillip, Bosanquet, Bull, and Clasper, (2015), as well as Highsmith, Kahle, Lewandowski, Klenow, Orriola, Miro, and Sutton, (2016), have researched the amputee population in regards to economic aspects of current and future care. Their research suggests the need of understanding the financial obligations of those injured during conflict. Whereas technology has helped in decreasing those who are killed in battle. Injuries that are sustained (i.e. amputations) will call for extended healthcare services after military service complete. van Dongen, Huizinga, de Kruijff, van der Krans, Hoogendoorn, Leenen, and Hoencamp, (2017), also

provided research on some social aspects of amputees. Summarizing the need for frequent operations and extended rehabilitation services that are/will be needed by this population. Each suggest as well as sources within the literature review section of this dissertation, noted that further research is needed. Also, due to certain constraints, most data collected examines the overall population of those injured in the recent conflicts and little to no data is collected for the amputee population (Lundberg, 2011, p. 113). Most data collected deals mainly with members suffering Post-Traumatic Stress Disorder and/or suffered Traumatic Brain Injuries, with limited data for those who sustained amputations. Efforts were taken to contact the Congressional Research Service (CRS) to obtain comparison data for the amputee population to assist with the validity of survey results, and resources suggested by CRS to find comparison information, validate this point. Tables within Appendix A provide the numbers of those injured and who suffered PTSD and TBI issues, between 2003-2013 as well as the amputation results for the criteria timeframe.

Summary

This research attempted to answer three research questions (s) in regards to associations between Quality of Life and Life Satisfaction and participation in Adaptive Sports Program in veteran amputees. The results presented in Chapter 4 showed that participation in adaptive sports programs can help the veteran amputee feel accepted within their socio-environment, as well as beneficial within their communities, in terms of education and employment. It is reasonable that participation can be beneficial in a rehabilitation treatment platform to help veteran cope with their amputation. This

suggests that adaptive sports programs should be an integral component of health care services provided in veteran amputees. Interpretation of the results presented in Chapter 4, recommendations and potential social implications are provided in Chapter 5.

Chapter 5: Results, Conclusions, and Recommendations

Introduction

The purpose and nature of the study involved the use of quantitative methods to assess psychosocial and behavioral aspects of amputee U.S. veterans' participation in ASPs in regard to the QoL of veteran amputees of OIF/OEF, as well as to quantify the positive effects of participation in ASPs. The solicited OIF/OEF amputee service members acquired their amputations from January 2003 to January 2012, and at 2 years post amputation, had begun participation or nonparticipation in an ASP. The 2 years following amputation allowed for recovery from surgical injuries, prosthetic fitting, and rehabilitation program initiation with the prosthetic. The study evaluated both QoL and life satisfaction. Consideration was also given to developing a rehabilitation platform for ASPs to be implemented at all levels of care and the benefits that enable veterans to feel accepted within their communities.

This chapter contains a summary of the dissertation, allowing both general and detailed interpretations of the findings. It also presents a comparison with previous studies relative to the limitations I encountered. The results acquired from participants' responses to the HQROL, WHOQOL-BREF, and TAPES surveys are compared to those of previous studies conducted on this population in regard to participation or nonparticipation in an ASP. The chapter also includes recommendations for future research. Finally, a concise conclusion is provided to summarize the whole body of work.

Overview of the Study

Previous peer-reviewed literature (Chockalingam et al., 2012; Deans et al., 2012; Yazicioglu et al., 2012; Zabriskie et al., 2005) described in Chapter 2 indicated a need to evaluate the QoL and life satisfaction of amputee veterans of OIF/OEF and their rehabilitation process. This study was conducted to determine whether participation or nonparticipation in an ASP benefited veterans in regard to how they felt about their QoL and life satisfaction. To address this issue, a survey was developed using well-validated surveys in conjunction with each research question:

1. What are the differences in the psychosocial and behavioral factors that encourage or discourage participation in adaptive sports programs (ASPs) for amputee U.S. war veterans using Health-Related Quality of Life (HRQOL) scores?

   H_0: There is no significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

   H_1: There is significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

2. Are there differences in quality of life (QoL) and life satisfaction of amputee U.S. war veterans who do or do not participate in ASPs based on World Health Organization Quality of Life—BREF (WHOQOL-BREF) scores?

   H_0: There is no significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

   H_1: There is significant association between participation in an ASP status and psychological and behavioral factors in OIF/OEF veterans.

3. How does duration of participation in ASPs by U.S. war veterans affect their physical, psychological, and social wellbeing based on scores from the Trinity Amputation and Prosthesis Experience Scales—Revised (TAPES-R) questionnaire?

   H_0: There are no significant associations between participation time length (greater than three years versus less than or equal to 3 years) in an ASP and physical, psychological, and social wellbeing scores in OIF/OEF veterans.

   H_1: There are significant associations between participation time length (greater than three years versus less than or equal to 3 years) in an ASP and physical, psychological, and social wellbeing scores in OIF/OEF veterans.

To evaluate whether amputee veterans' participation or nonparticipation in ASPs affected their QoL and life satisfaction, a quantitative, retrospective study was used to determine the correlations between amputee veterans and ASP participation or nonparticipation.

The target population consisted of 1,558 OIF/OEF amputee service members who sustained injury during the height of these conflicts from January 2003 to January 2012, and who, 2 years post amputation, could have begun participation in an ASP. Forty-four amputee veterans of OIF/OEF participated in this study. Although the calculated minimum sample size for this study had been determined to be 62 participants, only 44 were able to be enrolled; thus, the sample size was smaller than what was needed. This low sample size may have negatively affected the study by statistically reducing the chance of detecting the true effect of the problem.

Comparison With Previous Findings

The primary rationale for conducting this study was that there was a need to address previous literature that called for further research within this population. Chockalingam et al. (2012) investigated veterans' participation in sport and exercise training to aid in reintegration and confidence building. Their results suggested that further development of rehabilitation services (adaptive sports) was necessary to provide care for both mental and physical injuries. Additionally, Lundberg, Bennett, and Smith (2011) stated in their research that "Outcome data is sparse in most adaptive sports and recreation programs, and nearly non-existent in programs serving veterans" (p. 113). Although Goff (2012) found that "sport opportunities allow for families and service members to embrace a new life and see how active life can be after suffering a severe injury" (p. 28), did not present statistical data in her research, simply a generalization that using sports programs can assist in building confidence and increasing enjoyment of life.

In using three well-validated surveys in the current study, I explored the research questions in relationship to previous literature.

Research Question 1 was as follows: What are the differences in the psychosocial and behavioral factors that encourage/discourage participation in ASPS for amputee U.S. war veterans using the HRQOL scores? In relation to this research question, it was found that of the 43 participants who completed the HRQOL survey, 30 participated in an ASP and 13 did not. In evaluating the HRQOL survey in terms of overall health relative to gender, participation in ASP, and military branch, the following was discovered. A statistically significant association was found between gender and perception of overall

health. Of the participants who completed this portion of the survey, 30 (69.7%) males and females responded that their perception of their overall health was either "very good" or "good" if they were participating in an ASP. No statistically significant association was noted in regard to comparison of overall health with participation in an ASP and military branch. Therefore, it is not possible to reject the null hypothesis and accept the alternative hypothesis. Much like the study conducted by Karami et al. (2012), this study was structured to enable discovery of whether OIF/OEF veterans who participate in an ASP have stronger psychological and behavioral factors that encourage participation based on military branch.

Research Question 2 was the following: Are there differences in the QoL and life satisfaction of amputee U.S war veterans who do or do not participate in ASPs based on WHOQOL-BREF scores? In relation to this research question, it was found that of the 34 participants who completed the WHOQOL-BREF survey, 24 (70.6%) participated in an ASP, whereas 10 (29.4%) did not. This portion of the survey compared enjoyment of life, participation in an ASP, and gender, as well as meaningful life, participation in an ASP, and gender. In a comparison of both enjoyment of life and meaningful life analysis, each variable independently showed a statistically significant association between participation or nonparticipation in an ASP. I interpret this association as indicating that amputee veterans who participated in an ASP had a better outlook on life than those who did not participate.

Ebrahimzadeh, Moradi, Khorasani, Hallaj-Moghaddam, and Kachooei (2015) conducted a study of 291 Iranian male veterans of the Iran–Iraq war (1980–1988), in

which they found that 152 of these veterans were participating in sports for about 6.7 hours per week (p. 276). The authors also noted that in terms of the physical functioning domain, QoL scores showed a statistically significant difference in those that participate in sports. In the present research, no statistically significant association was found between enjoyment of life and meaningful life in comparison to gender. However, both males and females had an equal rate of response for enjoyment of life and having a meaningful life.

Research Question 3 was the following: How does duration of participation in ASPs by U.S. war veterans affect their physical, psychological, and social wellbeing based on scores from the TAPES-R questionnaire? In relation to this research question, I conducted an ordinal regression analysis to analyze the amputee veterans' perceptions about their overall health in association with how long they had lived with their amputation, considering the current prosthesis as well as whether gender, age, and military branch had an effect on acceptance of living with amputee status. Thirty-one (70.4%) of 44 participants completed this portion of the survey, with their responses indicating a statistically significant association between health and years since amputation. Respondents seemed to have greater positive belief in their health with a greater number of years since amputation. My overall interpretation in relation to this portion of the survey was that the longer veterans had lived with an amputation, the better perceptions they had of their health.

Dougherty, McFarland, Smith, and Reiber (2014) supported this assumption in their study comparing amputee Vietnam veterans and OIF/OEF veterans, in which they

reported that these groups reported similar scores in regard to QoL and overall health status. These results in comparison with Murray and Fox (2002) research shows that participants' acceptance of their amputations does not affect their perception of their health, because they have accepted their amputation, learned to live with it, and found ways through their chosen ASPs to feel healthy. Dougherty, et al., (2014) also found that OIF/OEF veterans reported better function and use of prosthetic devices, which allowed them increased participation in high-impact activities.

Limitations of the Study

Originally, I proposed that the following limitations would be noted:

1. Self-reported data by the participants. I made sure that outcome indicators from the survey results were objectively measured and accounted for, by having the survey results be anonymous. This varied from previous research conducted by Epstein et al. (2010), in which participants were placed into groups, as well as by Chockalingam et al., (2012) and Bragaru et al, (2011), which in their research, used literature reviews to determine their results for this population.
2. Potential confounding variables such as PTSD, TBI, and other health issues that might affect someone's interest in participating in adaptive sports in the first place as well as influence QoL. I made sure that this could be accounted for in the design, the analysis, or both by addressing the physiological, psychological, social, vocational, and spiritual needs of the military members, optimizing patient outcomes.

Much like Melcer, et al., (2010) and Gajewski and Granville (2006), the current research showed that most veteran amputees used a multidisciplinary approach to address their physiological, psychological, social, vocational, and spiritual needs of the military members, which served to optimize patient outcomes.

3. A small sample size in the current study and its implications in drawing a sound conclusion based on the results of the current study. This overarching limitation I discovered while conducting this study related to access to the population involved in ASPs. I had difficulty reaching this population because program representatives either did not want to help solicit participants for the survey or simply gave no response to my inquiries.
4. Another noted limitation was veterans' participation in surveys. Conversations I had with other active duty service members and veterans about participation in surveys indicated that many felt that their responses to surveys did not make a difference; therefore, they did not complete them.

The aforementioned limitations may hinder future research unless necessary steps are taken to mitigate these issues. One solution might involve conducting a qualitative study similar to one conducted by the Department of Veterans Affairs Office of Inspector General (2012), which would involve face-to-face or telephone interviews targeting a specific ASP (e.g., boxing) or focusing on a certain demographic to achieve results. From

this VA study, it was learned that some amputees remained on active duty and could help future research. Although none of the 44 participants in the current study were still on active duty, active duty personnel could be included in a future study. Finally, there were limited comparison demographic data for the 1,558 military amputees in the current research, which limited the opportunity to make comparisons among the members of the study group.

Recommendations

There remains a need for further research within amputee veteran populations. Though advances have occurred in veterans' care, research and development efforts continue to result in the discovery of innovative ways to improve the lives of veterans. Little is known about the relatively small group of veterans who have suffered amputations during recent conflicts in regard to their healthcare and, more importantly, their reintegration into society or return to active military service. Focusing specifically on the care of this special population may lead to increased knowledge on current healthcare practices, as well as further technological advances for daily living. The overall goal for future studies in this area will be to maximize amputee veterans' functioning and QoL by understanding what this population needs for long-term healthcare.

Moreover, I recommend that future researchers in this area establish collaboration with the VA healthcare service, which might may allow for greater success in soliciting participants, as well as expanding resources needed for this specific population in regard to their care and living with their amputations. The VA has gathered data on the

psychosocial adjustment and activity limitations of OIF/OEF veterans with amputations, as well as their prosthetic needs. These findings, along with those of past research, could be useful in developing qualitative studies that are directed at understanding the experiences and desires of service members with traumatic and nontraumatic limb loss.

Implications for Social Change

There is great interest in the distinctive healthcare needs of the military population and veteran's due to the conflicts these members have been involved in since the events of September 11, 2001. The VA and DoD have developed certain offices and programs to address the needs of these service members. For example, the U.S. Army's Amputee Patient Care Program and the Extremity Trauma and Amputation Center serve as the lead agents in the treatment and rehabilitation of extremity injuries and amputations.

Many young men and women in the armed forces have been asked to make immense sacrifices for their country. Some have given their lives, and others have given their limbs. Through advances in medicine, those who have suffered limb loss have been able to survive their battle-related injuries and either return to duty or be reintegrated within the civilian population. After war ends, health issues will continue to arise for veterans, and the healthcare system must be prepared to address them. Increasingly, the services of new healthcare professionals, such as physical therapists, rehabilitation therapists, and behavioral health specialists, are being sought to help injured service members reintegrate back into society. As part of this movement, participation in ASPs has increased.

From the beginning of ASPs, when skiing was introduced to World War I and II veterans, to today, involvement in sport has helped veterans gain self-worth as well as reintegration and acceptance within society. As previously stated, the implications of this study for positive social change include increasing awareness of the benefits of adaptive sports for veteran amputees. The goal of this research was to document the value of adaptive sports for increasing QoL and life satisfaction for veterans, their families, and their communities.

Conclusion

According to Bonura and Lovald (2015), less than 1% of all people in the United States have served in the military. Every year, young men and women make the conscious decision to join the nation's military. At times, they leave behind parents, wives, sons, and daughters to fight in a war. Due to their calling, they go to fight for the freedom of those left back home. Some do not come back, but others do. However, they are not the same as when they left. They are greeted as heroes for their sacrifice.

This research was motivated by my personal experiences as a member of the military on the Critical Care Air Transport Team (CCATT). In this role, I taught other CCATT team members, in addition to transporting those fortunate enough to come back home. One "date night," when my wife and I went to the movies, I had a realization that underscored the importance of this research. In front of us at the concession stand, there were two very energetic little girls. My first impulse was to wonder why their parents were not controlling them, but as they began to walk away from the concession stand, still very energetic, I noticed why they were so happy. With them was a tall, double-leg

amputee, a muscular man who wore a t-shirt with an inscription on the back that read, “I Sacrificed, Have You?”

Over generations, the nation’s armed forces have gone to war, and some members have returned. Some have been welcomed as heroes; some have not. Recent conflicts have helped society adjust to the effects of war once service members return home, showing acceptance to their injuries and support of the “fight for freedom”. However, Americans must gain a better understanding of the sacrifices that veteran amputees have made and the unique situations the they encounter on a daily basis. All military healthcare departments and agencies must understand current multidisciplinary healthcare practices, including ASPs, that can help these veterans reintegrate into society.

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Appendix A: Congressional Research Report

Table 4. Individuals with Battle-Injury Major Limb Amputations for OEF and OIF/OND, 2001-2013

(as of December 31, 2013)

Injury Date	OEF	OIF/OND	Total (OEF, OIF, OND)
2001	0	0	0
2002	0	0	0
2003	9	68	77
2004	6	149	155
2005	16	145	161
2006	9	148	157
2007	13	195	208
2008	27	66	93
2009	62	22	84
2010	202	1	203
2011	248	2	250
2012	140	0	140
2013	30	0	30

Source: CRS communication with Dr. Michael Carino, Army Office of the Surgeon General, January 10, 2014

Source: Congressional Research Service Report authored by Hannah Fischer, 2014.

Appendix B: CDC HRQOL

Study ID Number: _____

Healthy Days Core Module (CDC HRQOL– 4)

1. Would you say that in general your health is?

Please Read	
a. Excellent	1
b. Very good	2
c. Good	3
d. Fair	4
e. Poor	5
Don't know/Not sure	7
Refused	9

2. Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?

a. Number of Days	_ _
b. None	8 8
Don't know/Not sure	7 7
Refused	9 9

3. Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?

a. Number of Days	_ _
b. None	8 8
Don't know/Not sure	7 7
Refused	9 9

If both Q2 AND Q3 = "None", skip next question

4. During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

a. Number of Days	_ _
b. None	8 8
Don't know/Not sure	7 7
Refused	9 9

Activity Limitations Module

These next questions are about physical, mental, or emotional problems or limitations you may have in your daily life.

1. Are you LIMITED in any way in any activities because of any impairment or health problem?

a. Yes	1
b. No	2
Don't know/Not sure	7
Refused	9

2. What is the MAJOR impairment or health problem that limits your activities?

a. Arthritis/rheumatism	0 1
b. Back or neck problem	0 2
c. Fractures, bone/joint injury	0 3
d. Walking problem	0 4
e. Lung/breathing problem	0 5
f. Hearing problem	0 6
g. Eye/vision problem	0 7
h. Heart problem	0 8
i. Stroke problem	0 9
j. Hypertension/high blood pressure	1 0
k. Diabetes	1 1
l. Cancer	1 2
m. Depression/anxiety/emotional problem	1 3
n. Other impairment/problem	1 4
Don't know/Not sure	7
Refused	9

3. For HOW LONG have your activities been limited because of your major impairment or health problem?

a. Days	1 _ _
b. Weeks	2 _ _
c. Months	3 _ _
d. Years	4 _ _
Don’t know/Not sure	7 7 7
Refused	9 9 9

4. Because of any impairment or health problem, do you need the help of other persons with your PERSONAL CARE needs, such as eating, bathing, dressing, or getting around the house?

a. Yes	1
b. No	2
Don't know/Not sure	7
Refused	9

5. Because of any impairment or health problem, do you need the help of other persons in handling your ROUTINE needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?

a. Yes	1
b. No	2
Don't know/Not sure	7
Refused	9

Healthy Days Symptoms Module

1. During the past 30 days, for about how many days did PAIN make it hard for you to do your usual activities, such as self-care, work, or recreation?

a. Number of Days	__
b. None	8 8
Don't know/Not sure	7 7
Refused	9 9

2. During the past 30 days, for about how many days have you felt SAD, BLUE, or DEPRESSED?

a. Number of Days	__
b. None	8 8
Don't know/Not sure	7 7
Refused	9 9

3. During the past 30 days, for about how many days have you felt WORRIED, TENSE, or ANXIOUS?

a. Number of Days	__
b. None	8 8
Don't know/Not sure	7 7
Refused	9 9

4. During the past 30 days, for about how many days have you felt you did NOT get ENOUGH REST or SLEEP?

a. Number of Days	__
b. None	8 8
Don't know/Not sure	7 7
Refused	9 9

5. During the past 30 days, for about how many days have you felt VERY HEALTHY AND FULL OF ENERGY?

a. Number of Days	__
b. None	8 8
Don't know/Not sure	7 7
Refused	9 9

Source: (Centers for Disease Control and Prevention, 2011; Centers for Disease Control and Prevention, 2011)

Appendix C: WHOQOL-BREF

Study ID Number: _____

WHOQOL-BREF

The following questions ask how you feel about your quality of life, health, or other areas of your life. I will read out each question to you, along with the response options. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last four weeks.**

		Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life?	1	2	3	4	5
		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2.	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last four weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	5	4	3	2	1
4.	How much do you need any medical treatment to function in your daily life?	5	4	3	2	1
5.	How much do you enjoy life?	1	2	3	4	5
6.	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7.	How well are you able to concentrate?	1	2	3	4	5
8.	How safe do you feel in your daily life?	1	2	3	4	5
9.	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

		Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life?	1	2	3	4	5
11.	Are you able to accept your bodily appearance?	1	2	3	4	5
12.	Have you enough money to meet your needs?	1	2	3	4	5
13.	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14.	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5
		Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well are you able to get around?	1	2	3	4	5
		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16.	How satisfied are you with your sleep?	1	2	3	4	5
17.	How satisfied are you with your ability to perform your daily living	1	2	3	4	5

	activities?					
18.	How satisfied are you with your capacity for work?	1	2	3	4	5
19.	How satisfied are you with yourself?	1	2	3	4	5
20.	How satisfied are you with your personal relationships?	1	2	3	4	5
21.	How satisfied are you with your sex life?	1	2	3	4	5
22.	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23.	How satisfied are you with the conditions of your living place?	1	2	3	4	5
24.	How satisfied are you with your access to health services?	1	2	3	4	5
25.	How satisfied are you with your transport?	1	2	3	4	5

Do you have any comments about the assessment?

Appendix D: TAPES-R

Study ID Number: _____

Trinity Amputation and Prosthesis Experience Scales- Revised (TAPES-R)

What is this survey about?
This questionnaire looks at different aspects of having prosthesis. The information gathered will be used to improve our understanding of aspects of prosthesis use and to assist in the development of better services for prosthesis users.

Who should complete the questionnaire?
The person with prosthesis should complete the questionnaire. However, if the person needs help to complete the questionnaire, the answers should be given from his/her point of view – not the point of view of the person who is helping.

How to complete the questionnaire?
Please answer every item as honestly as you can. For each question, please tick clearly inside one box using a black or blue pen. Don't worry if you make a mistake; simply cross out the mistake and put a tick in the correct box.
There are no right or wrong answers.

Your answers will be anonymous

This is a questionnaire designed to investigate different aspects of having prosthesis. Please answer every item as honestly as you can. There are no right or wrong answers.

_____

1. Date of Birth (DOB) with Age

2. Are you male.... [ ] female..[ ]

3. How long ago did you have your amputation? _____ years
   _____ months

4. How long have you had a prosthesis? _____ years
   _____ months

(If you have had more than one amputation surgery please refer to your first amputation surgery).

6. How long have you had the prosthesis that you wear at the moment?
   _____ years _____ months

7. What type of prosthesis do you have? (Please tick the appropriate box)

Below-Knee	[ ]	Below-elbow	[ ]
Through-Knee	[ ]	Through-elbow	[ ]
Above-Knee	[ ]	Above-elbow	[ ]

Other (please specify) _____

8. What was your amputation a result of? (Please tick the appropriate box)

Peripheral Vascular Disorder	[ ]
Diabetes	[ ]
Cancer	[ ]
Accident	[ ]

Other (please specify) _____

Part I

Below are written a series of statements concerning the wearing of a prosthesis. Please read through each statement carefully. Then **tick the box** beside each statement, which shows how strongly you agree or disagree with it.

		Strongly disagree	Disagree	Agree	Strongly agree	Not applicable
1.	I have adjusted to having a prosthesis.....	[1]	[2]	[3]	[4]	[ ]
2.	As time goes by, I accept my prosthesis more.....	[1]	[2]	[3]	[4]	[ ]
3.	I feel that I have dealt successfully with this trauma in my life	[1]	[2]	[3]	[4]	[ ]
4.	Although I have a prosthesis, my life is full	[1]	[2]	[3]	[4]	[ ]
5.	I have gotten used to wearing a prosthesis.....	[1]	[2]	[3]	[4]	[ ]
6.	I don't care if somebody looks at my prosthesis	[1]	[2]	[3]	[4]	[ ]
7.	I find it easy to talk about my prosthesis	[1]	[2]	[3]	[4]	[ ]
8.	I don't mind people asking about my prosthesis	[1]	[2]	[3]	[4]	[ ]
9.	I find it easy to talk about my limb loss in conversation	[1]	[2]	[3]	[4]	[ ]
10.	I don't care if somebody notices that I am limping ..	[1]	[2]	[3]	[4]	[ ]
11.	A prosthesis interferes with the ability to do my work.....	[4]	[3]	[2]	[1]	[ ]
12.	Having a prosthesis makes me more dependent on others than I would like to be	[4]	[3]	[2]	[1]	[ ]
13.	Having a prosthesis limits the kind of work that I can do.....	[4]	[3]	[2]	[1]	[ ]
14.	Being an amputee means that I can't do what I want to do.....	[4]	[3]	[2]	[1]	[ ]
15.	Having a prosthesis limits the amount of work that I can do.....	[4]	[3]	[2]	[1]	[ ]

	Yes, limited a lot	Limited a little	No, not limited at all	
(a) Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	[2]	[1]	[0]	
(b) climbing several flights of stairs	[2]	[1]	[0]	
(c) running for a bus	[2]	[1]	[0]	
(d) sport and recreation	[2]	[1]	[0]	
(e) climbing one flight of stairs	[2]	[1]	[0]	
(f) walking more than a mile	[2]	[1]	[0]	
(g) walking half a mile	[2]	[1]	[0]	
(h) walking 100 metres	[2]	[1]	[0]	
(i) working on hobbies	[2]	[1]	[0]	
(j) going to work	[2]	[1]	[0]	[Not applicable]

The following questions are about activities you might do during a typical day. Does having a prosthesis limit you in these activities? If so, how much? Please tick the appropriate box.

Please tick the box that represents the extent to which you are satisfied or dissatisfied with each of the different aspects of your prosthesis mentioned below:

		Not satisfied	Satisfied	Very Satisfied
(i)	Colour.	[1]	[2]	[3]
(ii)	Shape	[1]	[2]	[3]
(iii)	Appearance	[1]	[2]	[3]
(iv)	Weight	[1]	[2]	[3]
(v)	Usefulness	[1]	[2]	[3]
(vi)	Reliability	[1]	[2]	[3]
(vii)	Fit	[1]	[2]	[3]
(viii)	Comfort	[1]	[2]	[3]

Please circle the number (0-10) that best describes how satisfied you are with your prosthesis?

0	1	2	3	4	5	6	7	8	9	10
Not at all Satisfied										Very Satisfied

Part II

(For the following questions, please tick the appropriate boxes)

1. On average, how many hours a day do you wear your prosthesis? _____ **hours**

2. In general, would you say your health is:

Very Poor [1] Poor [2] Fair [3] Good [4] Very Good [5]

3. In general, would you say your physical capabilities are:

Very Poor [1] Poor [2] Fair [3] Good [4] Very Good [5]

4(a) Do you experience **residual limb (stump) pain** (pain in the remaining part of your amputated limb)? No [0] .... (If no, go to question 5)
Yes [1] .... (If yes, answer part (b), (c), (d) and (e))

(b) During the last week, how many times have you experienced stump pain? _____

(c) How long, on average, did each episode of pain last? _____

(d) Please indicate, the average level of stump pain experienced during the last week on the scale below by ticking the appropriate box:

Excruciating	Horrible	Distressing	Discomforting	Mild
[5]	[4]	[3]	[2]	[1]

(e) How much did stump pain interfere with your normal lifestyle (eg. work, social and family activities) during the last week?

A Lot	Quite a Bit	Moderately	A Little Bit	Not at All
[5]	[4]	[3]	[2]	[1]

5. (a) Do you experience **phantom limb pain** (pain in the part of the limb which was amputated)?

No [0] .... (if no, go to question 6)

Yes [1] .... (If yes, answer part (b), (c), (d), and (e))

(b) During the last week, how many times have you experienced phantom limb pain? _____

(c) How long, on average, did each episode of pain last? _____

(d) Please indicate the average level of phantom limb pain experienced during the last week on the scale below by ticking the appropriate box:

Excruciating	Horrible	Distressing	Discomforting	Mild
[5]	[4]	[3]	[2]	[1]

(e) How much did phantom limb pain interfere with your normal lifestyle (e.g. work, social and family activities) during the last week?

A Lot	Quite a Bit	Moderately	A Little Bit	Not at All
[5]	[4]	[3]	[2]	[1]

6. (a) Do you experience any **other medical problems** apart from stump pain or phantom limb pain? No [0]

Yes [1] (If yes, answer part (b), (c), (d), (e),(f) and (g))

(b) Please specify what problems you experience _____

(c) During the last week, how many times have you suffered from these medical problems? _____

(d) How long, on average, did each problem last? _____

(e) Please indicate the level of pain experienced as a result of these problems during the last week on the scale below by ticking the appropriate box:

Excruciating	Horrible	Distressing	Discomforting	Mild
[5]	[4]	[3]	[2]	[1]

(f) How much did these medical problems interfere with your normal lifestyle (e.g. work, social and family activities) during the last week?

A Lot	Quite a Bit	Moderately	A Little Bit	Not at All
[5]	[4]	[3]	[2]	[1]

(g) Do you experience **any other pain** that you have not previously mentioned?

No [0]
Yes [1]
If yes, please specify _____

7. Did you complete this questionnaire: (please tick the appropriate box)

on your own? [ ]
with assistance? [ ]

8. Date of Completion: _____

Please check that you have answered all the questions.
Thank you for all your help.

Source: Gallagher, Desmond, & MacLachlan (2011) TAPES-R

Appendix E: Letter of Permission to use TAPES-R

Sean Seay <sean.seay@waldenu.edu>

Permission to use TAPES-R survey

3 messages

Sean Seay <sean.seay@waldenu.edu> Sat, Jan 10, 2015 at 12:18 PM
To: pamela.gallagher@dcu.ie

Dr. Gallagher,
I am writing to ask permission to used this survey for my dissertation for Walden University. I have attached my Prospectus so that you can see what study I a proposing to carry out. Also I would like to know If I could have access to the version of the TAPES-R that is adapted for use with people with limb loss who do not use a prosthesis.

v/r
Sean V. Seay
PhD Candidate Walden University

Sean Seay Prospectus Approved_1-24-2014.docx
37K

Pamela Gallagher <pamela.gallagher@dcu.ie> Mon, Jan 12, 2015 at 4:10 AM
To: Sean Seay <sean.seay@waldenu.edu>

Dear Sean,
I am happy for you to use the TAPES-R. Please find attached the limb loss version. If I can be of any further help, please let me know.
Best wishes,
Pamela
[Quoted text hidden]