

Research

Outcomes of Adaptive Sports and Recreation Participation among Veterans Returning from Combat with Acquired Disability

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Abstract

The purpose of this study was to examine changes in quality of life, mood states, and sports related competence for veterans of Operation Iraqi Freedom and Operation Enduring Freedom who participated in a therapeutic adaptive sports and recreation program. The researchers hypothesized that participation would lead to increases in physical, psychological, social, and environmental QoL, increases in sports related competence, and reductions in mood disturbances such as depression and anger. A total of 18 veterans participated in one of three week-long therapeutic and adaptive sports programs in Sun Valley Idaho. Veterans responded on a pretest and posttest questionnaire. Because no control group was available, multiple paired sample t-tests with Bonferoni adjustments were used to look at the differences between the pretest and posttest scores. Results identified significant pre and posttest differences in psychological health, overall quality of life, mood states including tension, depression, anger, and vigor, and sports related competence. The results highlight the impact that therapeutic adaptive sports and recreation programs potentially have for combat veterans in areas of quality of life, reduction of mood disturbances, and sports related competence.

Keywords: *Adaptive sports, competence, Iraq, mood states, quality of life, veterans*

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The Research and Development (RAND) Center for Military Health Policy Research recently found that 31% of returning service members from Iraq and Afghanistan meet criteria for a mental health condition such as posttraumatic stress disorder (PTSD), depression, or report experiencing a traumatic brain injury (TBI; Tanielian & Jaycox, 2008). In addition, many service members are returning from combat with a wide variety of physical disabilities including amputations and visual impairments. Researchers have suggested that service members are twice as likely to experience amputations in Operation Iraqi Freedom, as a result of the improvised explosive device (IED), than in any other conflict in the past century (Weisskopf, 2007). Incidents of service members returning home with visual impairments have also increased significantly (Zoroya, 2007).

Above and beyond these statistics pertaining to the conflicts in Iraq and Afghanistan, the challenges associated with returning from combat have been well documented, including potential negative outcomes such as: general alienation, bitterness, boredom, substance abuse, unemployment, poor mental health, and difficulty in relationships (Shay, 2002). These factors suggest that veterans returning from combat may experience diminished quality of life and increases in negative mood states. As recreation and therapeutic recreation programs are being promoted as a service to address these issues (Carnahan, 2008; Hawn, 2008), the purpose of this study was to examine changes in quality of life, mood states, and sports related competence for veterans of Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) who participated in a therapeutic adaptive sports program. Specifically it was hypothesized that participation would lead to improvements in qual-

ity of life (QoL) and perceived competence in sports, while reducing overall mood disturbance.

Quality of Life

Reductions in the signs and symptoms of any given disorder continue to be the critical outcomes within the health care industry; however, improvement in QoL is an increasingly important result of both mental health (Gladis, Gosch, Dishuk, & Crits-Christoph, 1999) and physical rehabilitation (Hampton, 2004) services. The importance of QoL as an outcome was highlighted in the World Health Organization's 1948 definition of health as "a state of complete physical, mental, and social well-being and not merely the absence of disease" (World Health Organization [WHO], 1948, para. 1). The WHO defines QoL as an "...individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (WHOQOL Group, 1998, p. 5). In this definition the WHO suggests that QoL is not necessarily meeting an objective criteria, but a subjective assessment of how the individual sees the quality in his or her life within broad categories such as physical or mental health, the nature of one's social relationships, and the quality of the environment in which one lives. Acquiring a disability as a result of combat, whether physical or psychological in nature, has the potential to negatively affect one's QoL and potentially increase overall mood disturbances.

Acquired physical disability and QoL. Approximately 31,000 individuals have been physically wounded in the OIF/OEF conflicts (Leland & Oboroceanu, 2010). Acquiring a physical disability can be considered a devastating and traumatic event resulting in significant life changes

(Frank & Elliot, 2000; Klebine, 2004). Loss of function due to physical disability may negatively impact the ability to accomplish activities of daily living, fully participate in family, occupation, and social roles (Miller, 2000; Rolland, 1987), present physical symptoms such as pain and fatigue (Putzke, Richards, Hicken, & DeVivo, 2002), and include a variety of negative mood states such as sadness, anger, depression, denial, and stress (Klebine; Frank & Elliot). All of these symptoms are negatively associated with QoL (Schwarz & Clore, 1983). Specifically, higher levels of depressive mood states have been identified for individuals with SCI and TBI as compared to individuals without a disability (Kemp & Krause, 1999; Kreuter, Sullivan, Dahllof, & Siosteen, 1998). These factors associated with acquiring a disability suggest a negative relationship to QoL.

In addition to the physical and emotional consequences of acquiring a disability, various psychosocial issues may also negatively affect one's QoL such as stigma, negative stereotyping, devalued social status, and inaccurate labeling (Dunn, 2000). Individuals with acquired disability also frequently experience disruption in social relationships and social support networks including friends and family (Chwalisz & Vaux, 2000), and experience a wide variety of architectural, social, policy and attitudinal barriers resulting in numerous disadvantages (Rimmer, Riley, Wang, Rauwroth, & Jurkowski, 2004).

PTSD and QoL. As an anxiety disorder, posttraumatic stress disorder (PTSD) has numerous negative effects in various life domains. A person diagnosed with PTSD experiences significant distress or impairment in their social, occupational or other important functional areas (American Psychiatric Association, 2000). Symptoms of PTSD consist of: (a) intrusive thoughts or memories including nightmares or flash-

backs, (b) being hyper-aroused leading to difficulties with sleep, being irritable or easily angered, being constantly on guard, or easily startled and frightened, and (c) avoiding and numbing feelings related to memories associated with the traumatic event including people, places or activities (Schiraldi, 2000). Attempting to avoid or numb painful and disturbing memories is a natural response to trauma; however, it also appears to have a numbing effect on joyful and happy memories as well, leading to the avoidance of people and activities that were previously considered pleasant and enjoyable (Schiraldi). Considering the symptoms associated with PTSD and the resulting distress and impairment, it is clear that PTSD has a negative effect on one's QoL (Clapp, Beck, Palyo, & Grant, 2008).

In addition, PTSD is frequently a comorbid condition, particularly for individuals who have been exposed to military conflict. PTSD and other mood disorders often appear together (de Jong, Komproe, & Van Ommeren, 2003). PTSD also occurs at higher rates for individuals who have acquired physical disability, TBI, or other mental health issues, such as depression, as a result of combat experience (Hoge et al., 2004; Klein, Caspi, & Gil, 2003). In essence, PTSD has a negative influence on QoL due to its symptoms as well as its comorbidity with other conditions negatively associated with QoL.

Perceived Competence

Individuals who have recently acquired a disability initially question their ability to perform tasks done previously and may view themselves as less competent since acquiring their disability. Further exacerbating these challenges, negative stereotypes continue to persist within the general population regarding the in-

abilities of individuals with disabilities (Goodwin, Thurmeier, & Gustafson, 2004). Thus, improving one's perceived competence may assist an individual in dealing with the challenges associated with acquiring a disability.

In general, perceived competence is seeing one's self as capable in performing a challenging task (Deci & Ryan, 1985) and is related to healthy development and well-being (Ryan & Deci, 2002). White (1959) described competence as a state of effectiveness, which is sought out and achieved in order to satisfy an individual's innate desire to master his or her environment. Competence leads people to seek challenges that match their abilities and to either maintain or enhance skills through active involvement. Perceived competence then is a personal judgment about how confident one feels that his or her skills will bring about some desired action. Environments that foster the development of perceived competence provide opportunities for growth, development, and improved well-being (Ryan & Deci).

While not theoretically tested in this study, perceived competence may facilitate improvements in both QoL and the reduction of negative mood states. As mentioned by Ryan and Deci (2002), perceived competence is related to improved well-being, a term used synonymously with QoL by some (Whiteneck et al., 2004). Research has also indicated the relationship between perceived competence and both positive and negative mood states in a variety of domains including athletics (Kavanagh & Bower, 1985). Additional research is needed to understand the theoretical connections between QoL, mood states, and perceived competence for veterans with acquired disabilities who participate in adaptive sports and recreation activities.

Therapeutic Recreation and Services for Veterans

Certified Therapeutic Recreation Specialists (CTRSs) work in various settings serving veterans with acquired disabilities returning from OIF/OEF. Most commonly, the department of Veteran Affairs (VA) provides for recreational therapy within its continuum of care to enhance the rehabilitation process, facilitate functional improvements, and achieve optimal levels of wellness. Recreational therapy services through the VA vary depending on the needs of clients as well as the expertise of staff, but may include activities or programs such as: psychiatric inpatient and outpatient programs, addiction treatment services, health, wellness, leisure education, community integration, and adaptive sports and recreation programs.

Adaptive sports and recreation.

In addition to the adapted sports and recreation programs provided through the VA, other community-based organizations are beginning to offer adaptive sports and recreation services in an effort to assist returning combat veterans with acquired disabilities (Disabled Sports USA, 2010). A growing number of recreation and therapeutic recreation programs are available or in the process of being developed to serve the needs of OIF/OEF veterans, (Hawn, 2008; Recreation & Sports, n.d., retrieved 2010; Vaira, 2009); however, to date there is little to no research evaluating the effectiveness of these programs in achieving any specified outcome.

Summary

Veterans returning from military service with acquired physical disabilities, PTSD, TBI, and depression (Tanielian & Jaycox, 2008) are potentially at risk of experiencing low quality of life, negative mood states, and potentially low perceived

competence. While a variety of therapeutic recreation services are offered through the VA hospital system, additional services within the community are needed and are currently being developed and implemented. Thus, the primary purpose of this study was to determine the impact of participation in an adapted sports and recreation program by observing changes in quality of life, mood states, and perceived competence, using a pre-post study design. Three adaptive sports and recreation programs designed for veterans and their significant others were evaluated in this study.

A secondary purpose of the study was to observe program offerings and provide suggestions for program improvement and future research. It was hypothesized that participation in the therapeutic adaptive sports and recreation program would lead to increases in physical, psychological, social, and environmental QoL as defined by the WHO, reductions in negative mood states such as depression and anger, and increases in sports related competence.

Methods

Sample

The sample consisted of a total of 18 veterans with the following demographic characteristics. The average age of the sample ranged from 30-34 years old. Ten participants (56%) were Caucasian, four (22%) were African-American, two (11%) were Hispanic, and two (11%) indicated other. Nine (50%) of the participants were married, five (28%) were single, never married, and four (22%) were separated or divorced. Ten (56%) participants were not employed, five (39%) were employed full-time, and one (5%) was employed part-time. The median income of the sample was \$30,000-\$39,000, with incomes ranging from \$10,000 to \$100,000. Fourteen

participants (83%) had not previously participated in any adaptive sport or recreation activities. Each participant identified multiple acquired disabilities including TBI (83% of all participants), PTSD (50%), visual impairments (38%), amputations (27%), orthopedic impairment including SCI (55%), and depression (28%).

Instruments

Instruments incorporated into the questionnaire included the following: (a) the World Health Organization's Quality of Life Assessment (WHOQOL), a 26-item generic quality of life instrument applicable to individuals from various cultures and life situations (WHOQOL Group, 1998); (b) the Profile of Mood States-Brief (POMS-B), a 30-item scale designed to measure mood states (McNair & Heuchert, 2005); and (c) a four-item modified version of the Perceived Competence Scale (PCS) designed to measure competence in a specific sport environment (Williams & Deci, 1996; Williams, Freedman, & Deci, 1998).

The WHOQOL-BREF contains 26 items scored on a 1-5 scale with scores ranging from 26 to 130, higher scores indicating higher quality of life. Items on the scale belong to one of four domains: physical health, psychological health, social relationships and environment. The scale also includes two items intended to measure overall perceptions on QoL and health. The WHOQOL-BREF domain scores have demonstrated good discrimination validity, criterion validity, content validity, test-retest reliability, and internal consistency (WHOQOL Group, 1998). In this study, posttest scores from the WHOQOL-BREF had a Chronbach's alpha reliability coefficient of .92.

The Profile of Mood States-Brief (POMS-B) is a measure used to assess mood states and overall mood disturbance (Cur-

ran, Andrykowski, & Studts, 1995; McNair & Heuchert, 2005). The POMS-B is a 30-item Likert scale that contains five items for six different factors including: fatigue, vigor, tension, depression, anger, and confusion, where five factors indicate negative mood states and one factor indicates a positive mood state. Individual items are scored based on the presence of a given mood state from 0 to 4 (not at all, a little, moderately, quite a bit, extremely) with scores ranging on the scale from 0 to 120. A total mood score or factor scores can be generated using the POMS-B. The total mood score was used in this study and was obtained by totaling all negative factors and subtracting vigor, the positive factor. Higher total scores indicate more mood disturbance. Information on internal consistency for each of the six factors is also available with reliability coefficients ranging from .84 to .95 (McNair & Heuchert). In this study, posttest scores from the total POMS-B had a Chronbach's alpha reliability coefficient of .87.

The Perceived Competence Scale (PCS) is a short four-item questionnaire with individual items ranging from one to seven and the total score ranging from four to 28. Items on the PCS reflect the individual's level of perceived competence in successfully completing an identified behavior (Williams & Deci, 1996; Williams, Freedman, & Deci, 1998). Results have typically indicated a Cronbach's alpha of .80 (Williams & Deci; Williams et al.). This scale was modified to determine individuals' competence in performing sports related tasks consistent with the program in which they were participating. In this study, posttest scores from the PCS had a Chronbach's alpha reliability coefficient of .92.

Setting

Veterans participating in this study were involved in the Higher Ground pro-

gram operated by Sun Valley Adaptive Sports' (SVAS) in Sun Valley Idaho. The Higher Ground program provides recreationally based services to individuals who have been severely wounded in Iraq and Afghanistan as a means of healing and rehabilitation. The program offers winter snow-sport camps and summer adventure camps to service members and their significant others each year. Higher Ground programs serve veterans with acquired physical and emotional disabilities due to combat such as: blindness and visual impairments, TBI, SCI, limb amputations, PTSD, and other emotional disturbances such as depression.

The mission of Higher Ground is to build physical skills and a sense of competence while providing meaningful, healthy, and fun experiences to aid service members in successfully transitioning into their new lives. Goals of SVAS and the Higher Ground program include improving individuals' quality of life, personal relationships, work and school success, and decreasing negative mood states such as stress and depression. Higher Ground seeks to accomplish these goals through successful participation and the development of interpersonal and recreational skills. The program utilizes daily discussion topics, journaling, debriefing, and processing in order to highlight the therapeutic benefit of participation as it relates to the individual needs of veterans and their significant others.

Higher Ground adaptive sports and recreation programs. Veterans in this study participated in three separate Higher Ground groups appropriate for the season in which they visited Sun Valley, Idaho. The first group consisted of five veterans with acquired disabilities and their significant others who participated in various adaptive sports and recreation activities including water skiing, kayak-

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ing, river rafting, canoeing, and fly-fishing, over a five-day period. The second group included six veterans with acquired disabilities and their significant others who participated in a five-day fly-fishing camp. The third group included seven veterans with acquired disabilities and their significant others who participated for five days in ski/snowboarding, ice skating, and Nordic skiing.

Procedures

Participants were recruited to the Higher Ground program through Transitional Care Units at various Veteran Affairs (VA) Hospitals. A flyer introducing the Higher Ground program was distributed to veterans by VA representatives. Interested veterans then contacted High Ground for additional information and potential participation in the program. Participants were informed that a pre-post evaluation study would occur as part of their participation with Higher Ground. After participants agreed to participate, they completed an online questionnaire prior to coming to Sun Valley. If questionnaires were not completed online, a paper copy was provided for them to complete upon arrival at the program. After completion of the program, participants were given another paper copy of the questionnaire to complete as

a post-test. Internal review Board approval was obtained for the study, individuals participated on a voluntary basis, and data were gathered over a seven-month period from September of 2008 to March of 2009.

Data Analysis

This study utilized a single group pre-test posttest design. Prior to conducting an analysis of the presented hypotheses, a One-way Analysis of Variance (ANOVA) was used to determine any differences between the three Higher Ground programs on post-test scores of the dependent variable that appeared to capture the largest amount of variation, Total Mood Disturbance as assessed by the POMS-B. No significant differences were found between the three groups, $F(2, 15) = .63, p = .546$; therefore, all subjects were collapsed into one group for hypothesis testing (see Table 1). Paired sample t-tests with Bonferoni adjustments were used to examine the differences between the pre-test and post-test scores to determine the impact of program participation on variables of interest. Because multiple comparisons were being conducted, the alpha level was adjusted using the conventional .05 divided by the number of comparisons, 13, resulting in a new more conservative alpha level of .0038 (Keppel & Williams, 2004).

Table 1
Analysis of Variance for Total Mood Disturbance

| | Sum of Squares | df | Mean Square | F | p |
|----------------|-----------------------|-----------|--------------------|----------|----------|
| Between Groups | 381.152 | 2 | 190.576 | .630 | .546 |
| Within Groups | 4537.348 | 15 | 302.49 | | |
| Total | 4918.5 | 17 | | | |

Results

For this sample of OIF/OEF veterans, post-test QoL scores from the WHOQOL-BREF ranged from 59 to 104 ($M = 78.79$, $SD = 13.94$). Post-test scores on the POMS-B ranged from 4 to 62 ($M = 33.74$, $SD = 16.86$), and post-test scores on the PCS ranged from 7 to 28 ($M = 21.68$, $SD = 5.52$; see Table 2).

Results indicated no statistically significant improvement in QoL from pretest to posttest, $\alpha = .0038$. Although not significant, preliminary results of interest were observed in the psychological health domain, $t(17) = 2.473$, $p = 0.024$, and in overall quality of life, $t(17) = 2.179$, $p = 0.044$. No notable differences were observed in the areas of physical health, social relationships, and environment (see Table 3).

Observing mood states using the POMS-B, results showed a significant reduction in total mood disturbance after participation in the adaptive sport program, $t(17) = 4.515$, $p < .001$. The average mood disturbance score prior to participation was 60.42. Following participation the mood disturbance score was reduced on average to 33.74. Looking at individual mood states, the posttest scores were significantly reduced in the areas of tension, $t(17) = 4.847$, $p < 0.001$; depression, $t(17) = 5.374$, $p < 0.001$; and anger $t(17) = 4.688$, $p < 0.001$ (see Table 3). The posttest scores were significantly increased in the area of vigor, $t(17) = 3.358$, $p = 0.004$ (see Table 3). Prior to participation average scores were 15.47 for tension, 13.79 for depression, 13.74 for anger, and 11.84 for vigor; following participation the average scores were 10.11 for tension, 7.74 for depression, 8.42 for anger, and 17.32 for vigor.

Table 2
Pretest and Posttest Descriptive Statistics for Dependent Variables

| Dependent Variable | Pretest Scores | | | Posttest Scores | | |
|--------------------|----------------|-----------|-------|-----------------|-----------|-------|
| | <i>M</i> | <i>SD</i> | Range | <i>M</i> | <i>SD</i> | Range |
| QoL | 74.37 | 15.023 | 50 | 78.79 | 13.94 | 45 |
| Physical | 20.11 | 5.666 | 17 | 21.05 | 5.836 | 22 |
| Psychological | 17.89 | 5.374 | 18 | 20.05 | 4.075 | 14 |
| Social | 10.16 | 2.588 | 10 | 10.21 | 3.19 | 12 |
| Environmental | 26.21 | 4.602 | 16 | 27.47 | 3.777 | 14 |
| POMS-B | 60.42 | 24.033 | 79 | 33.74 | 16.86 | 58 |
| Tension | 15.47 | 5.2 | 17 | 10.11 | 4.081 | 13 |
| Depression | 13.79 | 5.554 | 19 | 7.74 | 3.364 | 9 |
| Anger | 13.74 | 4.736 | 16 | 8.42 | 3.626 | 12 |
| Vigor | 11.84 | 4.1 | 15 | 17.32 | 4.607 | 16 |
| Fatigue | 16.11 | 5.37 | 16 | 13.21 | 4.049 | 14 |
| Confusion | 13.16 | 3.775 | 13 | 11.58 | 3.626 | 13 |
| PCS | 16.32 | 6.12 | 20 | 21.68 | 5.518 | 21 |

Table 3
Paired Sample T-tests for Dependent Variables

| Dependent Variable | <i>M</i> | <i>SD</i> | <i>t</i> | <i>p</i> |
|---------------------------|----------|-----------|----------|----------|
| QoL | 4.67 | 9.088 | 2.179 | .044 |
| Physical | 1.11 | 4.143 | 1.138 | .271 |
| Psychological | 2.28 | 3.908 | 2.473 | .024 |
| Social | .11 | 1.676 | .281 | .782 |
| Environmental | 1.17 | 3.204 | 1.545 | .141 |
| POMS-B | 25.72 | 24.168 | 4.515 | <.001* |
| Tension | 5.06 | 4.425 | 4.847 | <.001* |
| Depression | 5.83 | 4.605 | 5.374 | <.001* |
| Anger | 5.11 | 4.626 | 4.688 | <.001* |
| Vigor | 5.39 | 6.81 | 3.358 | .004* |
| Fatigue | 2.89 | 6.361 | 1.927 | .071 |
| Confusion | 1.44 | 3.634 | 1.687 | .110 |
| PCS | 5.37 | 6.048 | 3.869 | .001* |

* $p < .0038$

The researchers also asked four questions about the participants' feelings of competency in sport participation. A significant increase in perceived competence was found, $t(17) = 3.869$, $p = 0.001$ (see Table 3).

Discussion

Outcome data is sparse in most adaptive sport and recreation programs, and nearly non-existent in programs serving veterans. The findings of this study are an important first step in establishing the efficacy of recreation services for veterans of OIF/OEF who have acquired a disability. Results of this study are particularly interesting considering the compounding negative effects of acquired disability and emotional disturbances such as PTSD and depression. These findings preliminarily indicate the therapeutic potential of adaptive sport and recreation services for combat veterans in increasing perceived competence and a general sense of vigor,

while reducing negative mood states such as depression, tension, and anger. The results also indicate a promising trend, although not significant, towards potential improvement in overall QoL and psychological health. It may be that, over time, regular participation in such programs can eventually increase overall QoL as mood states and perceived competence in the associated activities are enhanced.

Veterans with Acquired Physical Disability and QoL

Recreation and therapeutic recreation services are currently providing, and continue to develop, a wide array of services for veterans returning from combat (Carnahan, 2008; Hawn, 2008). While it is critical that services address specific physical and emotional symptoms, loss of function, and diminished social roles and status, consideration must also be given to how these identified needs negatively affect one's quality of life. Previous research sug-

gests that adaptive sports and recreation programming may be appropriately suited to address QoL issues for individuals with acquired disability (Zabriskie, Lundberg, & Groff, 2005). Applying these findings to veterans with acquired disabilities seems appropriate.

In this study, differences, although nonsignificant, were observed in veterans' overall perception of QoL and their psychological health as a component of QoL. Interestingly, the veteran's psychological health was observed through the WHO-QOL questions regarding items such as the veteran's body image and appearance, negative feelings, positive feelings, self-esteem, and spirituality. Some of these concepts have been identified in previous research on the effects of adaptive sports involvement suggesting that one's self perception can be significantly improved through participation (Brittain, 2004; Huang & Brittain, 2006; Lundberg, Taniguchi, McCormick, & Tibbs, 2011). In this study it appears that a similar trend for psychological improvement was developing.

Mood states and QoL. While there was no direct support for the research hypothesis regarding improvement in QoL, theorists have made the assertion that mood states directly influence QoL (Schwarz & Clore, 1983). Thus, the ability to consistently experience positive mood states will, over time, enhance quality of life. As such, the significant changes in mood states observed in this study provide indirect evidence that the programs have the potential to impact quality of life. Having an effect on mood states is especially important considering that individuals with acquired disabilities experience higher rates of negative mood than individuals without disabilities (Kemp & Krause, 1999; Kreuter, Sullivan, Dahllof, & Siosteen, 1998).

The reduction of negative mood states and total mood disturbance following participation in the adaptive sport and recreation program was clearly an important finding of this study. In addition, the positive mood state of vigor was increased suggesting that participating in outdoor sports and recreation activities not only facilitated the reduction of negative mood states, but also assisted individuals in experiencing a sense of energy, vitality, and enthusiasm. For an individual with a recently acquired disability, having the opportunity to experience a sense of vigor is extremely important considering the physical, social, and emotional barriers they must continually negotiate (Rimmer et al., 2004).

Mood states and PTSD. This study also identified the unique ability of adaptive sports and recreation activities to reduce negative mood states commonly associated with PTSD. While not all of the veterans in this sample reported experiencing PTSD, the results of this study confirm the ability of adaptive sports and recreation activities to reduce negative mood states such as: tension, depression, and anger (Lundberg, 2010). While further research is needed to identify the specific mechanisms by which these changes were facilitated, the fun, relaxing, and supportive environments surrounding recreation participation would likely have been a contributing factor in the reduction of negative mood states.

Adaptive sports and therapeutic recreation programs may be uniquely positioned to address symptoms of PTSD and negative mood states. Recreation can be used as a therapeutic modality which facilitates stress reduction, the development of social networks, the redevelopment of skills needed to enjoy activities, and the recreation of joyful memories, all of which are particularly challenging for the individual with PTSD (Schiraldi, 2000). Consider-

ing the high incidence rate of PTSD among veterans returning from OIF/OEF, this area of investigation deserves further attention.

Perceived Competence

Changes in the veterans' mood states and QoL may have been affected by their perceptions of competence based on the sports and recreation activities in which they were involved. As perceptions of competence are related to higher levels of well-being (Ryan & Deci, 2002), it might also be assumed that improving one's sports related competence might facilitate some improvements in areas such as body image and appearance, positive feelings, and self-esteem, which are components of psychological health as defined by the WHOQOL (1998).

It is also possible that veterans who once saw themselves as physical and powerful may question their capabilities after acquiring a disability. Additionally, because soldiers are trained to be highly skilled in their work, becoming injured may be inaccurately seen as a sign of incompetence or weakness, potentially having an overall negative effect on a soldier's general perception of competence. Improvements in sports and recreation related competence is one area that soldiers with acquired disabilities can experience success and demonstrate a new level of ability, further facilitating a positive self view (Brittain, 2004; Huang & Brittain, 2006; Lundberg et al., 2011).

Further research is needed to understand the theoretical importance of perceived competence as it relates to QoL and either improvements in positive mood states or reductions in negative mood states (Kavanagh & Bower, 1988). The development of perceived competence through adaptive sports and recreation participation may prove to be a critical component

in understanding the potential for further growth and development among veterans with acquired disabilities.

Implications for Therapeutic Recreation Practitioners

As an ever-increasing percentage of veterans return from the OIF/OEF conflicts with acquired disabilities such as TBI, PTSD, amputations, SCI, visual impairments, and emotional disorders (Ainspan & Penk, 2008), it is likely that therapeutic recreation practitioners will have increased opportunities to serve veterans in a wide variety of service settings. Considering this growing trend, the findings of this study suggest important implications regarding perceived competence, increasing the positive mood state of vigor, and decreasing negative mood states such as tension, anger and depression. This study also highlights the need to utilize community resources in order to better serve veterans from the OIF/OEF conflict.

Based on the findings of this study, it is recommended that CTRSs who serve the OIF/OEF veteran population design programs that facilitate opportunities for the development of perceived competence through sports and recreation. Prior to their acquired disability, the OIF/OEF veteran's work required them to be highly physical and willing to accept risk. Providing recreation programs that appropriately address these characteristics, within an atmosphere designed for successful participation, has the potential to develop a sense of competence and may also lead to a feeling of coherence between life prior to acquiring a disability and their current situation (Kleiber, Hutchinson, & Williams, 2002).

Programming for the development of competence will focus on achieving success in challenging atmospheres. The CTRS should be aware that success can be de-

fined through various sources of feedback including the veterans own physiologic response to the situation, the demands of the natural outdoor setting, and from other individuals participating in the recreation setting. In order to facilitate a successful experience, the CTRS must be aware of these various sources of feedback and in some cases may need to assist the client in redefining success based on his or her current abilities.

Recognizing that individuals with acquired disability frequently experience negative mood states (Kemp & Krause, 1999; Kreuter et al., 1998) and understanding the relationship between positive mood states and QoL, it is recommended that CTRSs intentionally highlight and program towards changes in mood states as an outcome of recreation participation. Because mood states are considered transient or temporary, they are frequently seen as a byproduct of participation; they should instead be considered a desirable and intentional outcome. CTRSs might consider assisting clients in developing a repertoire of sports and recreation activities that can be done independently with the intention of eliciting positive mood and reducing negative mood states such as anger, tension, and depression.

The results of this study also suggest that CTRSs should consider outdoor sports and recreation involvement as a way to facilitate vigor, or a sense of energy, vitality, and enthusiasm. Assisting clients with acquired disabilities achieve a sense of vigor is particularly important considering they continue to experience a wide variety of barriers in becoming physically active and healthy (Rimmer et al., 2004).

Regardless of the CTRS's primary practice area, but particularly for those serving the veteran population, more needs to be done to network and connect with appropriate community resources. This

is particularly true for veterans with acquired disabilities, as they have historically experienced a wide variety of challenges successfully integrating back into civilian life (Shay, 2002). Additionally, previous research has identified that connecting with resources in the community is a critical component of quality of life for individuals with disabilities (Chun, Lee, Lundberg, McCormick, & Heo, 2008). Based on the findings of the study, CTRSs should further connect with various community resources and ensure that veterans and other clients have the necessary skills to utilize community resources independently, which may include advocating for appropriate transportation and funding. Community resources are widely available in local and national parks and recreation organizations, organizations such as SVAS Higher Ground, and adaptive sport and recreation chapter affiliates which exist in nearly every state through organizations like Disabled Sports USA and others (Disabled Sports USA, 2010).

Limitations and Future Research

Various limitations and implications for future research are important to consider as a result of this study. The short duration of the program clearly limited its potential impact, particularly in the area of QoL. Where possible, programs of a longer duration are encouraged and may facilitate more change in QoL. Future research should also include longitudinal measurement to observe changes over time.

The lack of a control group also limited the study in that changes from the pretest to the posttest due to learning effects and general maturation were not controlled. While the inclusion of a control group would significantly strengthen the study design, the five to seven days between pre-test and post-test may have been

long enough to limit some learning effects and short enough to avoid changes due to general maturation. Nonetheless, the initial positive findings of this study warrant further research under a more controlled research design.

In addition, the severity of disabilities was not accounted for in this study. It can be assumed that certain participant profiles will react differently to participation, depending on the nature of their disability. Therefore, while some improvements in QoL and reduction of mood states were noted from pretest to posttest, it is not clear if any disability related symptoms were affected. Future research should observe specific disability related symptoms to determine the direct effect of adaptive sports and recreation participation as it relates to a specified disability or disorder. Also, considering TBI and PTSD as the signature wounds of OIF/OEF, future research should focus on how adaptive sports and recreation programs can be more effectively utilized with these populations. Future studies should also seek larger and more representative samples to improve the generalizability of findings.

Future research in this area should also consider the theoretical connections between QoL, mood states, and perceived competence. Further research is needed to determine the causal relationships between these variables. Do changes in perceived competence bring about elevated positive mood states such as vigor, and reduce negative mood states such as depression,

anger, and tension, or do the variables interact in a different sequence? Different methodological approaches are needed to answer these questions.

Conclusion

As a large number of veterans are returning from combat with acquired disabilities (Tanielian & Jaycox, 2008), more and more CTRSs have the opportunity to work with this growing population. The challenges facing veterans returning from combat have been well documented and include various negative outcomes such as: general alienation, bitterness, boredom, substance abuse, unemployment, poor mental health, and difficulty in relationships (Shay, 2002). While a variety of programs exist to address these challenges (Carnahan, 2008; Hawn, 2008), this study observed changes in quality of life, mood states, and sports related competence for OIF/OEF veterans who participated in a therapeutic adaptive sports and recreation program in Sun Valley, Idaho.

After participation in the therapeutic recreation program, significant changes were observed in mood states and perceived competences. A promising trend, although not significant, was also observed regarding improvement in QoL and psychological health. These findings illustrate the therapeutic potential of adaptive sport and recreation services in addressing the needs of returning combat veterans who have acquired a disability.

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