Individual Literature Review: Occupational therapy intervention for veterans with Traumatic Brain Injury

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Literature Review

This literature review will look into different studies that focus on both civilian and military populations with Traumatic Brain Injury (TBI). In addition, this review compares the effectiveness of different treatment approaches that are designed to improve self awareness, community integration, work performance, and quality of life, and thus, have implications for use with military populations with TBI.

Introduction

In 2007, about 350 active duty military members were admitted to the Veteran Affairs (VA) inpatient units with traumatic injuries that resulted from explosion and/or blast by grenades and improvised explosive devices, land mines, falls, bullets, and vehicle accidents in combat. The majority of the veterans of Iraq and Afghanistan are likely facing Traumatic Brain Injury (TBI), Post Traumatic Stress Disorder (PTSD), and other physical injuries (United States Department of Veterans Affairs, 2007; Defense and Veterans Brain Injury Center, n.d). TBI is one of the common diagnoses that causes cognitive and behavioral changes that will reduce the patients' self awareness of deficits and of improper social behaviors. Veteran's absence of self consciousness of impairments and inappropriate interpersonal interaction cause problems in controlling their impulsiveness. As a result, the veterans have problems reintegrating into their social lives, have fewer opportunities to return to active duty and/or work, and finally have diminished quality of life (Goverover, Johnston, Toglia & Deluca, 2007; Keltner & Cooke,2007).

Self awareness

Patients who do not recognize their deficits and limitations have a lower rehabilitative rate; as a result, they are less likely to return to their prior life styles. Because patients who are

unaware that their safety and independent functions are being interfered with by their impairments, they do not have the motivation to engage in any therapeutic activities. Often, lack of self-awareness is mostly seen in patients with TBI and it decreases the patients' abilities in making appropriate judgments; therefore, patients with TBI require supervision to ensure their safety (Toglia & Kirk, 2000). Research by Cicerone et al. (2008) compared the effectiveness of standard neuro-rehabilitation and intensive cognitive rehabilitation. The study consisted of 68 adult participants who had TBI as their primary diagnosis and were injured at least three months prior to the study. The participants had to communicate and participate in verbally-based group interventions for 3-days a week during a minimum of four months. The participants were randomly assigned into either the standard neuro-rehabilitation group or the intensive cognitive rehabilitation group and received treatments for 16 weeks. Both interventions were based on the principles of neuro-psychologic rehabilitation; the difference between the interventions was that the intensive cognitive rehabilitation program focused on addressing cognitive deficits, emotional difficulties, interpersonal behaviors, and functional skills, while the standard neuro-rehabilitation program focused on cognitive retraining.

Both programs consisted of physical, occupational, neuro-psychology, prevocational, and speech therapies. Results showed that participants in the intensive cognitive rehabilitation group improved in community participation and self-efficacy for management of cognitive and emotional symptoms. In addition, those improvements remained stable during the 6-month follow-up period after the completion of the intervention. In comparison, the participants from the standard neuro-rehabilitation group required continual comprehensive rehabilitation for 6-months after discharge from the study. In conclusion, the intensive cognitive rehabilitation

program provided more continuous and stable improvement in psychological well-being compared to the standard neuro-rehabilitation program.

In contrast, Goverover, Hohnston, Toglia and Deluca (2007) conducted research that appraised the effectiveness of treatment focusing on functional activities in improving self-awareness in TBI patients. Goverover and colleagues completed a single blind study that included six individualized treatment sessions for at least three weeks. The intervention focused on Instrumental Activity of Daily Living (IADL). Twenty participants were invited from an outpatient cognitive rehabilitation program. Criteria for the adult patients with TBI to participate were: being oriented to person, time and place, medical stability, and independence in Activity of Daily Living (ADL). The participants were randomly assigned into either the treatment group or control group. Both groups participated in six IADL activities which were (1) selecting a birthday gift, (2) packing a lunch box, (3) paying the telephone bill, (4) making a doctor's appointment, (5) filling a pill organizer, and (6) preparing a birthday cake.

The difference between the two groups was that the participants from the treatment group had to foresee their own performance before finishing the tasks and evaluate their performance after completing each task. The researchers employed six instruments to obtain information from participants. The instruments were administered pre- and post-test to measure outcome. The instruments were Assessment of Awareness of Disability (AAD) (Kottorp & Tham, 2004) Self-Regulation Skills Interview (SRSI) (Ownsworth, McFarland, & Young, 2000), Assessment of Motor and Process Skills (AMPS) (Fisher 2001), Satisfaction with quality of care (Paniak, Toller-Lobe, Durand, & Nagy, 1998), Awareness Questionnaire (AQ) (Shere, Bergloff, Boake, High, & Levin, 1998), and Community Integration Questionnaire (CIQ) (Willer, Ottenbacher, & Coad, 1994).

The results did not reach the level of statistical significance. However, the participants were able to self-regulate and perform IADL successfully during the treatment sessions by identifying the challenges to their performance. The researchers mentioned that the limitations of this study were a small sample size and a limited number of treatment sessions (Goverover, Johnston, Toglia, & Deluca, 2007).

The results from both studies showed that anticipating the potential challenges before completing functional activities had a prolonged positive outcome in patients with TBI after discharge. The differences of these studies were the holistic approach and the task orientation approach, the former approach connected with neuro-rehabilitation and intensive cognitive rehabilitation, and the latter approach associated with intervention focused on IADL. However, the implications for these treatment methods with the specific veteran TBI population are broad, and there is a significant gap in the research for this population, regarding self awareness capabilities and treatment.

Community Integration

Social interaction with family members, friends and spouses is usually a problem for veterans with TBI, as it is for civilians with TBI, due to lack of or loss of social communication skills. In Keltner and Cooke's study (2007), two soldiers with TBI and their family members were interviewed. The study concentrated on the feelings of the family members regarding the behavioral changes in patients with TBI. The family members of the soldiers stated that the soldiers became different people. The soldiers' family members and colleagues also mentioned that they were afraid of the soldiers after the soldiers were injured, since they were irritable, aggressive, and psychotic. Because of those symptoms, family members and friends disliked

being around veterans with TBI, and veterans with TBI had an excessive amount of difficulty participating in any social events.

Dahlberg et al (2007) conducted research regarding social communication skills training with 52 volunteers with TBI who were at least 1 year post-injury, had already received some form of rehabilitation, and had clearly identified deficits in social communication skills. In this study, some participants received 1.5 hour group therapy sessions once a week for 12 weeks, while the other group's treatment was deferred to act as a control. The main outcome measures used included the Profile of Functional Impairment in Communication (PFIC) (Linscott, Knight, & Godfrey, 1996), the Social Communication Skills Questionnaire–Adapted (SCSQ-A) , the Goal Attainment Scale (GAS) (Kiresuk, Smith, & Cardillo, 1994), the Craig Handicap Assessment and Reporting Technique–Short Form (Mellick, 2000), the Community Integration Questionnaire (Willer, Rosenthal, Kreutzer, Gordon, & Rempel, 1993), and the Satisfaction With Life Scale (SWLS) (Diener et al, 1985). Results showed significant treatment effect when compared with the deferred/no treatment group immediately after the first 12 weeks of the study. Additionally, at follow-up 6 months after treatment, scores on the assessments remained higher than initial baseline scores, indicating that the skills learned had been maintained and that quality of life had been significantly increased.

In a meta-analysis that reviewed existing studies regarding community-integrated rehabilitation (CIR) programs, Trudel, Nidiffer, and Barth (2007) found that comprehensive, holistic day-treatment programs demonstrated treatment efficacy in improving quality of life for those with TBI. Due to inconclusive research and lack of randomized controlled trials, Trudel et al proposed a study of a new 12-week pilot program sponsored by the Defense and Veterans Brain Injury Center (DVBIC). This program offered comprehensive therapeutic services, some

of which were designed to improve social interaction by addressing depression, anxiety, anger-management, and irritability. The overall goal of this comprehensive multidisciplinary approach was to return service members to active duty and/or work, and successfully reintegrate injured service members with TBI back into the community. Individual and group services included education, functional therapeutic interventions, and cognitive behavioral therapy. At this time, the therapeutic value of the program has not been disclosed.

Overall, it seems that although there are gaps in the research specifically focusing on community reintegration for veterans with TBI, the body of scientific treatment analysis is growing. In addition, there are several methods previously studied with civilian populations that show merit and that could be easily adapted to the specific needs of and difficulties experienced by veterans with TBI.

Work performance

Cognitive and behavioral changes also affect the work performance of veterans with TBI. Bottes and Chapparo (2002) interviewed 20 occupational therapists who were experienced and knowledgeable about TBI. The researchers found six behavioral factors and 20 cognitive factors that diminished the work performance in people with TBI. The behavior factors were social adeptness, temperament control, intra personal, social insight, affect, and coping with noise. The cognitive factors were memory, concentration, problem solving, organizational skills, information processing, insight, communication, task performance, new learning engagement, information recall, fatigue, general executive functioning, motivation and/or attitude, following information and/or instructions, initiative, abstract and concrete thinking, judgment, academic skills, visual spatial ability, and perception. Since patients with TBI encountered some cognitive and behavioral difficulties due to impairments, it was significantly more challenging for them to

manage their work assignments and perform their roles as employees and co-workers than those who are not impaired.

Vanderploeg et al. (2008) compared the effectiveness of the cognitive-didactic and functional-experiential rehabilitation approach for TBI veterans. They found that the cognitive-didactic program was more effective in helping younger TBI veterans return to work or active duty; on the other hand, the functional-experiential program could more successfully help older veterans regain the ability for independent living. Participants received 1.5 to 2.5 hours of either cognitive-didactic therapy or functional-experiential therapy depending on the specific groups they were placed in. Besides the specific cognitive and functional therapies, participants additionally received 2 to 2.5 hours from skilled occupational and physical therapists for 26-84 calendar days. The veterans were followed up after discharge on their level of required assistance, functional independence, ability to return to and sustain work and/or school.

Veterans with TBI under the age of 30 years who received the cognitive-didactic treatment had higher return rates to work because they learned to accommodate their cognitive deficits through a "trial-and-error approach". Compared to the cognitive-didactic group, veterans over 30 and those with a higher educational level in the functional-experienced group could maintain prolonged independent living after discharge because they had the basic foundation of knowledge and independence prior to the injury. Therefore, this group of veterans benefited more from the "learning-by-doing" approach. The researchers pointed out that one of the limitations was the similarity of both treatment approaches. Both approaches employed the same compensatory technique of using a notebook as memory aide or tool to increase self awareness. Due to the similar technique, the outcome became unclear about how effective one

approach was over the other. Another limitation of this study was lack of generalization to female veteran because 93% of the participants in this study were male.

Another randomized cognitive rehabilitation study compared the effectiveness of the in-hospital intervention and home program in helping military personnel return to and sustain work (Salazar et al, 2000). Salazar and colleagues (2000) conducted a randomized study focusing on inpatient cognitive rehabilitation and compared the effectiveness between the inpatient cognitive rehabilitation and home program. The researchers invited 120 soldiers with moderate-to-severe closed head brain injuries from Walter Reed Army Medical Center. The criteria of the participants was having a Glasgow Coma Scale score of 13 or less when admitted to a hospital at least three month ago. The participants had to have Rancho Los Amigos cognitive level of 7 (oriented and appropriate). Sixty-seven soldiers were randomly assigned to an intensive and standardized in-hospital cognitive rehabilitation program for 8 weeks. Fifty three soldiers were enrolled in a home rehabilitation program with telephone support from a psychiatric nurse. The in-hospital group was larger because of the number of participants who were in favor of starting the program. Due to the uneven size of the groups, the data was analyzed using "intent-to-treat analysis". However, the results did not reach the level of statistical significance because of the small sample size, which was the primary limitation of this study.

Even though the level of statistical significance was not met, 90% of the participants in the in-hospital program were able to return to work, compared to 94% participants in the home program. In addition, 91% of the participants in the in-hospital program and 93% of the participants in the home program were able to maintain their job successfully. The results showed that the in-home treatment group was more effective. However, the researchers' understanding of the implications of treatment and validity of the results was somewhat limited

by the fact that the recovery progress was not measured or tracked in between the time of discharge and the follow-up period.

Quality of life

One of the major concerns in developing occupational therapy interventions is how to enhance the quality of life for veterans with TBI, yet the subjective nature of quality of life makes it a difficult aspect to research. Fortunately, some researchers were able to relate quality of life with the performance of meaningful daily activities and with the ability to communicate socially. However, it is important to note that none of the studies reviewed focused directly on the specific needs and challenges of veterans with TBI, who often have significantly different lifestyles and backgrounds than civilians, as well as a higher incidence of accompanying psychological issues, such as Post-traumatic Stress Disorder (PTSD). Many of the studies and treatment methods do demonstrate merit, though, and it can be safely assumed that these modalities could be used and adapted appropriately with veterans with TBI.

Burleigh, Farber, and Gillard (1998) found that social reintegration improved the quality of life in patients with TBI. The researchers selected 11 women and 19 men with severe TBI from a suburban, community re-integration outpatient program. The age range of the participants was 26 to 60 years old, and the participants were required to fill out a Community Integration Questionnaire (CIQ) (Willer, Rosenthal, Kreutzer, Gordon, & Rempel, 1993) and Life Satisfaction Index-A (LSIA-A) (Neugarten, Havighurst, & Tobin, 1961). From the responses, the researchers identified that successfully developing socialization skills increased the satisfaction level in patients with TBI (Burleigh, Farber & Gillard, 1998).

In contrast, Cicerone and colleagues (2008) developed an intensive cognitive rehabilitation program which included physical, occupational, speech, neuropsychology and

prevocational therapies. The researchers employed the Community Integration Questionnaire (CIQ) (Willer, Rosenthal, Kreutzer, Gordon, & Rempel, 1993) and Perceived Quality of Life scale (PQOL) (Patrick, Danis, Southerland & Hong, 1988). The participants in the intensive cognitive rehabilitation group reported that their self-efficacy (quality of life) remained the same, even through their responses to the CIQ were significantly higher at the follow-up period.

Wheeler, Lane, and McMahon (2007) studied the relationship between the community participation and life satisfaction. The researchers administered an occupational therapy intervention that focused on intensive life skills training to 18 participants, and established a control group with another 18 participants. The adult participants in the life skills training group had to complete baseline and re-evaluation assessments independently, and have no history of other severe neurological or mental illness. The control group included patients from private psychology and psychiatric clinics, as well as rehabilitation clinics. The Community Integration Questionnaire (CIQ) (Willer, Rosenthal, Kreutzer, Gordon, & Rempel, 1993) and Satisfaction with Life Scale (SWLS) were employed for outcome measure (Diener, Emmons, Larsen, & Griffin, 1985).

The result of this study showed improvement in the overall level of community integration, but the correlation between community integration and life satisfaction did not reach a level of statistical significance. The researchers stated that the limitation to this study included a lack of randomization of the participants selected, a prolonged follow-up period, and potential biases in determining the collection of measuring outcome.

Besides community reintegration, being able to independently complete everyday occupations is also associated with life satisfaction (quality of life). Gentry, Wallace, Kvarfordt and Lynch (2008) conducted a study that used a personal digital assistant (PDA) as an aide in

recording performances of everyday occupations (appointment management, money management, and medication management). The researchers used fliers and community service program hospital clinics to recruit participants. The criteria of the adult participants with severe TBI had to be able to manipulate a stylus to command the PDA, be able to follow visual and verbal instructions, be accompanied by a family member or caregiver during the period of the study, and be able to work on a home personal computer to backup data. Sixteen men and 7 women aged between 18 and 66 were included in the study. Each participant received a PDA as a cognitive aid. In addition, the participants received training on how to enter data to the PDAs, transfer information from and to the personal computer, set an alarm and organize a "to-do" list as a reminder. After the training, the participants could only contact the researchers by phone or email for technical support.

The Canadian Occupational Performance Measure (COPM) (Law, Baptiste, Carswell, McColl, Polatajko & Pollock, 2005) and Craig Handicap Assessment and Rating Techniques-Revised (CHART) (Mellick, 2000) were used to collect the performance and satisfaction level data of participants before and after interventions. The findings showed that participants' level of satisfaction increased while the occupational performance improved. However, since this study was not randomized and the participants were highly functional prior to the enrollment, it could not represent the population with severe TBI, nor did it focus on the unique needs and difficulties of veterans with TBI.

Researchers tried to measure life satisfaction in people with TBI by looking into their level of community integration and independence functioning. However, some of the results were contradictory in different studies. Wheeler, Lane, and McMahon (2007) and Cicrone et al (2008) found that the level of social participation did not have any correlation with life

satisfaction, while Burleigh, Farber and Gillard (1998) found that socialization and life satisfaction was positively correlated. Summarily, there is more research to be done regarding TBI, the accompanying deficits and limitations, and treatments that can effectively impact and increase satisfaction or quality of life.

Conclusion

Numerous studies address occupational therapy interventions for people with TBI or veterans with TBI in terms of coping with cognitive and behavioral changes, transitioning them back to work or active duty, and re-integrating them to the community successfully. Nonetheless, there is not a direct study about how occupational therapy interventions can help veterans regain independence in certain areas, such as performance of ADL, IADL, work, leisure, and educational activities, and social participation. To further understand the veterans' perspective about which rehabilitation interventions will be more effective, more occupational therapy based research should focus specifically on the population of veterans with TBI, their unique needs and challenges, and the techniques that prove most effective for assisting these individuals with regaining independence and the ability to re-engage themselves in meaningful activities.

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