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Improving Work Outcomes for Veterans with Traumatic Brain Injury

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14. ABSTRACT The study is a 12-month randomized controlled trial comparing supported employment plus Cognitive Symptom Management and Rehabilitation Therapy (SE-Cog) to enhanced supported employment (ESE) for OEF/OIF veterans with mild to moderate traumatic brain injury (TBI) who are unemployed and want to return to work. CogSMART is a manualized, 12-week compensatory cognitive training intervention designed to provide: a) psychoeducation, b) strategies to address sleep problems, fatigue, headaches, and stress, and c) strategies to improve prospective memory, attention, learning/memory, and executive functioning. Assessments of cognition, post-concussive symptoms, psychiatric symptoms, functional skills, and quality of life will be administered at baseline, and at 3, 6, and 12 months following study enrollment. Work outcomes (i.e., weeks and hours worked; wages earned) will be measured weekly during the 12-month study. Results thus far indicate that CogSMART has robust effects on post-concussive symptoms, as well as some aspects of neuropsychological performance. In addition, there are CogSMART-associated trends toward improvement in depressive symptom severity and quality of life. These results suggest that CogSMART, in the context of supported employment, may improve post-concussive symptoms and cognitive performance, as well as more distal outcomes such as depressive symptoms, quality of life, and potential work outcomes.					
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INTRODUCTION:

The study is a 12-month randomized controlled trial comparing supported employment plus Cognitive Symptom Management and Rehabilitation Therapy (SE-Cog) to enhanced supported employment (ESE) for OEF/OIF veterans with mild to moderate traumatic brain injury (TBI) who are unemployed and want to return to work. CogSMART is a manualized, 12-week compensatory cognitive training intervention designed to provide: a) psychoeducation, b) strategies to address sleep problems, fatigue, headaches, and stress, and c) strategies to improve prospective memory, attention, learning/memory, and executive functioning. 64 participants will be randomized to one of two conditions: SE-Cog or ESE. SE-Cog and ESE will be delivered by the supported employment specialists during the first 3 months of the 12-month study. Assessments of cognition, post-concussive symptoms, psychiatric symptoms, functional skills, and quality of life will be administered at baseline, and at 3, 6, and 12 months following study enrollment. Work outcomes (i.e., weeks and hours worked; wages earned) will be measured weekly during the 12-month study. The results of the study will reveal whether supported employment services for this population can be improved by adding cognitive rehabilitation.

BODY:

As outlined in the Statement of Work Year 2 timeline, Year 2 was devoted to participant recruitment, enrollment, and retention. In Year 1, our enrollment total was 19 out of the targeted 32 participants (59% of target). Main reasons for lower than expected recruitment in Year 1 were: a) delay in funding arriving so positions could be posted and filled; b) delays in the hiring process and difficulties obtaining computer access for the new staff members; c) long wait times for neuropsychological evaluations (required for entrance into the study if not already completed). None of these issues were problematic in Year 2.

Enrollment in Year 2 was also 19 out of the targeted 32 participants (59% of target). Our primary difficulty in recruitment and enrollment has been the high level of veteran participation in the Post 9/11 GI Bill, which provides a living stipend of \$2200 per month in San Diego while veterans attend college. Many veterans have chosen to attend college rather than work (and rightly so). We are now targeting veteran groups at local colleges and universities to offer the supported employment services of the study, which will help these veterans obtain valuable paid work experience while they earn their degrees. We have been successful in placing many veterans in paid work-study experiences as well as in federal employment.

Although our number of study completers is too low to be able to examine work outcomes over the 12-month trial, we do have preliminary shorter-term results to report regarding the efficacy of the CogSMART intervention. We examined the assessments of the first 20 veterans enrolled in the study. Participants were all male, 85% non-Caucasian, with a mean age of 32 and mean education of 13 years. Their TBIs occurred a mean of 4 years before study enrollment, and their mean losses of consciousness lasted 4 minutes. Sixty-nine percent met criteria for post-traumatic stress disorder. Their mean baseline scores were low-average to average on tests of attention, processing speed, learning, delayed recall, prospective memory, and executive functioning. However, their mean performance on one processing speed task (Digit Symbol) was below average (mean SS=6.6). Repeated measures ANOVA using baseline and three-month scores showed that, compared with the ESE group, SE-Cog participants reported more improvement in post-concussive symptoms ($F=10.5$, $df=1$, $p=.014$); there was also a significant improvement in verbal fluency, a measure of verbal processing speed ($F=8.4$, $df=1$, $p=.023$). There were trends toward improvement in depressive symptom severity and quality of life. These results suggest that CogSMART, in the context of supported employment, may improve post-concussive symptoms, cognitive performance, and more distal outcomes such as depressive symptoms, quality of

life, and potential work outcomes. The abstract reporting these data was presented at the VA Mental Health Conference in July 2010, and has been appended to this document as Appendix 1.

We have also examined relationships between neuropsychological performance, psychiatric symptom severity, and post-concussive symptom severity among the first 28 participants with baseline assessment data. The demographics of the sample are similar to those presented above. We found that neuropsychological performance was related to psychiatric symptom severity (PTSD and depressive symptoms), but was not related to self-reported post-concussive symptoms in this population. Specifically, lower processing speed performance was correlated with higher PTSD symptom severity ($r=-.47$, $p=.012$; $r=-.43$, $p=.023$) and higher depressive symptom severity ($r=-.41$, $p=.030$; $r=-.43$, $p=.021$). The abstract reporting these results, submitted to the International Society of Neuropsychology, has been appended as Appendix 2.

This study is novel in that there has been no published research on enhancing supported employment with cognitive training for clients with TBI. The main outcomes of the study will be (1) Knowledge regarding the efficacy of combining compensatory cognitive training with supported employment for clients with TBI; (2) A finalized CogSMART manual that will be made available for other service settings at the study's completion; and (3) 64 veterans with TBI will receive high-fidelity supported employment to assist them in transitioning back to the workforce.

The original Statement of Work presents the project timeline as follows:

Project timeline	
Time	Tasks
Year 1	Month 1-3: Submit IRB application, hire and train staff, begin recruitment Month 4-12: Enroll 32 participants (3-4 participants per month)
Year 2	0-9 months: Enroll 32 participants (3-4 participants per month) Month 9: Final participant enrolled
Year 3	9 months: Final participant completes study 9-12 months: Data analyses, manuscript writing, preparation of finalized CogSMART manual for dissemination in other settings

We will continue to enroll participants until the remaining 26 participants are enrolled. To accomplish this, we will target veteran groups at local colleges and universities, in addition to our normal sources of referrals (VA Polytrauma Clinic, VA TBI Cognitive Rehabilitation Clinic, VA Wellness and Vocational Enrichment Clinic). Due to our initial power calculations we used to arrive at a sample size of 64, we would like to continue to recruit until we reach a sample size of 64, and we believe this will be possible with the more aggressive recruiting efforts we are planning. We will plan to recruit until Year 3, month 6. We are planning to seek a no-cost extension at the appropriate date to be able to follow the final participants through to the end of their study participation and wrap-up the project as originally intended.

KEY RESEARCH ACCOMPLISHMENTS:

- 38/64 participants enrolled thus far (59% of target)
- 4 participants dropped (3 moved out of San Diego; 1 no longer interested in working)

REPORTABLE OUTCOMES:

Abstract presented at VA Mental Health Conference:

- Twamley, E., Thomas, K., Williams, R., Bondi, M., & Delis, D. (July 2010). CogSMART Compensatory Cognitive Training and Supported Employment for Veterans with TBI. VA Mental Health Conference, Baltimore, MD.

Abstract submitted to the International Neuropsychological Society:

- Thomas, K.R., Gregory, A.M., Williams, R.E., Bondi, M.W., Delis, D.C., & Twamley, E.W. (submitted). Cognitive Efficiency in Veterans with TBI is Reduced by Psychiatric Symptom Severity, Not Post-Concussive Symptoms. Journal of the International Neuropsychological Society (International Neuropsychological Society).

Additional relevant conference presentations:

- Twamley, E.W. (November 2009). CogSMART: Cognitive Symptom Management and Rehabilitation Therapy. VA VISN 9 Polytrauma Conference, Nashville.
- Twamley, E.W. (May 2010). Counseling and Psychotherapy for Individuals with Traumatic Brain Injury, University Counseling Services for Returning Veterans Continuing Education Program, University of San Diego.

CONCLUSION:

The results of the baseline and 3-month data suggest that CogSMART, in the context of supported employment, may improve post-concussive symptoms, cognitive performance, and more distal outcomes. Data collection is on-going. If this pattern holds with a larger sample, the results would justify including cognitive training in the delivery of supported employment for veterans with mild-to-moderate TBI as well as CogSMART as a standalone intervention to reduce post-concussive symptoms and improve cognition.

REFERENCES:

None included in this report except those above.

APPENDICES:

Abstracts attached as Appendices 1 and 2.

SUPPORTING DATA:

None included in this report.

Appendix 1. Abstract presented at the VA Mental Health Conference, July 2010

4th Annual VHA Mental Health Conference
July 27-29, 2010
Baltimore, MD

Oral Presentation Proposal

Oral presentations are didactic presentations for research studies, clinical demonstration projects, or educational interventions. Oral presentations are data-driven. Abstracts for research projects should include a research design and outcome data. Clinical projects should have at least one year of data and involve multiple sites. Educational projects should include evaluation data and demonstrate a change in practice. Generally, oral presentations are about 20 minutes, with 3 per breakout session. If you are proposing three presentations on a single theme/project for a full breakout session (90 minutes), be sure to indicate this and identify all presenters.

Presenting Author(s) information							
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VISN/ Vet Center Region:	22	Service:	Psychiatry				
Submission information							
Type of Presentation (choose one)							
☒	This submission is for a <u>single oral presentation</u> (with one or two speakers, up to 20 minutes)			☐	This submission is for <u>two or three presentations that are grouped together</u> with multiple presenters (up to 90 minutes). In the form below, please include a brief description about each presentation in the group to allow for sufficient review. Please list the primary author(s) of the related presentation(s) above.		
Topic(s) (select no more than 3; rank order if selecting more than one)							
☐	Implementation of the UMHS Handbook	☐	PTSD and traumatic stress	☐	Substance use disorder	☐ 2	Special populations (e.g., women, inpatient, rural, OEF/ OIF, elderly, etc)
☐	Families	☐	Integrated approaches to Veteran-centered care (e.g., health psychology/behavioral health, PC-MH, MH in medical settings)	☐ 1	Community reintegration and support	☐	Readjustment Counseling Service and outreach
☐	Recovery oriented care	☐	Co-morbid conditions	☐	Wellness and resilience	☐	Suicide Prevention
☐ 3	Evidence-based treatments	☐	Ending homelessness	☐		☐	

Title of Presentation
CogSMART Compensatory Cognitive Training and Supported Employment for Veterans with TBI
Background
Traumatic brain injury (TBI) can result in cognitive impairments (e.g., slow information processing, poor concentration, and impairments in learning, memory, and problem-solving) that limit functional recovery, including cognitive readiness for civilian work. Post-concussive symptoms and post-traumatic stress disorder symptoms can further contribute to cognitive impairment. This study is a randomized controlled trial to investigate a combined cognitive and vocational rehabilitation intervention for OEF/OIF veterans with mild-to-moderate TBI. The combined intervention includes: 1. Supported employment, the evidence-based vocational rehabilitation model for individuals with TBI, and 2. CogSMART (Cognitive Symptom Management and Rehabilitation Therapy), a compensatory cognitive training program targeting difficulties with concentration, memory, and problem-solving. Accumulating evidence demonstrates that cognitive impairments can interfere with getting and keeping jobs. Difficulty learning job tasks, distractibility, or slowness in job performance, for example, may lead to job failures. CogSMART is a one-hour per week, manualized treatment teaching compensatory cognitive strategies and habits to help clients bypass their cognitive impairments as they return to work. Combining supported employment with cognitive training could improve work outcomes by helping clients compensate for their cognitive deficits.
Methods & Results
Our ongoing study is a 12-month randomized controlled trial comparing supported employment plus CogSMART to enhanced supported employment. The sample includes OEF/OIF veterans with mild-to-moderate TBI and neuropsychological impairment who are unemployed and want to work. All participants receive high-fidelity supported employment services for 12 months. CogSMART and enhanced support are delivered by the employment specialists during the first 3 months of the study. Assessments of cognition, post-concussive symptoms, psychiatric symptoms, and quality of life are administered at baseline, 3, 6, and 12 months. Measures include assessments of processing speed, attention, verbal learning/memory, executive functioning, and prospective memory, as well as neurobehavioral, PTSD, and depressive symptoms, functional capacity, and quality of life. Work outcomes (i.e., weeks and hours worked; wages earned) are measured weekly during the 12-month study. The initial results of the first 20 participants in our randomized controlled trial comparing enhanced supported employment to supported employment plus CogSMART are positive. Supported employment participants receiving CogSMART reported more improvement in post-concussive symptoms at three months ($F=10.5$, $df=1$, $p=.014$) and had more improvement in letter fluency, a speeded word generation task ($F=8.4$, $df=1$, $p=.023$); there were also trends toward improvement in depressive symptoms and quality of life. In addition, those receiving the CogSMART intervention were more likely to obtain competitive work.
Conclusions
These results suggest that CogSMART, in the context of supported employment, may improve post-concussive symptoms, cognitive performance, and work outcomes.
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McGurk, S.R., E.W. Twamley, D.I. Sitzer, G.J. McHugo, and K.T. Mueser. <i>A meta-analysis of cognitive remediation in schizophrenia</i>. American Journal of Psychiatry, 2007. 164:1791-1802. Twamley, E.W., D.V. Jeste, and A.F. Lehman. <i>Vocational rehabilitation in schizophrenia and other psychotic disorders: a literature review and meta-analysis of randomized controlled trials</i>. J Nerv Ment Dis, 2003. 191: 515-23. Twamley, E.W., J.M. Narvaez, D.R. Becker, S.J. Bartels, and D.V. Jeste. <i>Supported Employment for Middle-Aged and Older People with Schizophrenia</i>. American Journal of Psychiatric Rehabilitation, 2008. 11:76-89. Twamley, E.W., D.V. Jeste, and A.S. Bellack. <i>A review of cognitive training in schizophrenia</i>. Schizophr Bull, 2003. 29(2): p. 359-82. Twamley, E., G. Savla, C. Zurhellen, R. Heaton, and D. Jeste. <i>Development and pilot testing of a novel compensatory cognitive training intervention for people with psychosis</i>. American Journal of Psychiatric Rehabilitation, 2008. 11:144-163. Vanderploeg, R.D., G. Curtiss, and H.G. Belanger. <i>Long-term neuropsychological outcomes following mild traumatic brain injury</i>. J Int Neuropsychol Soc, 2005. 11:228-36. Vasterling, J.J., et al., <i>Neuropsychological outcomes of army personnel following deployment to the Iraq war</i>. JAMA, 2006. 296:519-29. Wehman, P., et al., <i>Productive work and employment for persons with traumatic brain injury: what have we learned after 20 years?</i> J Head Trauma Rehabil, 2005. 20:115-27. Wehman, P.H., et al., <i>Supported employment: an alternative model for vocational rehabilitation of persons with severe neurologic, psychiatric, or physical disability</i>. Arch Phys Med Rehabil, 1991. 72:101-5.

Please submit the completed form to Jan.kemp@va.gov by **March 15, 2010**.

Appendix 2. Abstract submitted to the International Neuropsychological Society

Cognitive Efficiency in Veterans with TBI is Reduced by Psychiatric Symptom Severity, Not Post-Concussive Symptoms

Kelsey R. Thomas, Amber M. Gregory, Rebecca E. Williams, Mark W. Bondi, Dean C. Delis, and Elizabeth W. Twamley

Traumatic brain injury (TBI) is frequently co-morbid with psychiatric symptoms. We examined the correlations between neuropsychological performance and post-concussive symptoms (PCS), post-traumatic stress disorder (PTSD) symptoms, and depressive symptom severity in returning veterans with mild-to-moderate TBIs.

Twenty-eight unemployed Iraq/Afghanistan veterans with a history of mild-to-moderate TBI and diagnosed Cognitive Disorder NOS were administered a battery of neurocognitive measures and psychiatric interviews. Participants were mostly male ($n=27$), 85% non-Caucasian, with a mean age of 32 and mean education of 13 years. On average, their TBIs occurred 5 years before study enrollment, and their length of loss-of-consciousness was 72 minutes. Eighty-two percent met criteria for PTSD, with moderate-to-severe PTSD symptom severity and moderate depressive symptom severity. Their mean scores were average on tests of attention, processing speed, learning, delayed recall, prospective memory, and executive functioning. However, their mean performance on one processing speed task (Digit Symbol) was below average (mean $SS=6.9$).

Pearson correlations showed no significant correlation between PCS severity and neuropsychological performance. However, performance on two measures of processing speed (D-KEFS Trails Visual Scanning and Number Sequencing) was significantly correlated with both PTSD symptom severity ($r=-.47$, $p=.012$; $r=-.43$, $p=.023$) and depressive symptom severity ($r=-.41$, $p=.030$; $r=-.43$, $p=.021$).

These results suggest that more severe PTSD and depressive symptoms are associated with worse processing speed performance, whereas PCS severity showed no such association. Psychiatric symptom severity may play a role in reducing cognitive efficiency in returning veterans with remote histories of mild-to-moderate TBI. Evidence-based treatment of psychiatric symptoms may, therefore, improve neuropsychological performance.