Objective: Some active-duty military service members and veterans experience combinations of persistent traumatic stress, depression, suicidal ideation, anger, aggressive behavior, substance misuse, sleep disturbance, complicated grief, moral injury, headaches and migraines, chronic bodily pain, and cognitive weakness or deficits. The purpose of this study is to describe the clinical outcomes of active-duty service members and veterans who have completed the traumatic brain injury (TBI) and brain health track of a two-week intensive clinical treatment and rehabilitation program.

Participants and Methods: The sample included 141 participants, with a history of TBI, in the Intensive Clinical Program (ICP). The ICP is a multidisciplinary, two-week treatment and rehabilitation program for active duty service members and veterans with complex psychological, cognitive, and physical health concerns. The program is comprised of daily individual therapy, group psychotherapy, psychoeducation, skills-building groups, and complementary and alternative medicine treatments. Participants in the ICP completed the following measures prior to initiating treatment and immediately following completion of treatment: Neurobehavioral Symptom Inventory (NSI), Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5), Patient Health Questionnaire-9 (PHQ-9), Self-Efficacy for Symptom Management Scale (SE-SMS), and Patient-Reported Outcomes Measurement Information System (PROMIS)-Satisfaction with Participation in Social Roles and Activities-Short Form 8a, version 1.0 (PROMIS-S). Wilcoxon signed ranks tests were used to examine differences in scores on self-report measures from pretreatment to posttreatment for the full sample and within three subgroups stratified by age (in years: 20-34; 35-45; and 46-66). For the NSI, changes in the proportion of participants endorsing moderate or worse levels of individual symptoms from pretreatment to posttreatment were assessed using McNemar's tests. Alpha levels were set at $p<0.05$ for all analyses.

Results: Participants reported statistically significant improvements across all of the administered measures (NSI, PCL-5, PHQ-9, PROMIS-S, and SE-SMS) upon conclusion of treatment. Effect sizes ranged from medium to large (d=0.34–1.04) for the full sample. Effect sizes were largely consistent across age subgroups (20-34: d=0.32–1.05; 35-45: d=0.55–0.96; 46-66: d=0.28–1.05). The magnitude of change on the SE-SMS appeared to be less with increasing age (20-34: d=1.05; 35-45: d=0.69; 46-66: d=0.28). Individual item analyses for the NSI revealed statistically significant reductions in the proportion of participants endorsing moderate or greater severity from pretreatment to posttreatment for 18 of 22 symptoms.

Conclusions: Active duty service members and veterans participating in the two-week TBI and brain health intensive clinical program reported considerable symptom reduction at the conclusion of the program. Further research is indicated to assess the durability of symptom reduction.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Adult)
Keyword 1: traumatic brain injury
Keyword 2: cognitive rehabilitation
Keyword 3: quality of life
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4 The Role of Cognition and Self-Awareness on Driving Patterns After Moderate-to-Severe Traumatic Brain Injury

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Objective: Return to driving after moderate-to-severe traumatic brain injury (TBI) is often a key step in recovery to regain independence. Survivors are often eager to resume driving and may do so despite having residual cognitive limitations from their injury. A better

understanding is needed of how cognition and self-awareness impact survivors' driving after injury. This study examined the influence of cognition and self-awareness on driving patterns following moderate-to-severe TBI.

Participants and Methods: Participants were 350 adults aged 19–87 years (mean age = 46 years; 70% male) with history of moderate-to-severe TBI, who resumed driving and were enrolled in the TBI Model System. Cross-sectional data were obtained ranging 1–30 years post injury, including questions on driving practices, the Brief Test of Adult Cognition by Telephone (BTACT), and the Functional Independence Measure (FIM). Self-awareness of cognitive function was measured via the discrepancy between dichotomized ratings (intact versus impaired) of objective cognitive testing (BTACT) and self-reported cognitive function (FIM Cognition subscale). Driving patterns included frequency (driving 'more than once a week' versus 'once a week or less') and restricted driving behavior (total number of driving situations the survivor described as restricted, ranging 0-15). Regression analyses were conducted to examine the relationships between cognition, self-awareness, and each driving outcome (frequency and restriction), followed by causal mediation analyses to examine the mediating effect of self-awareness. Demographics (age, sex, education), injury characteristics (time since injury, injury severity, history of seizures in past year), and medical/social factors (family income, motor function, urban-rural classification) were included in the models as covariates.

Results: Thirty-nine percent of survivors had impaired self-awareness, 88% of survivors drove numerous times per week, and the average survivor reported limited driving in 6 situations (out of 15 total situations). Cognition was inversely related to impaired self-awareness (OR = 0.03, $p < 0.001$) and inversely related to restricted driving behavior (b = -0.79, $p < 0.001$). Motor function was positively related to impaired self-awareness (OR = 1.28, $p < 0.01$). Cognition was not related to driving frequency, and self-awareness did not mediate the relationships between cognition and driving patterns (all $p > 0.05$).

Conclusions: Most survivors who drive after their injury are driving frequently, but the situations they drive in differ based on their cognitive ability. Impaired self-awareness of cognitive deficits is common after TBI, and self-awareness of cognitive function does not affect driving patterns. Future research needs to focus on how cognition affects nuanced aspects of driving behavior after injury (i.e., types of situations survivors drive in).

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5 Hospitalization Outcomes Following Neuropsychological Evaluation in a Traumatic Brain Injury Sample

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Objective: Previous research has shown that positive outcomes are associated with receiving a neuropsychological evaluation (NPE). The current project examined hospitalization outcomes following an NPE in a sample of patients who had sustained a traumatic brain injury (TBI). Hospitalization rates were compared between the two years pre- and two years post-evaluation. The role that insurance status plays on these health outcomes was also examined. This project is part of a growing effort to evaluate outcomes of clinical neuropsychological services in order to better characterize the broad health impacts of NPEs.

Participants and Methods: Participants for the current study come from the Optum® de-identified Electronic Health Record dataset. The final sample included 245 patients who completed at least one NPE and were diagnosed with a TBI, according to ICD codes associated with their healthcare records. Patients were aged 21-87 (M = 51.55, SD = 16.74) with an average Charleston Comorbidity Index of 1.77 (SD = 2.41). The sample consisted of 124 females (50.6%), 121 males (49.4%). The majority of the sample identified as non-Hispanic white (N = 213; 86.9%), while 8.6% identified as another race or ethnicity. Regarding insurance, the most common insurance type was commercial (61.6%), followed by Medicare (13.5%), Medicaid (9.4%), and uninsured