



## Life After TBI: Substance Abuse

Brooke Luckhardt, M.S., CBIS

Substance use disorder (SUD) is linked to traumatic brain injury more often than people realize. Substance use can occur after sustaining a traumatic brain injury but can also be an antecedent to a TBI as well. A common thread is risk taking behavior, which can lead to sustaining a TBI and to substance use. What is not commonly known is that sustaining a TBI is a significant risk factor for developing a co-occurring substance use disorder. Research conducted of service utilization by health maintenance organization enrollees found that TBI survivors with no evidence of mental illness or substance abuse-related service utilization in the year prior to injury had a 4.5 odds ratio of substance abuse within the first-year post-injury (Fann, Burington, Leonetti, Jaffe, & Thompson, 2004).

As mentioned, a substance use disorder can be a precedent to sustaining a traumatic brain injury due to risky behavior, lack of impulse control, etc. A study by McHugo et al., (2017) examined 295 people with co-occurring mental health and substance use disorders to find that 80% also reported history of a TBI, current alcohol use, psychiatric symptoms, and lifetime homeless and institutionalization. A SUD increases the risk of being injured and sustaining a traumatic brain injury due to the risk factors mentioned herein.

The following are key points to remember to recognize and manage the signs and symptoms of substance use related to traumatic brain injury.

**Who is at risk?** Anyone who has sustained a traumatic brain injury is at risk for substance abuse. Additionally, anyone with a SUD is at risk for sustaining a TBI. However, other factors can play a role in exacerbating the risk. In a sample of discharged military service persons, research estimated that those diagnosed with a mild TBI were 2.6 times more likely to have been discharged due to alcoholism or drug use, while those with a moderate TBI were 5.4 times more likely (Ommaya et al., 1996). Persons in the general population who consume alcohol are at four times the risk of sustaining a TBI than those who do not (Bombardier, Rimmele, & Zintel, 2002).

**Both negatively affect mood and behavior.** Together, a TBI and substance use disorder cause even higher instance of poor judgment and impulsivity. Many who have sustained a traumatic brain injury try to self-medicate due to pain or mood disorders. In a study by Tate et al., (2004) post-injury alcoholism was highest in the sample group that reported the most pain. After consuming alcohol, threat-detecting brain circuits are dulled and are less able to differentiate between threatening and nonthreatening social stimulus that can lead to further injury (Olsen-Madden, Brenner, Corrigan, Emrick, & Britton, 2012). Risk of suicide also increases with these two risk factors. The risk of suicide increases four times in individuals with a history of TBI and substance use (Olsen-Madden et al, 2012).

**TBI may disrupt dopamine neurocircuitry.** Research has emerged to suggest that TBI can disrupt mesolimbic dopaminergic neurocircuitry that can result in stunted incentive motivation system (Arciniegas & Silver, 2006). In a study by Larson et al., (2007), the TBI group showed a deviant response to violations of environmental cues and reward expectancy compared with controls. Pharmacologic studies have also provided evidence that TBI patients that use stimulants, or dopaminergic agents, have improved cognition, suggesting it is possible that substances such as cocaine would provide this effect, giving the feeling of normalized brain circuitry (Bjork & Grant, 2009).

**Reduces positive rehabilitation outcomes.** A substance use disorder can negatively affect rehabilitation outcomes. Substance use after TBI can hinder medical, behavioral, vocational, and neurological outcomes (Ponsford, Whelan-Goodinson, & Bahar-Fuchs, 2007). Life satisfaction and psychosocial wellness can decline as well. Due to this, return to premorbid substance use levels should be a rehabilitation concern. A study by Ponsford et al, (2007), examined 121 participants with traumatic brain injury and found that in the first year after injury 17.4% of participants were back to drinking alcohol at high amounts and 25.4% had returned to this by 3 years post injury. Similarly, 8.4% participants reported returning to premorbid drug use levels (Ponsford et al, 2007).

**TBI can exacerbate a premorbid substance use disorder.** Poor decision making, impulsivity, and lack of awareness are variables to consider when screening this population for substance misuse-related problems. Traumatic brain injury can be a trigger for relapse due to cognitive and physical impairments, depression, and lack of self-control. Nearly double the participants in a study conducted by Corrigan et al, (2013) reported problematic use of substances after TBI versus controls, 33% versus 19%.

**SUD creates higher risk of further injury.** As mentioned, behavior can be dramatically affected in a negative way by substance use. Substances encourage disinhibition and reckless behavior that puts people at risk for injury. Research has shown that up to 75% of traumatic brain injuries are incurred when people are intoxicated (Bombardier

et al, 2002). Substance use prior to injury predisposes individuals to higher rates of postinjury substance use. Many individuals report higher sensitivity to alcohol after a traumatic brain injury, which can lead to further injury (Ponsford et al, 2007).

**Increased risk of mental illness.** Traumatic brain injury is known to cause social dysfunction and impairment that can lead to isolation and inappropriate behaviors. This can lead to substance use through self-medicating or attempts at fitting in socially. TBI can also cause organic personality disorder and depressive disorders that are conducive to substance abuse (Bjork & Grant, 2009). Premorbid alcohol abuse increases the risk of developing a mood disorder after a TBI (Olsen-Madden et al, 2012).

## Author's Biography:

Brooke Luckhardt, M.S., CBIS obtained her master's in forensic psychology at Walden University. She specializes in traumatic brain injury and has worked with the physicians at Associates in Physical Medicine and Rehabilitation, P.C. in Ypsilanti, Michigan for 24 years. She has been a certified brain injury specialist through the Brain Injury Association of America for the last 13 years. She is a member of the St. Joseph Mercy Hospital Concussion Committee in Ann Arbor, Michigan and is a cofounder of the Ann Arbor Concussion Clinic. Luckhardt is a member of the Society for Police and Criminal Psychology, the National Society of Leadership and Success, and the American Congress of Rehabilitation Medicine. She is also an expert trainer for the American Institute for the Advancement of Forensic Studies. She has been a co-author on multiple peer-reviewed articles relating to traumatic brain injury and has lectured nationally on TBI and criminality.

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