

Research Findings from the Traumatic Brain Injury Model Systems

Depression and Traumatic Brain Injury

By Mary Car-Blanchard, OTD, OTR/L

“*Depression is a horrible thing to have to live with day in and day out. I developed depression after I had a traumatic brain injury. I couldn't do the things that I used to be able to do. I couldn't work. I couldn't go places. I couldn't get out and see people and after awhile, people stopped coming by to see me. I thought, 'What's the point? I can't do anything. Nothing is working out.' I felt like a total failure. I almost gave into suicide. I was at the end of my rope. It seemed like too much to bear, so I called my doctor. I found out that depression can happen after traumatic brain injury, and I got help.*”

— From "Bill," an individual with a traumatic brain injury and depression. *

*Names and identifying information in all statements used in this article have been changed to provide confidentiality.

Individuals with traumatic brain injury and their loved ones may already be familiar with statements like the one above made by "Bill." Others may or may not know what depression is, how to recognize it, or why it is associated with traumatic brain injury. Everyone needs to be aware that depression is quite common for individuals with traumatic brain injury.

To date, most research studies have focused on the amount of depression and traumatic brain injury; little research has been conducted about treatments. Rosenthal, Christensen, and Ross (1998) were among the first to highlight the problem of depression and traumatic brain injury in a review article in the Archives of Physical Medicine and Rehabilitation. At the present time, there appears to be more questions than answers. Researchers at the Traumatic Brain Injury Model Systems are dedicated to earlier identification of individuals with TBI who may be at high risk for or are actually experiencing depression. They are also assessing the effectiveness of specific drugs and other psychosocial therapeutic interventions to treat individuals who have both traumatic brain injury and depression. Information for this article about their research findings thus far was obtained from the Traumatic Brain Injury Model Systems' published research, which can be viewed on the TBI Model systems website: www.tbincd.org.

Depression

Depression is a real medical condition that can be treated.

Depression is not a "normal part" of every day life. Individuals with depression report that they continually feel sad, irritable, tired, and uninterested in activities that they used to find enjoyable. Other common symptoms of depression include changes in appetite, having difficulty getting a good night's sleep, moving the body at a much slower pace, and not being able to remember things or concentrate as easily as before (American Psychiatric Association, 2000).

“*My husband had a traumatic brain injury over a year ago. His friends just don't come around anymore. Now he just sits alone in his room. He self-mutilates-cuts and burns himself. I kept telling everyone that my husband is depressed. No one believed that he could be that depressed from having a traumatic brain injury. This weekend he slit his wrists...*”

— From "Anne," spouse of an individual with traumatic brain injury and major depression. *

Above, "Anne" describes some life-threatening symptoms of depression that her husband experienced following traumatic brain injury. It is important to realize that there are different kinds of depression and that no symptom of depression should be taken lightly. Of particular concern, is a type called "major depression." Major depressive disorder is characterized by many symptoms of depression, but the symptoms are more intense or severe. Individuals with major depression may think about suicide, have a plan for suicide, or successfully complete suicide (American Psychiatric Association, 2000).

Individuals with symptoms of depression should report their concerns to their physician and be evaluated and treated by appropriate healthcare professionals. In the event of a medical emergency, 911 or the emergency response services for an area should be called. An individual could also go to a hospital emergency room. Resources regarding depression will be discussed later in this article.

Depression and Traumatic Brain Injury

A traumatic brain injury can change the way that individuals think, feel, and move their bodies. It can also change the way the body's systems function and work together. Depression can interfere with individuals' ability to meet rehabilitation goals and achieve long-term independence. This can limit their recovery and affect every function of their lives, including returning to home, work, or school. Depression and traumatic brain injury can also lead to strained family and personal relationships. Further, it can increase the cost of

rehabilitation and long term needs.

It appears that the number of individuals with traumatic brain injuries that are re-hospitalized for mental health reasons increases after a year from their injury dates. Cifu and colleagues at the Virginia Commonwealth University (1999) found that mental health reasons were the most frequent reason for non-elective re-hospitalizations. Therefore, it is important that individuals with traumatic brain injury and depression are correctly identified and that they receive timely treatment.

The Number of Individuals with Depression and Traumatic Brain Injury

Because there has not been a lot of research conducted about depression and traumatic brain injury, the numbers of individuals with reported depression and traumatic brain injury has varied greatly—from below 10% to as high as 77% (Rosenthal et al, 1998). Further, past researchers have used small study groups and different research methods, which limit the generalizability of the results. The investigators at the Traumatic Brain Injury Model Systems are trying to study larger, more diverse groups of people to maximize usefulness for the general population. To date, the TBIMS research confirms that depression appears to be a common occurrence following traumatic brain injury.

Historically, researchers have used a variety of tests to evaluate depression. Many of these tests were developed and standardized for individuals with psychiatric diagnoses. Recently, Drs. Ronald Seel and Jeffrey Kreutzer, of the Medical College of Virginia and the Defense and Veterans Brain Injury Center, used the Neurobehavioral Functioning Inventory (NFI) to identify and characterize depression in individuals with traumatic brain injury. They evaluated 172 individuals with traumatic brain injury who were treated at a Traumatic Brain Injury Model Systems' outpatient clinic. The researchers were able to formulate scoring ranges for the NFI to identify and classify depression. They found that between 30% and 38% of the participants were moderately to severely depressed. Additionally, the symptoms of depression that the participants most frequently reported were frustration, restlessness, thinking about the same thing over and over again, boredom, and sadness (Seel, 2003a).

Another recent study also found that individuals with traumatic brain injuries have a high risk for developing symptoms of depression. Dr. Ronald Seel and colleagues examined data from 666 individuals who were treated at the seventeen Traumatic Brain Injury Model Systems with primarily moderate to severe traumatic brain injuries. Twenty-

seven percent of the participants in their study were diagnosed with major depression. The most common symptoms of depression reported were feeling exhausted, poor attention span or concentration, anger or irritability, and the inability to get their mind off of certain thoughts (i.e. they kept thinking about the same thing over and over again). In this study, the individuals with depression were more likely to be minorities, unemployed, and receiving low incomes (Seel, 2003b).

It appears that depression can occur after all severity levels of traumatic brain injury. Dr. Jeffrey Kreutzer and researchers at the Medical College of Virginia found that 42% of the participants in their study reported the number of symptoms required for a diagnosis of major depression. They examined 722 individuals with varying severity levels of traumatic brain injury that were in outpatient treatment at one facility. The most frequent symptoms reported were exhaustion, frustration, and poor concentration. Almost a third of the participants reported : feeling bored and distractible; having problems with making decisions and remembering if they did things; thinking about the same thing over and over again or the inability to get their mind off of certain thoughts; and physically moving slowly (Kreutzer et al, 2001).

Researchers are interested in knowing whether depression occurs more often in males or females, or older or younger individuals after traumatic brain injury. In a small study, Dr. Mel Glenn and colleagues at the Spaulding Rehabilitation Hospital in Boston, Massachusetts found that 59% of their participants had mild to severe levels of depression. Their participants included 41 older individuals with traumatic brain injury at one outpatient rehabilitation setting. In their study, individuals with depression were most likely to be older females with a mild traumatic brain injury who were taking anti-depressant medication (Glenn, 2001).

What's it like to have depression and a traumatic brain injury?

“ My ex-husband had been physically abusing me. He hit me in the head-- hard. I left. I took the kids and was almost homeless. I couldn't get a job. I had bad headaches and was so tired. I didn't know about traumatic brain injury or depression. I didn't know that there were professionals who could help me. I didn't make a connection between my symptoms--my inability to think straight, handle money, or get a job-- and the fact that I had a traumatic brain injury from being hit in the head by my ex-husband. I got very depressed around the holidays. I sold all of our furniture and belongings to buy presents for my kids. This left us sleeping on the bare

floor. At that point, I felt like I had lost everything. I went to the hospital on Christmas Eve and got help...”

From "Tina," an individual with a traumatic brain injury and depression, and a survivor of domestic violence. *

Because all individuals, traumatic brain injuries, and life experiences are not alike, individuals may experience depression and traumatic brain injury differently. The symptoms of depression and traumatic brain injury can appear to be similar. Together, the symptoms can overlap and be complex, making them difficult to recognize. As "Tina" stated above, not all individuals may link their symptoms to an injury or recognize what they are experiencing. It is important to understand what can happen when an individual receives a traumatic brain injury and develops depression.

It is common for individuals with traumatic brain injuries to feel exhausted and have difficulty concentrating or paying attention. Depression can add to these problems. Some individuals with both traumatic brain injury and depression experience more difficulties with cognitive (thinking) skills. This can lead to problems in rehabilitation and beyond because the ability to think and concentrate is necessary to learn new things, make decisions, and solve problems.

Depression can also add to the exhaustion and sleep problems that can occur with traumatic brain injury. Dr. Norman Fichtenberg and researchers at the Rehabilitation Institute of Michigan (2000) found that depression and mild traumatic brain injury appear to be linked with insomnia. Individuals with insomnia have difficulty falling asleep or remaining asleep. In their study of 91 individuals with traumatic brain injury, 68% experienced insomnia, and 81% of those with insomnia had depression. Individuals that are tired and move their bodies at a slower pace can have greater difficulties participating in therapies, and making gains physically and cognitively.

Awareness of Deficits

Researchers have determined that individuals with brain injuries can have neurological impairments and not be aware of their deficits. Such individuals do not recognize the need or importance of adjusting their behaviors towards others. It appears that as some individuals become aware of their deficits and realize how the brain injury has affected their lives, they develop symptoms of depression.

How individuals react to changes in their lives can affect the lives of family members and significant others (Wallace and Bogner, 2000). Drs. Wallace and Bogner of the Ohio State University (2001) evaluated 50 pairs of individuals with brain injuries and their caregivers. They determined that the individuals with traumatic brain injury were unaware of many of the deficits that were perceived by significant others. As they grew more aware of their deficits, the individuals with brain injuries appeared to experience more emotional distress.

One third of the caregivers in this study also reported emotional distress.

Socialization and Seizures

Some individuals can have problems adjusting to their changed lives, as they become more aware of changes that have occurred. Again, it appears that as some individuals develop more insight to their conditions they are more likely to develop depression. They can experience problems with social skills. They may be irritable, anxious, or easily frustrated (Glenn, 2001; Kreutzer, 2001). They can have a hard time regulating emotions and behaviors. These types of emotional and behavioral changes can make it difficult for them to get along with others. This can strain family and personal relationships, plus make it harder to perform well at rehabilitation, school, or work.

“ My adult son pretty much isolated himself to his room. He couldn't drive because of seizures and he couldn't walk. He was angry at the world and 'down in the dumps' all the time. He was very difficult to get along with and snapped at us all the time. He thought that getting an electric wheelchair would solve all of his problems. He thought he would be able to hang out with his old buddies and date just like before. He didn't realize the complexities of transporting the electric wheelchair and catheterization equipment. Apparently, he wasn't as popular on the "outside" as he had hoped. His anger and grouchiness turned people off. The public isn't always kind...having an electric wheelchair did not solve his problems, the issues were really those within him...”

From "Vicki," the mother and caretaker of an adult son with traumatic brain injury and depression.

It appears that individuals with seizures from traumatic brain injury may be at particular risk for developing depression. Dr. Tamara Bushnik and colleagues at the Northern California Traumatic Brain Injury Model System of Care at Santa Clara Valley Medical Center have identified an association between seizures (in people living with epilepsy) and depression. Individuals can experience a seizure as a medical consequence of traumatic brain injury. A seizure occurs when there is a temporary electrical imbalance in the brain. A person having a seizure can experience uncontrollable body movements, heightened or decreased sensations, and varying levels of awareness. "Early posttraumatic seizures" occur during the first week of a traumatic brain injury and "late posttraumatic seizures" occur after the first week (Bushnik et al, 2004).

Individuals with seizures report that they feel fearful about the uncertainty of having a seizure. These individuals experience greater amounts of depression, anxiety, and low self-esteem than that of the general population. Individuals

that experience seizures more often and/or severe seizures tend to experience greater difficulties with mental health (Bushnik, 2004).

Driving restrictions for individuals with seizures can add to limited social and employment opportunities. Driving restrictions vary from state to state. An individual may be prohibited from driving until they are seizure free for three to twelve months, depending on the state's requirements. Unemployment rates are three times greater for individuals with seizures than the general population. Individuals with seizures tend to have lower incomes and lower social status (Bushnik, 2004).

Although the way that individuals cope with living with seizures differs from person to person, it is reasonable to understand how the perception of loss can contribute to depression. It appears that individuals with seizures report difficulties with depression, anxiety, general health, social isolation, thinking skills, and low income. Dr. Bushnik and her researchers plan to continue their studies about the effect of living with seizures, because the implications are so important (Bushnik, 2004).

Why does it happen?

Historically, clinicians believed that depression after traumatic brain injury was caused by an individual's psychological reaction to loss, disability, and changes in lifestyle. As medical technology advanced and neuroimaging techniques were developed, clinicians were able to "see" what happens to the injured brain. Advances in medications and neurological research have made it possible to identify changes that take place in the injured brain. These include changes in brain chemicals that are associated with depression (Rosenthal et al, 1998). Although it is not exactly clear how psychological reactions and chemical changes in an injured brain exactly cause depression, it is undisputed that it does indeed occur and can be a big problem for individuals with traumatic brain injury.

What should people do?

Individuals who suspect that they have depression should seek professional help. Caretakers, family members, and friends of individuals with traumatic brain injuries should monitor their loved ones for signs of depression. Professionals should also monitor or screen individuals with traumatic brain injury. Individuals should discuss their symptoms with their physician and ask for referrals to professionals who are familiar with treating individuals with brain injuries. In some rehabilitation centers, this responsibility may fall in the realm of the neuropsychiatrist on the treatment team. Other properly trained professionals include psychiatrists, psychologists, or social workers.

What can help?

Only a professional who examines an individual can

determine if the person is experiencing depression. Once the professional diagnosis has been made, the professional will discuss treatment options. The most common treatments for depression include prescription medication, psychotherapy ("talk therapy"), or a combination of both.

“ I had a bad bout with depression after my brain injury. I can tell you that it really happens. I got help and it is manageable. Now, when I ask people how they are doing, I mean 'how is the brain functioning.' That's what matters, how people are feeling. The public needs to know that depression can really happen after traumatic brain injury. They also need to know that there is help out there. ” *

From "Bill," an individual with a traumatic brain injury and depression. *

Depression appears to occur at high levels after traumatic brain injury. It is also evident that depression may affect both the individual with brain injury, as well as significant others such as family members, caregivers, etc. It appears that depression is associated with all levels of severity of brain injury. At this time there appears to be more questions than answers. What is known is that symptoms of depression can be relieved and that there is hope.

These results from the Traumatic Brain Injury Model Systems offer a glimpse at their research efforts to improve the lives of individuals with traumatic brain injuries. These projects about depression have provided them with information to conduct more research in this area. These projects and other studies about brain injury may be viewed on the Traumatic Brain Injury Model Systems' National Data Center's website at www.tbinc.org.

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Seel, R. T.; Kreutzer, J. S.; Rosenthal, M.; Hammond, F. M.; Corrigan, J.; & Black, K. (2003b). Depression after traumatic brain injury: A National Institute on Disability and Rehabilitation Research Model Systems multicenter investigation. *Archives of Physical Medicine and Rehabilitation*, 84, 177-184.

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Abstracts

The Traumatic Brain Injury Model System's research abstracts are available on the Brain Injury Association of America's website at www.biausa.org (Click on "Research"). Below are some abbreviated abstracts referenced in this article.

Levels of Depression for Outpatients with Traumatic Brain Injury

Glenn, M.B., O'Neil-Pirozzi, T., Goldstein, R., Burke, D., & Jacob, L. (2001). Depression amongst outpatients with traumatic brain injury. *Brain Injury*, 15, 811-818.

The Question: What is the rate and level of depression for individuals with traumatic brain injury in an outpatient rehabilitation setting?

Past Studies about traumatic brain injury and depression have not had consistent results.

This Study examined the level of depression for 41 individuals with traumatic brain injury at one outpatient rehabilitation setting. The majority of the participants were 43 years old with mild brain injuries and it was about 41 months since their injury dates. Approximately one third of the group was taking prescription anti-depressant or stimulant medication.

The researchers found that 10 of the 41 participants had a mild level of depression. Fourteen had moderate to severe levels of depression. A total of 24 of the 41 participants (59%) were found to have mild to severe levels of depression.

Individuals with depression were most likely to be older females with a mild traumatic brain injury who were taking anti-depressant medication.

Caveats: These results should be viewed with caution. This study used a small sample size of people who were older, who had experienced their brain injury over a wide range of time (4 months to 21 years), and had some members who were taking medication for psychological disorders.

Bottom Line: In this study, 59% of the individuals were rated as having mild to severe levels of depression.

Symptoms and Rates of Depression after Traumatic Brain Injury

Kreutzer, J.S., Seel, R.T., & Gourley, E. (2001). The prevalence and symptom rates of depression after traumatic brain injury: A comprehensive examination. *Brain Injury*, 15, 563-576.

The Question: What are the most common symptoms and number of people who experience depression after traumatic brain injury?

Past Studies have been limited by the use of small study groups and inappropriate tests to diagnose depression. Researchers have not found consistent information about the relationship between depression and traumatic brain injury.

This Study examined 722 individuals with varying severity levels of traumatic brain injury that were referred to outpatient treatment at one facility. The participants' average age was 36 and the average time since injury was approximately 2.5 years.

Forty-two per cent of the participants were rated as having major depression disorder. The most common symptoms reported were: feeling exhausted- 46%, feeling frustrated- 41%, and having difficulty concentrating (38%). Almost a third of the participants reported: feeling bored and distractible; having problems with making decisions and remembering if they did things; thinking about the same thing over and over again or the inability to get their mind off of certain thoughts; and physically moving slowly.

Caveats: A large study from many different locations would provide a group with different characteristics and provide results that were more generalizable.

Bottom Line: Forty-two percent of the participants in this study had major depression disorder. The most frequent symptoms reported were exhaustion, frustration, and poor concentration.

The Neurobehavioral Functioning Inventory (NFI) Depression Scale appears to be a useful Tool for Classifying Depression

Seel, R.T., & Kreutzer, J.S. (2003). Depression assessment after traumatic brain injury: An empirically based classification method. *Archives of Physical Medicine and Rehabilitation*, 84, 1621-1628.

The Question: Is the Neurobehavioral Functioning Inventory (NFI) Depression Scale a useful tool for classifying depression in individuals with traumatic brain injury?

Past Studies have used a variety of tests to evaluate depression. Many of these tests were developed and standardized for individuals with psychiatric diagnoses. Recently, researchers have used the Neurobehavioral Functioning Inventory (NFI) to identify and characterize depression in individuals with traumatic brain injury. A particular scoring scale for individuals with traumatic brain injury has not been developed for the NFI.

This Study focused on determining score ranges for the Neurobehavioral Functioning Inventory (NFI) to identify and classify depression in individuals with traumatic brain injury. Participants included 172 individuals with traumatic brain injury at a TBI Model Systems' outpatient clinic. The participants completed the NFI and another test to evaluate depression. By comparing the test scores, the researchers were able to formulate scoring ranges for the NFI.

Thirty percent of the participants were classified as moderately to severely depressed with the NFI. The NFI accurately identified nearly 90% of the participants with depression and about 80% of the participants with little or no depression. The NFI appeared to be less accurate for identifying individuals with borderline levels of clinical depression. Additionally, the participants most frequently reported the following symptoms of depression with the NFI: frustration (81%), restlessness (66%), thinking about the same thing over and over again (69%), boredom (66%), and sadness (66%).

Caveats: Information about the participants' history of depression was not available to the researchers. The researchers state that future studies should examine the extent to which a traumatic brain injury might make an individual's predisposition to depression worse, as well as whether depression might be a risk factor for traumatic brain injury.

Bottom Line: The researchers were able to formulate scores for the Neurobehavioral Functioning Inventory (NFI) to classify degrees of depression for individuals with traumatic brain injury.

First Large Study: Individuals with Moderate and Severe Traumatic Brain Injury Appear to be at High Risk for Depression

Seel, R. T.; Kreutzer, J. S.; Rosenthal, M.; Hammond, F. M.; Corrigan, J.; & Black, K. (2003b). Depression after traumatic brain injury: A National Institute on Disability and Rehabilitation Research Model Systems multicenter investigation. *Archives of Physical Medicine and Rehabilitation*, 84, 177-184.

The Question: What are the causes, symptoms, and number of people who experience

depression after traumatic brain injury?

Past Studies have not found consistent information about the causes, symptoms, and number of people who experience depression after traumatic brain injury.

This Study examined 666 persons with primarily moderate to severe traumatic brain injuries 10 to 126 months after their injury date. This is the first study to examine depression that focused on a large diverse population from the 17 Traumatic Brain Injury Model Systems facilities throughout the country.

Twenty-seven percent of the participants were diagnosed with major depression. The most common symptoms of depression reported were: feeling exhausted- 29%, poor attention span or inability to concentrate- 28%, anger or irritability- 28%, and thinking about the same thing over and over again or the inability to get their mind off of certain thoughts- 25%. Individuals with depression most often had low incomes, no jobs, and were members of ethnic minority groups. It appeared that the severity of the brain injury, how long it had been since the injury occurred, and marital status after injury were not important risk factors for developing depression.

Caveats: Participants in this study experienced mostly moderate to severe traumatic brain injuries. It is not known if persons with mild traumatic brain injury would have the same experiences.

Bottom Line: Twenty-seven percent of the participants were diagnosed with major depression. The most common symptoms of depression experienced were feeling exhausted, poor attention span or concentration, anger or irritability, and the inability to get their mind off of certain thoughts (i.e. they kept thinking about the same thing over and over again). In this study, the individuals with depression were more likely to be minorities, unemployed, and receiving low incomes.

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