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# Alcohol Abuse Among Persons with Traumatic Brain Injuries

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RESEARCH PAPER APPROVAL

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# CHAPTER 1

## INTRODUCTION

The literature on traumatic brain injuries is extensive. The research includes clinical reports, intervention strategies, identification of risk factors, and demographic patterns, among others. A subset of this literature has examined alcohol abuse in people with traumatic brain injuries. As there is extensive amounts of alcohol abuse within the traumatic brain injury (TBI) population and the associated risks are high, rehabilitation professionals need to expand assessment, prevention, and treatment skills (Taylor, Kreutzer, Demm, & Meade, 2003). One treatment option includes motivational interviewing, which has been shown to be effective with alcohol addictions, as well as with brain injury populations (Medley & Powell, 2010). The four basic principles of this therapy—expressing empathy, developing discrepancy, rolling with resistance, and supporting self-efficacy—provide clients with active strategies and a collaborative bond that develop self-awareness and engagement in the rehabilitation process (Burke, Arkowitz, & Menchola, 2003; Medley & Powell, 2010). A motivational model is also a decision model in that it assumes that behavior is the result of a decision process and can be modified by changing alternatives from what the person chooses (Cox & Klinger, 2004). Therefore, understanding the decision-making process to drink has implications for interventions in overcoming abuse.

The cost of TBIs due to acute hospitalization and rehabilitation is very high and is an economic burden, especially due to the high number of incidents. The loss of earnings, loss of productivity at work, treatment costs of alcohol abuse, crime, and motor vehicle accidents add to the societal burdens for these coexisting disabilities (Graham & Cardon, 2008). There is evidence that once there is improvement of functional and physical status, there is an increased risk of post-injury alcohol use (Graham & Cardon, 2008). People who work and drive after their

injury find that alcohol is readily available. This could be why long-term patterns show increased alcohol use as time passes post-injury, generally more than one year after injury (Taylor et al., 2003). It has also been shown that more severely impaired clients are likely to consume less alcohol than those with less impairment (Taylor et al., 2003). There is also increased hardship for those attempting to support family members with a TBI and there is a strain on family dynamics because of lack of knowledge about the effects of alcohol abuse on a person with a TBI (Taylor et al., 2003). Involving family members in assessment and treatment, as well as, educating them to use relapse prevention strategies can be helpful for rehabilitation professionals in providing better care and initiating support outside of their services (Taylor et al., 2003).

The National Institutes of Health recommended in 1999 that there be an inclusion of substance abuse evaluation and treatment in TBI rehabilitation programs (Graham & Cardon, 2008). However, it has been found that substance abuse is often overlooked by rehabilitation professionals due to the already heavy load and effort of rehabilitation for those with a TBI (Ponsford, Whelan-Goodinson, & Bahar-Fuchs, 2007). Substance abuse is often not recognized and therefore is not addressed properly in the rehabilitation process (Ponsford et al., 2007). Even though it is the rehabilitation professional's job to motivate and encourage a return to work and further independence, there need to be strategies put into place that will prevent alcohol abuse and relapse after treatment.

This paper is an investigation of the social problem, reasons for the higher rate of these co-occurring disabilities, strategies for treatment and prevention, and why there is a lack of knowledge among rehabilitation professionals on how to coordinate services that will benefit the client and address both disabilities. Rehabilitation professionals should aim for preventative efforts to decrease alcohol use and misuse in the TBI population which could result in reduction

of the number of injuries and consequences, such as the socio-economic burden, hence providing a scope of practice that helps not only those directly affected but also society at large.

## Background of the Problem

Traumatic brain injury is the most common type of central nervous system trauma in the U.S., with over 230,000 people with TBI who are discharged from acute care hospitals each year (Bell, Pepping & Dikmen, 2006). Alcohol intoxication is the underlying cause of nearly half of traumatic injuries in the United States and alcoholism is reported to be the most prevalent chronic disease among those involved in traumas (De Guise et al., 2009). Pre-injury drinking problems have been shown to be predictive of continued abuse after the injury, and that those intoxicated at the time of injury have a higher likelihood to be problem drinkers both before and after injury (Jorge et al., 2005; Taylor et al., 2003). There is a potential that alcohol may contribute to poor recovery and influence important outcomes in rehabilitation (Bombardier, 2006). Consumption of alcohol after TBI may magnify cognitive impairments and hinder neurological recovery, and is counterproductive to rehabilitation (Allen, Goldstein, Caponigro, & Donohue, 2009). Since people with TBI already generally have some neuropsychological impairment, alcohol intensifies these problems (Bombardier, 2006). Once a person with TBI receives treatment for alcohol abuse or abstains from use, it is likely that they will need preventative techniques that will help them from relapsing (Taylor et al., 2003). Education is also an important component for those who drank heavily pre-injury and those who wish to continue in order for them to understand the dangers connected with alcohol consumption (Taylor et al., 2003).

The general population of substance abusers has a high rate of relapse, but it is even higher for those with a brain injury who encounter cognitive and behavioral deficits, and may even be ineligible for certain programs due to these issues (Hensold, Guercio, Grubbs, Upton, &

Faw, 2006). These additional barriers make conventional treatments for abuse sometimes ineffective and should therefore be adapted to accommodate the abilities and deficiencies of the client (Hensold et al., 2006). There are other critical features to the treatment of clients with substance abuse as well as TBI that rehabilitation professionals need to address for optimal progress, such as monitoring abuse over time, identifying risk factors and patterns, educate clients and their family members, and use of repetition in presenting information (Taylor et al., 2003).

The injury and inability to work disturbs the person's productivity, sense of self and self-worth, and has consequences for their capacity to be autonomous (Tsaousides, Ashman, & Seter, 2009). There is a strong relationship between employment and quality of life, with life satisfaction rated higher for those who are able to be employed after TBI (Tsaousides et al., 2009). Depending on the level of injury, rehabilitation pursues the potential of the individual to return to as high a level of pre-injury employment as can be achieved (Tsaousides et al., 2008. Work has been shown to provide people with a sense of purpose and is an important area of participation, and in the case of people with traumatic brain injuries, it can be especially helpful in their recovery (Velzen, Van Bennekom, Edelaar, Sluiter, & Frings-Dresen, 2009). Research has shown that people who are employed have a lesser chance of relapse to alcohol abuse (Roman & Blum, 2002). However, even for those that do return to work after their brain injury, many do not sustain employment for long, possibly due to substance abuse and lack of interpersonal skills (Macaden, Chandler, Chandler, & Berry, 2010). There are models of vocational rehabilitation that focus on both return to work and sustaining employment for the long-term which can help to formulate plans and programs (Macaden et al., 2010). Goals for rehabilitation are made more difficult when alcohol abuse and dependence is involved (Heinemann, Lazowski, Moore, Miller, & McAweeney, 2008). An ongoing process of

assessment and use of strategies for motivation to get and stay clean are needed throughout rehabilitation because relapse and abuse is a threat to future progress. There are barriers, however, that prevent screening in rehabilitation populations that could serve to identify those who struggle with substance abuse or have potential to relapse back into drinking (Heinemann et al., 2008).

Locally and nationally, there are people who require help for this coexisting disability. There is a prevalence of alcohol abuse among people with TBI, and yet effective screening and interventions for substance abuse are absent from many rehabilitation programs and neglected to be addressed by vocational rehabilitation counselors (Heinemann et al., 2008). This paper concentrates on the issue that has become a social problem, as there are more people than ever with TBI because of advancing medical technology that saves the lives of people that otherwise would not have survived. Rehabilitation counselors need training and knowledge in addictions in order for the rehabilitation process to be an opportunity to intervene in these problems and allow for progress to occur.

## Significance of the Study

Rehabilitation professionals encounter people with a coexisting disability of traumatic brain injury and alcohol abuse frequently and need to understand how to help them in the rehabilitation process. In particular, the large amount of people with a TBI who also have an alcohol abuse problem make it a significant issue needing to be addressed by rehabilitation counselors (Taylor et al., 2003). If alcohol dependence is a pre-injury condition or if they were intoxicated at the time of the injury, more severe cognitive impairments may follow and deter rehabilitation outcomes (Turner, Kivlahan, Rimmele, & Bombardier, 2006). For those that abuse alcohol after injury, there is an increased likelihood of mortality, mass lesion, and neuropsychological impairments (Heinemann, Corrigan, & Moore, 2004). Targeting those who

heavily consumed alcohol prior to injury could prove helpful after assessment by using information about these dangers to curb the likelihood of going back to old drinking behaviors (Ponsford et al., 2007). Therefore, models for treatment of substance abuse and prevention that give emphasis to the development of incompatible behaviors and desire to change may help to achieve better outcomes (Heinemann et al., 2004).

Due to the lack of knowledge and training in treating people with both disabilities, and without understanding that there needs to be an emphasis to attend to both disabilities, rehabilitation counselors can make the wrong decisions in treating their clients and miss opportunities to provide them with the services they need (Ashman, Schwartz, Cantor, Hibbard, & Gordon, 2004; Heinemann et al., 2008). Often, rehabilitation counselors will mistake their clients' substance abuse issues for problems related with their TBI, but in fact may be due to the combination of their disabilities and the lack of help they are receiving for both of them (Bell et al., 2006). Alcohol abuse may not be noticed by the rehabilitation counselor, may result in lack of action in assessing their client, and can lead to a spiraling down of the progress they had previously gained in rehabilitation. Cost effectiveness comes into play in rehabilitation agencies, as it is not well established whether it is better to have early intervention involvement or a referral later on in the rehabilitation process (Heinemann et al., 2004). People with TBI who struggle with substance abuse sometimes are not receiving the services they need or referrals from their rehabilitation counselors, yet there are known approaches that can help this population if implemented (Bell et al., 2006). By having the information about this dual diagnosis, and the dangers and potentials of risk for complicating their condition, the quality of services from rehabilitation counselors can improve to a point where the client is receiving the proper kind of care they need depending on their own situation.

This paper will bring to attention some strategies that have been shown to be effective in improving the motivation of people with these coexisting disabilities to return to employment, seek treatment, and prevent relapse of alcohol abuse. The objective of relapse prevention is to assess risk behaviors, attend to situations that could possibly become a problem for the client, and continue with the goals attained (Rotgers & Davis, 2006). One prevention technique is to increase self-efficacy and a sense of control through accurate thinking and successes, which reduces the chance of lapses and relapses (Rotgers & Davis, 2006). Rehabilitation counselors can use this information to better prepare themselves to work with a client such as this and understand the importance of focusing on both disabilities, which are affected by one another. The strategies I will address in this paper have been shown in the literature to help those with these coexisting disabilities to be more independent through employment, self-reliance, and community involvement. Therefore, this research paper has a focus on the importance of a person with these disabilities to be more independent and discover new ways to improve their quality of life.

## Purpose and Objectives of the Paper

The purpose of this paper is to examine different treatments and determine strategies that have been discussed in current literature. This will be accomplished by a synthetic review of existing literature that has been conducted involving the best strategies people with co-occurring traumatic brain injury and alcohol abuse disorder can use to be motivated to return to work and prevent relapse.

- These research questions are addressed: What strategies can be used that are most likely to improve motivation to work with the coexisting disabilities of a traumatic brain injury and alcohol abuse disorder? What strategies can be used that are most likely to prevent relapse in persons with these coexisting disabilities? What treatment modalities

correspond with good treatment outcomes for people with this dual diagnosis and what can rehabilitation professionals do in order to get better outcomes for their clients?

The present study sought to resolve these questions by examining research relevant to these dual disabilities and the services that are necessary to ensure the greatest prospect for rehabilitation. By understanding these strategies, the goal is to equip rehabilitation counselors with the proper knowledge and skills to serve people with these coexisting disabilities. Once these strategies are known, they can motivate their clients to sustain employment and avoid harmful drinking behaviors that could be detrimental to their progress. By sparking this motivation to be more independent and do better for themselves, the process of rehabilitation will be more beneficial for them in the long run. This paper's purpose then is to be of importance to the rehabilitation counselor who works with this clientele and must make decisions about feasibility for employment and other services needed.

## Delimitations

The scope of this paper is to review the current literature concerning people with co-occurring traumatic brain injury and alcohol abuse disorder. The scope of work will be narrowed to literature that is a maximum of 10 years old and in the English language. It is not intended to discuss the issues of other dual diagnoses.

# CHAPTER 2

## REVIEW OF LITERATURE

Research is growing in the area of traumatic brain injuries (TBI) and revealing alcohol abuse at a higher rate than the average population. Some studies have shown that upwards of 28% of people with TBI meet the criteria for substance abuse or dependence, while others indicate abuse to be as high as 50% (West, 2011). A review of literature by Taylor et al. (2003), specifically tackling these co-occurring disorders, confirms that the TBI population have a higher rate of alcohol abuse than the general population. Although these issues are known, they are not extensively reported, and availability for treatment options and prevention resources are inadequate. Research on persons with disabilities and especially those with TBI is limited in the addictions literature; much of it comes from rehabilitation publications instead. Persons with disabilities are denied treatment services often because of issues with access and the dedication needed to attend to dual diagnoses (West, 2011; Hensfold et al., 2006).

Persons with substance abuse disorders have a higher rate of unsuccessful closures following vocational rehabilitation services than the general rate of unsuccessful closures for all those with a disability receiving these services (Atherton, Toriello, Sligar, & Campbell, 2010). Barriers affecting these outcomes include these: (a) vocational evaluation practitioners may not be knowledgeable about alcohol abuse disorders or not have proper training to carryout screening and assessment; (b) there are time constraints in vocational rehabilitation because of large caseloads; and (c) guidelines are not clearly defined on how to evaluate and refer those with drinking problems. By incorporating an assessment such as the Addiction Severity Index (ASI), into the VR process while serving persons with substance abuse disorders, barriers can be addressed and proper services can be established. The training necessary to administer the ASI would provide Vocational Evaluators and Vocational Counselors with information about

substance abuse disorders so they can better understand their consumers. The results from the assessment would also allow for proper treatment and referral to services needed (Atherton et al., 2010).

In order to properly screen and use interventions for people with substance use problems and TBI, rehabilitation professionals need to have an ability to communicate with consumers in a style that is nonjudgmental, have a commitment to change, and have competency in relevant knowledge and skills required to be helpful (Karoll, 2010; Medley & Powell, 2010). Professionals also should evaluate their biases concerning substance abuse before working with this population so that their interactions with consumers are not confused by their personal issues. There is potential that expectations, prognoses, and diagnoses can be influenced by negative beliefs; therefore, it is pertinent to assess preconceptions one may have surrounding people with these problems and to overcome unresolved negative attitudes (Karoll, 2010).

In order to investigate the impact of alcohol abuse on TBI, several aspects must be approached to get a full picture of how these co-occurring disabilities relate to one another and affect the behavior and consequences of an individual. Traumatic brain injury will first be looked at in a broad framework to establish the societal impact, as well as the functional and biological consequences of such an injury. Alcohol abuse, including pre and post-injury problem drinking, will be assessed to indicate the parameters of abuse and how an individual with TBI is affected. Screening and assessment, treatment for alcohol abuse, relapse prevention, and employment issues for people with TBI and alcohol abuse problems will also be disseminated to facilitate a discussion on how rehabilitation counselors can help clients with these coexisting disabilities to improve motivation to return to work and prevent relapse.

**Traumatic Brain Injury**

According to the Center for Disease Control and Prevention, there are an estimated 1.7 million people in the U.S. who sustain a TBI each year, with 275,000 hospitalizations and 52,000 deaths (Faul, Xu, Wald, & Coronado, 2010). It is estimated that the direct and indirect costs, such as lost productivity, are $60 billion yearly. From 2002 to 2006, there was an increase in hospitalizations and emergency room visits due to TBI. There are upwards of 1.4 million new cases of TBI each year, commonly incurred from motor vehicle accidents, falls, and violent assaults. Also, due to the country's military involvement, there are many military service people also suffering from TBIs—over 320,000 military personnel reported a TBI and it is estimated that 60% of returning veterans had a TBI (West, 2011). Motor vehicle accidents account for 48% of TBIs and are the most frequent, with falls in second at 23%, violence (firearm-related) at 10%, and non-firearm related at 9% (Bellet al., 2006).

There are two types of TBI: closed-head and penetrating injuries. Closed-head injuries occur through a direct blow to the head or indirectly through force. Direct blow injuries incur damage at the blow site and the opposite side of the brain because of the brain hitting the skull during deceleration. Indirect injuries, such as from a car accident, happen when the brain hits the skull in an anterior-posterior motion, resulting in frontal and temporal lobe lesions (Bell et al., 2006). Penetrating injuries occur when a foreign object, such as a bullet, comes into contact with the brain and causes damage to specific areas along the path of the object. The different types of injury result in various kinds of disability and limitation.

The frontal lobes of the brain are the most vulnerable area and are usually the most easily damaged during a TBI. Many people with a TBI incur some damage due to contusions and tearing of axon sheaths. Human brain functions that are essential to regulating actions are controlled in the frontal lobes and include complex social behavior, the ability to restrain

emotions, plan goal-directed behavior, and direct thinking skills. Therefore, frontal lobe impairment may worsen an underlying behavioral problem such as heavy drinking, as well as complicate the effectiveness of interventions (Corrigan, Bogner, Hungerford, & Schomer, 2010). Jorge et al. (2004) found that the prefrontal cortex and anterior temporal lobes damaged in TBI often cause unusual behavioral regulations which can increase the risk of relapse in those with alcohol abuse history. According to the Brain Injury Association of America (2007), there are likely to be behavioral and emotional changes, such as aggression, angry outbursts, difficulty tolerating frustration, impulsivity, depression and mood swings, paranoia, and inappropriate sexual behavior. These changes can lead to other problems, including substance abuse.

**Alcohol Abuse**

A third of people surveyed reported that they drank five or more alcoholic beverages at one time in the last year, and 15% reported doing this at least once per month (Rotgers & Davis, 2006). Most people at some occasion in their life have abused alcohol or other substances that has resulted in some consequences, such as a hangover. However, some people use substances to the level at which significant problems occur. Although it is socially acceptable to consume alcohol, there is a point to which alcohol use becomes associated with negative outcomes. Hazardous drinking is considered to be more than 14 drinks per week for men and 9 per week for women. This does not mean that the individual is dependent though. An alcoholic is generally seen as one whose drinking has created problems in their life, but it is not clear cut on how far the impact needs to go and what else is involved. The negative consequences of abuse may include loss of employment, financial struggle, legal problems, medical issues, as well as social and psychological impairments (Karoll, 2010).

According to the American Psychiatric Association's DSM-IV-TR (2000), the criteria for alcohol abuse would be to have one or more the following for over one year: role impairment,

hazardous use, legal problems, and social or interpersonal problems due to alcohol. For such a diagnosis, the suspected abuser must not have ever met the criteria for alcohol dependence as well. In addition, the client must experience "clinically significant impairment or distress" in his or her life because of alcohol consumption. Alcohol Dependence is diagnosed much more than Alcohol Abuse, possibly because those who seek help for alcohol problems generally have experienced more issues which relate to Dependence (Rotgers & Davis, 2006). The criteria for a diagnosis of Alcohol Dependence includes having three or more of the following happening in the same year: tolerance to alcohol; withdrawal symptoms or use in order to avoid withdrawal symptoms; alcohol being drunk in larger amounts or for more time than intended, having a desire to control use; using a large amount of time in drinking, obtaining, and recovering from alcohol use; giving up social, work, and recreational activities so they can drink; and alcohol use continuing despite the knowledge that they have a persistent physical or psychological problem that likely is made worse by drinking. In addition to these seven criteria, the DSM-IV-TR also includes two specifiers—the person's diagnosis is either with or without physiological dependence. There is a great deal of variability in alcohol problems and the specifiers were set up to capture some of that heterogeneity. Although the DSM-IV is a useful tool for assessing alcohol abuse, these problems need to also be understood in the aspects of negative consequences, consumption, and dependence and how they manifest themselves in the lives of clients (Morgenstern & Irwin, 2007).

**Pre-injury Alcohol Abuse.** Misuse of substances often causes TBI, and those who do so before their injury have a higher likelihood of continuing abuse afterward (Corrigan et al., 2010). Bombardier, Temkin, Macamer, and Dikmen (2003) showed that people who have a TBI may be 10 times more likely to have problems with alcohol if they had a history of abuse prior to their injury, after a short remission period. A much smaller proportion of people were found to start

heavy drinking behaviors only after the injury. Studies show that there is a period of time after injury where those with prior substance abuse abstain from use, but commonly return to pre-injury levels, and can continue into the long-term (West, 2011).

Some 44% to 79% of TBI survivors have been shown in various studies to have pre-injury alcohol abuse disorders (West, 2011). Many studies have shown it to be the most common pre-injury psychiatric disorder for people with TBI (Bombardier, Rimmele, & Zintel, 2002; De Guise at al., 2009). Yet many rehabilitation centers do not have systematic screening or treatment options for those who suffered from alcohol abuse prior to injury (Bombardier et al., 2002). In a study done by Bombardier and colleagues (2002), one third of the sample was intoxicated at the time of their injury. Wagner, Hammond, Sasser, and Wiercisiewski (2002) studied people with TBI who returned to productive activity. Those who did not report substance abuse problems pre-injury had a higher percentage of return to productive activity than those who did report a history of abuse.

It is commonly found that there is intoxication at the time of the injury, with some studies citing as much as 50% of TBI cases, although there are conflicting results due to post-injury and third party collection of data (West, 2011). De Guise et al. (2009) estimated the occurrence of intoxication at the time of injury to be similarly around 35%-50%. Alcohol abuse is related to acute medical complications in people with TBI and related traumas, such as sepsis, pneumonia, and organ failure (West, 2011). Andelic et al. (2010) found in their study that pre-injury substance abuse increased the probability of incurring a more severe injury. It is associated with complications post-injury and a higher severity of injury, as well as increased amount of time inpatient, more severe neuropathology, and lower scores on the Glasgow Coma Scale (Allen et al., 2009; West, 2011). This scale is the standard used in hospitals and trauma centers to evaluate the neurological condition of patients with brain injuries. Through the evaluation of

three components—eye-opening, verbal response, and motor response—doctors are able to determine functioning of the cerebral cortex, the upper brainstem, and the reticular activating system. The Glasgow Coma Scale is used for diagnosis and therapeutic decision-making, with the most sever injuries having the lowest scores (Zuercher, Ummenhofer, Baltussen, & Walder, 2009).

**Post-injury abuse.** Physical recovery after a TBI can be affected by continued alcohol use due to brain tissue atrophy, and could worsen the functional limitations of the survivor (West, 2011). Individuals who continue to drink after their injury are in a high-risk group which includes a long history of abusing alcohol and a prognosis that is jeopardized (Graham & Cardon, 2008). Research shows evidence that alcohol use increases with time after TBI and that those with less severe impairments have a higher likelihood of drinking post-injury (Taylor et al., 2003). However, literature shows that there is a decrease in alcohol use after injury. It is likely that functional limitations and attitude are changed after major trauma. Even so, when alcohol abuse does occur after injury, it can be due to factors in the person's life such as functional status, severity of TBI and pre-injury abuse, acknowledgment of consequences, and the desire to change (Graham & Cardon, 2008). Increased access to substances previously abused can cause difficulties for an individual. According to the Brain Injury Association of America (2007) factors that can lead to abusing substances after injury include depression, isolation, increased awareness of limitations, seeing friends again use misuse, denial of abuse, lack of employment, limited community integration, and difficulty coping with stresses.

## Screening and Assessment

Due to the impact that both TBI and alcohol abuse have on cognitive functioning and disinhibition, as well as mental health issues, assessment of a drinking problem is a particularly important step in identifying, diagnosing, and treating for this at-risk population (Taylor et al.,

2003; West, 2011). Screening and brief interventions have been found to be important for individuals who abuse alcohol in emergency departments and trauma centers, and those with a TBI are a large population who benefit from its use (Corrigan et al., 2010). This first line of defense in these settings is an effective means of identifying those with an abuse problem and helping them start a process of change. Studies addressing this topic, however, have not discussed accommodations, which is a concern for the TBI population due to their impaired cognition (Corrigan et al., 2010).

Assessment is a more in-depth survey of behavior and is used for diagnosing purposes. The Addiction Severity Index is a semi-structured interview where a consumer is asked to self-report problems in seven areas. Since it takes 45-60 minutes for the interview and another 20 minutes to score, and a trained clinician is required to administer, it is not used in many rehabilitation settings. However, it remains an option and is especially useful because it covers alcohol problems in various areas of life in order to pinpoint correlated issues (Makela, 2004). Assessment of personality and psychiatric problems may also be helpful for people with TBI because depressive and anxiety symptoms can follow injury. There may be an increased suicide risk, impaired psychosocial functioning, and problems with reintegration into the community and employment. Use of the Personality Assessment Inventory (PAI) has been shown to be advantageous for the TBI population due to the low reading level requirement and the addition of scales that relate to risk factors relevant to people with brain injuries including drug and alcohol use and aggression (Till, Christensen, & Green, 2009). Till and colleagues (2009) assessed the PAI for its relevance with this population and found that all scales were applicable for those with TBI except for the Somatic Complaints scale and the Schizophrenia-Thought Disorders subscale.

Literature suggests that there are many factors to consider that affect post-injury outcomes and how much alcohol may play a role. Therefore, some research has attempted to

correlate indictors and outcomes, such as levels of drinking and related problems. Cherner, Temkin, Machamer, and Dikmen (2001) created a composite measure to detect alcohol-related problems in consumers with TBI using blood alcohol levels at the time of injury, the Quantity-Frequency Consumption Index, and the Short Michigan Alcoholism Test. It was revealed that the participants with more alcohol problems were also less stable in employment and were underemployed. Those in the high alcohol consumption group also reported having less social support, which indicates poorer interpersonal functioning. Therefore, a system of identifying alcohol abuse as well as psychosocial issues can help to bring all factors into consideration during treatment. Rehabilitation counselors have the ability to address these issues in order to maximize quality of life of consumers.

Self-report instruments are an affordable and efficient way to screen for alcohol problems and gather information about potential for abuse. People with TBI and alcohol abuse have been shown to be reliable reporters when proper procedures are followed (Taylor et al, 2003). The CAGE alcohol questionnaire is a four question brief interviewer administered tool that concentrates on lifelong drinking behaviors. It is simple and popular in clinical settings. The Brief Michigan Alcohol Screening Test (BMAST) is self-administered and assesses common symptoms of alcoholism. At only 10 questions, it is short and is empirically supported, although it has not been studied in length with the TBI population. The Substance Abuse Subtle Screening Instrument (SASSI) identifies people with a high probability of having abuse disorders. The sensitivity is high compared to a clinical interview, although it has been shown to not be as sensitive to people with TBI. These screeners have the ability to be useful in many settings, unlike the Structured Clinical Interview from the DSM-IV (SCID), which is long and requires professional training (Ashman et al., 2004).

Alcohol abuse in rehabilitation is typically identified through indicators such as blood alcohol level at the time of injury, alcohol consumption, behavioral measures of abuse, and biological effects of long term drinking (Cherner et al., 2001). Ashman et al. (2004) examined the psychometric properties of assessments that have been used with TBI populations. They compared the CAGE, BMAST, and SASSI to a structured clinical interview. The CAGE showed a high specificity but low sensitivity which tended to have a number large number of false positives. The BMAST and the SASSI were both indicated to have a high specificity and sensitivity.

**Treatment**

Substance abuse treatment has been demonstrated to reduce healthcare costs by decreasing time in expensive inpatient care (Stecker, Curran, & Han, 2007). The cost of treatment is counterbalanced by savings to society from decreasing consumption of medical services, to avoiding another injury while intoxicated, and to employment in which tax revenue can be produced and supports from government not drawn on (Heinemann et al., 2004). However, persons with TBI have low rates of participation in substance abuse programs even though they are one of the largest disability populations with abuse patterns (West, 2011). This is due in part to inaccessibility issues at facilities, with denial of services estimated at 42% - 68% (West, Graham, & Cifu, 2009). For those with a TBI who may seek treatment, it is even more difficult and other avenues of help are sometimes needed.

Reduced self-control is a characteristic of problem drinking. Alcoholics have difficulty with behavioral control and can lead to disinhibition, which results in impulsiveness (MacKillop et al., 2010). This is one factor that effects the development of alcoholism and chances of relapse. They may not take into account delayed consequences and therefore lose willpower to stay sober. Alcoholism could be looked at as decision-making under ambiguity, meaning that a

person's choices are uncertain and undefined, and can lead to an inability to make choices for the long-term. Treatment addressing these issues of willpower, disinhibition, and motivation to change may be effective in preventing relapse (Noel, Bechara, Brevers, Verbanck, & Campanella, 2010).

Much literature in the field has shown that using a community-based approach with a multidisciplinary team and utilizing several different treatments is most advantageous for people with TBI and substance abuse disorders. The combination of skill-based interventions, motivational interviewing, support groups, and financial incentives has been found to be effective (Graham & Cardon, 2008). Case management has also been researched and found to be helpful for concentrating on access of proper substance abuse treatment care, organization of services and referrals, and stability through the treatment phases. Heinemann et al. (2004) did a study of case management on people with co-occurring TBI and substance abuse problems and found that it benefited adults in this program. The effects of the case management program were shown in the increase of life and family satisfaction, through the effort at community integration and pre-employment activities.

**Motivational Interviewing.** Research over the last few decades have revealed that alcohol abuse can be treated with brief interventions as well as the longer intensive interventions and can have similar positive effects The use of screening and brief interventions for alcoholism in many settings has been found to have efficacy and cost advantages (Corrigan et al., 2010). Motivational interviewing has been shown to be helpful as a brief intervention because of the assumption that change can be facilitated even by a brief encounter with a professional if done properly according to the guidelines of this technique (Morgenstern & Irwin, 2007).

Based on the transtheoretical model of change, motivational interviewing helps clients discover and resolve uncertainty about behavioral change in regards to alcohol use (Karoll,

2010). Positive action appears from dialogue with the therapist and therapist selective reinforcement of change statements. Written Change Plans are completed and discussions are undertaken on commitment to change. Magill (2010) found that therapist motivational interviewing behaviors and skills (reflections and questioning) and client change talk were positive predictors for completing a Change Plan, a major component at the end of sessions which has been shown to help prevent relapse. The emphasis is client autonomy and, therefore, has a good application in rehabilitation as autonomy is a high priority for the rehabilitation process (Hettema, Steele, & Miller., 2005). The other phase of MI is consolidating commitment because even though one may want to change, it is entirely different to actually act upon it (Hettema, 2005). The assumption of Motivational Interviewing (MI) is that all people have the innate desire to change, grow, and in the case of vocational rehabilitation, complete services in order to find employment. Rehabilitation professionals can take a special approach in using MI to encourage change in clients with substance abuse issues. Through MI, interviewers are approaching consumers from a humanistic attitude instead of more traditional attitudes about motivation, change, and alcohol abuse. By using this attitude and person-centered counseling skills, a rapport and trust can be built that stresses consumer autonomy. Miller and Rollnick (2002) set up the acronym OARS to summarize therapist behaviors typical to MI: asking *O*pen-ended questions, *A*ffirming the client's ambivalence, *R*eflecting client statements, and *S*ummarizing client statements to pay attention to "change talk."

In MI communication, being non-judgmental in understanding the consumer's situation and point of view is a foundation for a therapeutic environment that can then be used to explore attitudes of change. Unlike the traditional view of substance abusers being in denial, MI sees it as an ambivalence issue. The interviewer inquires about the likes and dislikes of consuming alcohol, and once the consumer sees their life as dysfunctional, they will want and seek out

change. They are more likely to choose to change in the face of unconditional positive regard than with force and pressure. MI is a contemporary approach that is used in competent practice these days because of the mounting evidence of its successes (Toriello, Atherton, Campbell, & Sligar, 2010). MI has been shown to be effective in use as an early intervention which increases retention and completion of services and therefore should be involved in the evaluation and planning of rehabilitation. When used with feedback, such as assessment results and when coupled with other interventions, MI can be especially effective. Hettema et al. (2005) found that effect size was much larger when MI was joined with other treatments.

**Stages of Change**. Also based on the transtheoretical model, the stages of change are the stages that the individual moves through in attempting to address addiction, with each stage consisting of specific tasks he or she needs to attend to in order to progress. Pre-contemplation, contemplation, preparation, action, and maintenance are the stages, in that order, which the person passes through from one to the next (Heather, Honekopp, & Smailes, 2009). A person who relapses will reenter the cycle of stages at pre-contemplation or contemplation. People are in different stages of change due to the various problem areas in their life and their motivation to change affects positive and negative behavioral change. Pre-contemplation is the first stage where the individual does not understand that they have a drinking problem. Contemplation is when people become aware of the problem, but are not sure about whether they would not to change this and therefore considers the pros and cons. In the preparation stage, the person begins to identify negative consequences of drinking and considers changing their behavior relating to their drinking problem. The action stage follows, with the individual attempting to change addictive behaviors. Lastly, the maintenance stage is an ongoing goal to prevent going back to problematic drinking in which the person takes action to stop the occurrence; however, in the

case of relapse happening, one must go through the stages again (Zhang, Harmon, Werkner, & McCormick, 2006).

Interventions in motivational interviewing help clients become more aware of negative consequences of drinking and positive consequences of change. Consciousness-raising and awareness exercises focus on both the negative aspects of using and the positive changes that would occur with embracing a healthier lifestyle without alcohol (Ingersoll, Wagner, & Gharib, 2002). By using these interventions and the therapeutic relationship, clients can begin to progress through the stages; however, it will be unique to each client the amount of time needed in each stage and the counseling strategies that will help the client most. Each client has an individual level of readiness to change and, therefore, the counselor must adapt to use appropriate motivational strategies for each stage of change (Ingersoll et al., 2002).

**Cognitive-behavioral therapy**. Cognitive-behavioral therapy (CBT) concentrates on having clients develop and execute new skills which will help them to avoid and overcome problem drinking. Since CBT sees addiction as learned, it is an ongoing process that needs to be worked on throughout life so that alternative thoughts and behaviors can be maintained. Their skewed cognitive processes can be adjusted and new ways of thinking can be practiced. Clients set goals with their therapist which is individualized to their specific behaviors. An intervention plan is set up to disrupt and prevent drinking by identifying antecedents to drinking, the behaviors and consequences that follow. By developing a strong therapeutic alliance, therapist and client can come up with ways to use coping strategies and avoid certain situations, while client receives support and empathy from the therapist. Continued assessment is encouraged because if something is not working, there could be failure on the therapist's part to properly teach coping and change strategies. A measurement of outcomes is helpful in not only

monitoring drinking behaviors but also discovering improvements in physical health, job maintenance, and family life during treatment.

CBT is time-limited, with permanent change achievable, and an emphasis placed on relapse prevention. Much work is done to develop strategies for coping with failures and situations without drinking. Research indicates that clients have catastrophic negative thoughts about themselves when lapses occur which can lead to demoralization and lack of self-esteem (Rotgers & Davis, 2006). Lapses and relapses have been shown to be common in people recovering from alcoholism, as they often cycle through while undergoing treatment before reaching a stable state of nondrinking or controlled drinking (Barrick & Conners, 2002; Witkiewitz, 2008). Lapses are a return to drinking and are viewed as different from relapses, which are a return to pretreatment status. Witkiewitz (2008) studied people with higher and lower alcohol dependence in a treatment program and found that those who had more symptoms of alcohol dependence were more likely to relapse. Therefore, while in CBT treatment, a client should be assessed for the severity of his or her problematic drinking and a plan set up specifically for their unique needs.

**Relapse Prevention**

It has been shown in many studies that the use of the disease model for alcoholism in treatment facilities was predictive of relapse within 6 months, which suggests that the conceptualization of the drinking problem can affect outcomes (Rotgers & Davis, 2006). Pushing abstinence on a client that is not convinced and discussing alcohol issues as a disease may not help them to be motivated to change or hope they can succeed. By showing clients that their problems stem from learned thoughts and behaviors can help to build self-efficacy. The therapist and client can then work together to assess risks of drinking and relapse, coming up with healthy ways to avoid and cope with threats to sobriety. More than 70% of relapse situations occur due

to negative emotional states, interpersonal conflict, and social pressure to use (Rotgers & Davis, 2006). The foundation of relapse prevention is to show clients to identify potential "triggers," which may include stressful situations and to track incidence and moods that have lead to use before. If they can recognize this, the client can use practiced coping responses that will alter their sense of perceived control and increase their self-efficacy, which in turn lessens their chance of relapse.

Stemming from cognitive behavioral therapy, accurate thinking, not positive thinking, is a foundation for increasing self-efficacy. If a client can create new thoughts that are accurate to their life and situation, they can feel they are better in control of their circumstances. The client can foresee signs of lapses and relapses through planning and awareness, and with recognition of issues can build self-efficacy (Rotgers & Davis, 2006). Relapse prevention is started early in the treatment process as the client learns to identify triggers, thoughts and feelings which lead to realization of goals. In doing a relapse prevention plan, a client needs to start by examining the positives and negatives of changing or maintaining behavior (a cost-benefit analysis), giving the client a new ways of looking at their problem drinking. This will show the therapist which stage the client is in (precontemplation, contemplation, or preparation) and if the client is truly ready for change.

Once the cost-benefit analysis is done, other steps including trigger identification, thought identification, recognition of triggers that lead to lapses in the past, and identification of warning signs should follow to make a complete plan that can be utilized (Rotgers & Davis, 2006). In order to integrate this plan and new skills learned to cope with cravings and stresses, the client and therapist should collaborate on role-playing exercises and open discussion so that the client can practice and feel more comfortable to incorporate strategies into their everyday

life. There also needs to be room to improve upon the relapse prevention plan if anything changes or needs to be eliminated so that it stays relevant to the client's life.

**Employment**

The National Data and Statistical Center (2011) did a massive study nationally that has shown that prior to TBI, 62% of people were employed and 14% were unemployed. One year later, 28% are employed and 31% are unemployed, and two years after injury 32% are employed and 26% are unemployed. Comparing these statistics, there is a considerable loss of employment in this population, with only a slight up tick in the second year following injury, indicating that despite the amount of time recovering there is still a large gap in those returning to work. Tsaousides et al. (2008) confirmed that there is significant loss of employment following TBI. In their sample, two-thirds of participants were employed before injury; however, only 1 out of 5 returned to work at the level they were at prior to injury (either full or part time). Through a qualitative approach, research done by Oppermann (2004) showed lower levels of employment after injury and increased monetary difficulties, as well as less job security and stability. Reintegration into the community may be difficult for some, as they may face adjustment issues and problems transitioning to new living and work situations. This may lead to a lower emotional well-being, depression, and decreased quality of life (Geurtsen et al., 2011). Community reintegration programs can be helpful for an individual with a TBI who has a desire to return to employment as it targets improvements in independent living and quality of life, with aims at teaching participants to create a balance in activities of daily living. Geurtsen et al. (2011) studied employment rates of individuals with TBI after treatment in such a program and found that there was an increase in the number of participants working and an increase in number of hours worked, as well as strides in better independence and emotional stability. This research

shows that a community reintegration program can be an effective step that will lead to significant improvements in many areas of life including work.

Research in the area of employment of people with substance abuse issues has shown that work has a positive affect on preventing relapse and retention in treatment, as well as contributing to higher self-esteem, self-efficacy, and hope (Atherton et al., 2010; Toriello et al., 2010; Tsaousideset al., 2008). Although integration of vocational rehabilitation and alcohol abuse treatment would be best since many do not follow up with referrals, it occurs rarely. Jorge et al. (2005) assessed a group of people with coexisting TBI and alcohol abuse disorder and found that a history of alcohol abuse was associated with poorer vocational outcomes. They also found that those who had a history of alcohol abuse did not have success in returning to work at a 1-year follow-up as much as the non-alcoholic group did.

People with substance abuse disorders have barriers to successful employment, such as their inability to control substance use, keeping their problems private, family problems, limited work experience, unrealistic goals for employment, transportation issues, lack of social skills, and the unwillingness of employers to hire or preserve the employment of people with substance abuse disorders (Atherton et al., 2010). Booth and Feng (2002) found in their sample study that drinking higher qualities of alcohol increased the likelihood that an individual would not be employed or be in full employment for less time, further indicating that high alcohol consumption is a major barrier for employment. This becomes more complicated when the consumer also has a coexisting disability such as a traumatic brain injury, which brings even more barriers to employment. Since substance abuse disorders affect approximately 25-50% of those receive vocational rehabilitation services, and a rate of about that also exists for people with brain injuries, it is important to screen for alcohol problems in order to assess possible difficulties in employment (Donnell, Mizelle, & Zheng, 2009).

## Summary

Rehabilitation counselors often assist clients who have co-occurring disorders, one of which is highly prevalent among the TBI population: alcohol abuse disorders. However, these consumers are frequently denied entrance into substance abuse programs due to the lack of modifications in the environment for people with disabilities and the lack of understanding of the cognitive deficits of those with TBI. Although return to work has been shown to increase quality of life, there are barriers which affect the higher rate of unsuccessful closures in vocational rehabilitation services for people with TBI and alcohol abuse. The use of screening and assessment early on the rehabilitation process brings about better outcomes because of identification of alcohol problems and other psychosocial issues needing to be addressed. This helps the rehabilitation counselor understand which problems are or may be hindering the progress of the consumer, as well as determine proper treatment plans and referrals necessary for recovery and relapse prevention. Motivational interviewing may be utilized to encourage the consumer to contemplate change and commit to a healthier lifestyle, which can become a first step to other treatment modes, including cognitive behavioral therapy, case management programs, community integration programs, and relapse prevention plans. Rehabilitation counselors can then work with clients to put strategies in place that will increase motivation to work and prevent relapse back into problem drinking.

# CHAPTER 3

## DISCUSSION AND IMPLICATIONS

The goal of the paper was to identify strategies which could be used to help motivate a person with co-occurring disabilities of TBI and alcohol abuse to return to work and prevent relapse. Both alcohol abuse and TBI have been shown to be a barrier to employment, and persons with substance abuse disorders have a higher rate of unsuccessful closures following vocational rehabilitation services than the general rate of unsuccessful closures (Atherton et al., 2010; Tsaousides et al., 2008). Bombardier et al. (2003) showed that people who have a TBI have a likelier chance to have problems with alcohol if they had a history of abuse prior to their injury, after a short remission period. Since around 30% to 60% of TBI survivors have a history of substance abuse and because misuse of substances often causes TBI, this population is at a special risk for problems in life due to abuse of alcohol and drugs. These problems may include difficulty returning to work after injury and struggling with relapses. There is a considerable loss of employment following a TBI (Tsaousides et al., 2008). Confounding this issue, Jorge et al. (2005) found that people with a history of alcohol abuse experienced poorer vocational outcomes than those without drinking problems. Lapses and relapses have been shown to be common in people recovering from alcohol abuse and, therefore, requires work on the part of the individual to take steps that will help prevent occurrences (Witkiewitz, 2008).

Research has indicated that there is a relationship between TBI and alcohol abuse. Many studies have shown it to be a widespread pre-injury and post-injury psychiatric disorder for people with TBI (Bombardier et al., 2002; De Guise at al., 2009). Social and vocational rehabilitation, as well as community integration, is an important process for those with TBI after the stabilization of medical issues (Kim et al., 2007). Complications such as substance abuse can interfere with rehabilitation interventions and can hinder autonomy in their daily living. Wagner

et al. (2002) studied people with TBI who returned to productive activity and found that those who reported substance abuse problems pre-injury had a lower percentage of return to productive activity. Factors in the person's life such as functional status, severity of TBI and pre-injury abuse, acknowledgment of consequences, and the desire to change can lead to alcohol abuse after injury (Graham & Cardon, 2008).

Substance abuse disorders affect approximately 25-50% of those receive vocational rehabilitation services, and similar rates exist for those with brain injuries (Donnellet al., 2009). It is important to screen for problem drinking in order to assess for possible difficulties in employment and other areas of independence. Identifying alcohol abuse and psychosocial issues can facilitate all factors of life being considered during treatment. Rehabilitation counselors have a duty to address these issues in order to maximize quality of life for their consumers. The VR process can incorporate screenings, such as the BMAST, and assessments such as the Addiction Severity Index (ASI) in serving persons with substance abuse disorders. Barriers can be attended to and suitable services can be recognized. The training necessary to properly use the ASI would supply vocational evaluators and rehabilitation counselors with information about substance abuse disorders so they can better recognize and identify difficulties their consumers may be struggling with. The results from the assessment would also allow for appropriate treatment and referral to services needed (Atherton et al., 2010). However, there are barriers that are resulting in a lack of screening for substance abuse disorders in the rehabilitation field. There often are no policies that are in place in a rehabilitation agency that require such screening. This is partly due to the time constraint that counselors endure because of heavy caseloads. Administrators giving the additional work of screening is difficult to manage in many agencies and, therefore often not done. Lack of knowledge about substance abuse and how to screen for it is also a barrier to proper implementation into the rehabilitation process.

Taylor et al. (2003) outlined critical features which rehabilitation professionals should utilize in assisting in the treatment of co-occurring substance abuse and TBI in the rehabilitation setting. The identification of abuse risk factors, spotting signs of abuse, understanding treatment needs, resources and challenges to recovery are recommended to be accomplished by those working with this population. Involving family members in the assessment and treatment process, as well as educating clients and their families about the dangers of alcohol abuse, relapse-prevention strategies, and distinguishing symptoms of each disability are beneficial interventions to complete for consumers. For at risk clients, regular assessments of substance abuse can be done to monitor problems that may arise. As there may be cognitive deficits for people with TBI, it is best to use repetition and utilize various modalities such as role playing, visual aids, and coaching to support learning. Rehabilitation professionals should also offer praise to clients who are working towards goals, encourage small steps, monitor progress, be available for discussion of the effects that alcohol abuse has on the client's life, and encourage alterative behaviors.

At times, rehabilitation counselors can run into resistance from their client on the acknowledgement of substance abuse. They may lack awareness or be in denial of the significance of the problem. Steps can be taken by the professional to help clients to recognize problem drinking and become involved in treatment. Involve family members in every effort so that they can continue to provide support and encouragement. Do screenings and assessments, providing a discussion of the results with clients. Help the client to consider the effects that problem drinking will have on their goals. Inform him or her of treatment options and use encouragement to help the client progress to their personal choice of whether to seek treatment. Discuss the potential barriers and benefits to treatment and recognize that clients may not seek treatment now, but that the help given has educated them on how to do it when they are willing.

There has been much variation in the rates of pre-injury substance abuse found in research. The number, although always indicating higher rates than that of the general population, fluctuates considerably because of the different data collection methods used. These disparities are shown by the different defining of severity of injury, small sample sizes, differing definition of substance abuse, information obtained through family members, and assessment at times after injury. Therefore, it is difficult to ascertain verification of such results, and instead many researchers look for an average in the rates to indicate a higher than normal rate of alcohol abuse.

**Limitations**

This synthetic literature review was limited to English language research in the field of TBI and substance abuse. Although there were some pieces of research available in other languages besides English, it was unusable due to the language barrier. The review was also limited to research published in the past 10 years. This was appropriate because of the ever growing and changing scope of research accomplished in more recent years pertaining to this population.

Many research studies have not used properly defined diagnostic criteria or empirically accepted norms of criteria such as the structured clinical interview in assessment of substance abuse (West, 2011). This variability limits the research in representing the population and in how we are to understand the course of substance abuse behaviors. Many studies have also determined TBI by a simple list of questions that were not empirically based, and could have used assessment tools for TBI in order to discreetly determine the existence of such a condition (West, 2011). This inconsistency could skew results by including participants who should not qualify admittance to a study. Overall study design has shown to be a limitation for the growing field of research; however, there has been a movement towards more precisely designed studies

that use validation of empirically supported tools and definitions (Kim et al., 2007). Sample size and selection of participants in studies is a limitation throughout much research in this area. This has been recognized by researchers though and will be addressed in new studies to come.

**Future Directions**

Although there has been a decent amount of research done on this subject, more is needed that will clarify issues and provide a clearer path to better outcomes in rehabilitation. Research involving return to productive activity needs to address psychosocial factors that may impact community integration and quality of life during and after rehabilitation. Determining how impairment and disability relate to return to productive activity and community integration is important in finding a focus of rehabilitation and how to improve it through an emphasis on psychosocial factors. Relapse prevention and the study of risk factors for relapse are important parts of substance abuse treatment; yet, it has not been thoroughly examined what the risk factors and triggers for relapse after TBI. There may be unique factors for this population that contribute to relapse. Therefore, it would be advantageous to have knowledge of triggers so this may be addressed in rehabilitation. Future research needs to be done on how to properly and effectively link people who have abuse disorders into the services they require to give them the tools they need to recover, including more treatment and rehabilitation referrals. An investigation into how individual characteristics influence when the optimal time for referrals is in order to get the greatest benefit would be helpful to discover when to implement referrals and other services ideally. It is not known why some consumers benefit from referrals at earlier or later times; however, it is thought that certain individual characteristics are at play.

More research is needed on alcohol and drug abuse after TBI and how the consequences may affect acute and post-acute rehabilitation. Studies about how prevention of a return to alcohol abuse after TBI can be accomplished through various interventions, particularly for those

who do not desire to attend AA or formal treatment. Trauma physicians and other specialists recognize that alcohol abuse is the most common cause, as well as the most common health issue, with those who sustain trauma, and identify a need to address this serious social problem (Bombardier et al., 2002). Therefore, further research on innovative intervention models will help rehabilitation professionals and health care professionals alike to provide care that will both prevent further injury and instill better outcomes. Most of the research in the field of substance abuse and TBI has been done with small sample sizes and limited follow-up (Graham & Cardon, 2008).

Larger samples sizes in research studies would be beneficial to be able to evaluate the data in a more holistic manner. Since the longest follow-up completed is around 2 years or less, a lengthier follow-up to studies, perhaps spanning more than three years, would be advantageous to further understanding the course and direction of those with co-occurring alcohol abuse and TBI. An area of future research that could prove to be beneficial for treatment programs would be an investigation into more specific reasons and factors that play into the maintenance of gains seen in such programs. Due to impulse control problems in persons with TBI and the high occurrence of relapses for those with substance abuse problems, having a complete evaluation of how maintenance does occur in treatment programs can provide an understanding of which areas of treatment work to highlight relapse prevention. Research on the inclusion of a community integration focus in treatment programs have so far shown promise for providing the skills needed for maintenance of gains (Hensold et al., 2006). However, since this focus is often ignored, there is little research done in this area. More exploration into how community integration may positively affect treatment outcomes is necessary to gain knowledge on this possibly effective tool.

Working towards prevention of TBI in the general population is an important task for the wellbeing of society. This may be accomplished through education of the public on the dangers that lead to TBI and risk factors associated with brain injury. Research into how this education may be implemented properly needs to be investigated in the future. An objective of prevention efforts in the TBI population on how to reduce alcohol abuse is also needed in order to decrease the chances of another brain injury and further harm that can result in more of a societal burden (Andelic et al., 2010). As the age of the general population advances, there will be more need to treat the elderly. Studies on the differences in injuries and outcomes of older and younger people with TBI are needed to be able to understand differing treatment requirements, as well as the relationship between alcohol abuse and the older population of TBI sufferers. A higher reporting is warranted in the issue of persons with TBI not receiving proper treatment due to denial of services in programs due to physical and cognitive barriers. Bringing this issue to the forefront would educate researchers and rehabilitation professionals on the occurrence of denials and perhaps they will start advocating for change and finding alternatives for this population. There is a lack of research in the area of screening and assessment of persons with TBI and alcohol abuse, especially pertaining to which devices work best for this population (West, 2011). Efforts are needed to establish which devices are most appropriate and proper standards for screening and assessment of people with TBI.

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