

# Brain Injury in Persons With Serious Mental Illness Who Have a History of Chronic Homelessness: Could This Impact How Services Are Delivered?

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## ABSTRACT

Clinicians completed interviews using the Ohio State University Traumatic Brain Injury Identification Method (TBI-ID) and sections of the Addiction Severity Index (ASI-Lite) with clients who were homeless and receiving community mental health services. Fifty-six percent of clients screened positive for TBI. Clients with a history of TBI were more likely to be using multiple substances, and were more likely to have, and be bothered by, family and emotional problems than clients without TBI. Homeless clients receiving mental health services may have undiagnosed TBI that could affect their ability to benefit from treatment. Such clients may require services that compensate for their cognitive deficits.

**Keywords:** traumatic brain injury, community mental health services, cognitive impairment, homelessness, serious mental illness

## RÉSUMÉ

Les cliniciens interviewent les clients itinérants recevant des services communautaires en santé mentale avec le Ohio State University Traumatic Brain Injury (TBI-ID) et des sections du Addiction Severity Index

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(ASI-Lite). Un traumatisme crânio-cérébral (TCC) est dépisté positivement chez 56% des clients. Ceux ayant un antécédent de TCC sont plus susceptibles de consommer plusieurs substances et d'être sujets et affectés par des problèmes familiaux et émotionnels que ceux sans TCC. Les clients itinérants recevant des services de santé mentale peuvent avoir un TCC non diagnostiqué qui affecte leur réponse au traitement. Ils pourraient nécessiter de services compensant pour leurs déficits cognitifs.

**Mots clés :** traumatisme crânio-cérébral, services communautaires de santé mentale, déficit cognitif, itinérance, trouble sévère de santé mentale.

Despite research conclusively demonstrating the frequent co-occurrence of TBI, mental disorder, substance abuse, and homelessness, clinical services typically address only one or two of these issues. A literature review identified the rate of traumatic brain injury (TBI) among homeless persons to range from 8 to 53% (Topolovec-Vranic et al., 2012). Among homeless men residing in a shelter in a large urban centre, 45% were positive for a TBI on a screening interview and 66% of those with a probable TBI identified having an injury from an assault (Topolovec-Vranic et al., 2014).

In combination, mental disorders and TBI are common and have been studied extensively (Rao & Lyketsos, 2002). A structured clinical interview of TBI patients six months to five and a half years post injury found 65% of the sample met criteria for a psychiatric diagnosis (Whelan-Goodinson, Ponsford, Johnston, & Grant, 2009). Telephone interviews of patients hospitalized for TBI found that 53% of the sample met the criterion of a major depressive disorder during the first year post-injury. Major depressive disorder was an independent predictor of lower quality of life (Bombardier et al., 2010). An earlier review also found evidence for a higher frequency of mood disorders after TBI. Prior psychiatric history and impaired social support were reported to be risk factors for developing mood disorders after TBI (Jorge & Robinson, 2003). Critical reviews of evidence show a significant association between TBI and schizophrenia (Batty, Rossell, Francis, & Ponsford, 2013; Molloy, Conroy, Cotter, & Cannon, 2011). A review of literature on persons with substance abuse and TBI established that substance use is common both pre- and post-injury. Frequently, substance use is a contributing factor for the occurrence of a brain injury (West, 2011). Also, Sacks et al. (2009) found that more than 50% of persons seeking treatment for substance abuse in New York State were positive for TBI using the Brain Injury Screening Questionnaire. Similarly, Walker, Cole, Logan, and Corrigan (2007) found that 32% of all persons entering substance abuse treatment in Kentucky reported one or more TBI with loss of consciousness. Persons who had sustained a TBI at any time before age 18 were found to be at a higher risk for suicide than persons who did not have a TBI. Severe injuries were associated with higher risks of suicide (Richard et al., 2015). In addition, clients in treatment for co-occurring substance use and mental illness often have histories of TBI (Corrigan & Deutschle, 2008). A recent large-scale assessment of substance use among persons with severe psychiatric illness also found an increased risk for smoking, substantial alcohol use, heavy marijuana use, and the use of other recreational drugs when compared to population controls (Hartz et al., 2014). Reviews from surveys of homeless persons in Western countries found frequent alcohol dependence and drug dependence for homeless persons with and without a psychotic illness (Fazel, Khosla, Doll, & Geddes, 2008). Bigler (2013) has presented evidence that brain injury, regardless of location and severity, has effects over time that may predispose persons with a brain injury to develop neuropsychiatric

disorders after the original brain injury. The parts of the brain related to social emotional processing and decision making (frontal lobes and anterior tips of the temporal lobes) seem to be the most susceptible to damage (Bigler, 2013). Thus, even remote injuries may have adverse effects in patients presenting for mental health treatment long after the original brain injury (Bigler, 2013).

Taken together this literature indicates that there are novel diagnoses of mental illness that are present after brain injury (Richard et al., 2015; Whelan-Goodinson et al., 2009) in addition to pre-existing diagnosis that will impact treatment efficacy (Bombardier et al., 2010; Jorge & Robinson, 2003). Recent literature has consistently recommended that routine screening occur in mental health and addictions settings, and that it occur not just at one point in time during the course of treatment (Sacks et al., 2009; Walker et al., 2007; Whelan-Goodinson et al., 2009). This practice has not been widely adopted and there are still some queries as to the need or relevance of using self-report screening tools for brain injury in these settings.

This accumulation of concomitant evidence suggests that service integration (across sector collaboration and capacity building) and service modification is likely necessary for persons with combinations of brain injuries, serious mental illness, substance use, and homelessness (Bombardier et al., 2010; Sacks et al., 2009; Walker et al., 2007). The reality is that current services usually address only one or two of these concerns that are consistent with the focus of their mandate. There has been reluctance to consider that when some clients with complex symptoms are not responding well to mental health and/or addictions treatment, there may be a history of brain injury that provides a useful context from which to continue to provide service. There has been a tendency to try to shift patients to other service sectors when multiple diagnoses are uncovered, likely reflecting a lack of confidence in being able to manage these complex clients. It is very common for brain injury providers to feel that patients would be better serviced in the mental illness and addictions sector and visa versa. What can happen is that these patients can end up not with any service, or not receiving service that is fully aware of the potential implications of their co-occurring conditions.

The present study aimed to identify whether clients seeking support from an Assertive Community Treatment Team (ACTT) serving homeless persons with a serious mental illness and/or substance use problems also had a significant history of brain injury, and if awareness could be raised among the team members, about the clinical utility of conducting brain injury screening in this context.

## METHODS

All clients registered to an ACTT serving homeless persons in a downtown urban setting were invited to participate in screening interviews. Participants received a gift card for a local coffee shop as a small honorarium. ACTTs generally comprise a multidisciplinary team with a range of professional and non-professional backgrounds who take responsibility equally for the clients. The team consisted of four nurse case managers (CMs), one vocational CM, one addictions CM, two mental health CMs, two peer support specialists, and two part-time psychiatrists. In keeping with the ACT philosophy, any member of the team could be involved in any clinical activity with the clients. With the exception of the psychiatrists, all of the team clinicians were trained to administer the short form of the Ohio State University TBI Identification (OSU TBI-ID) Method (Corrigan & Bogner, 2007) and selected subsections of the Addictions Severity Index (ASI-Lite; McLellan, Luborsky, & Woody, 1980) in screening interviews with participants. Efforts were

made during the training over multiple sessions to ensure that all members would consistently administer the tools for all clients. Both of the screening tools were modified for ease of completion. The formatting of the OSU TBI-ID short form was changed to include some detail about potential multiple mild injuries as asked on longer versions of this screening tool and to ensure that the results could fit on a single page. From the ASI-Lite questionnaire about alcohol and drug use, only the sections about family and psychiatric issues were administered. This change was made to minimize the amount of time participants would have to spend completing the screening while maximizing the information of most interest.

Demographic data were extracted from the ACTT records. Over the course of six months all persons on the service roster (approximately  $N = 78$ ) were to be approached for screening. The research protocol was approved by the institutional Research Ethics Board. Due to the small sample size and potential for type II error, level of significance was set at  $p = 0.05$  and trends would be interpreted and discussed.

## RESULTS

Sixty-three persons were approached and asked to participate. Fifteen persons (out of a roster of 78) were not approached as it was felt to be inappropriate to do so: persons were in active crisis, were struggling to remain engaged in service, or were very suspicious of paperwork and forms to the point that engagement in services would be compromised. Forty-eight of 63 clients invited to participate in the study completed screening interviews. Among the 48 participants, 69% were male, 33% had not completed high school, and 72% had always been single. The age of respondents ranged from 25 to 71 years with a mean of 43.40 ( $SD = 13.03$ ) years. Recorded primary diagnoses for participants (non-participants) included schizophrenia 61% (53%), other psychosis 13% (27%), mood disorder 8% (13%), substance abuse 8% (7%), and other 8% (0%). This ACTT was created in 2009 and most of the participants have been receiving service from this team since 2009 or 2010. History of any previous mental health treatment or medical records could not be collected. Concurrent substance abuse was identified in 31% (33%) of the participants. There were no statistically significant differences between participants and non-participants with regard to demographic characteristics.

Fifty-six percent of participants were positive for TBI history on the screening tool, and most of the TBIs were either mild (loss of consciousness of 5 or fewer minutes; 33%) or possible (19%). A possible TBI was identified when respondents indicated an injury to either their head or neck with no loss of consciousness but symptoms of headache and/or memory/concentration problems. When the only TBI, or most serious TBI if there were multiple injuries, were reviewed the most common causes of injury were assaults (53%) and falls (26%). Of the 19 participants (40%) reporting a TBI with loss of consciousness, 43% had a second brain injury, 26% had a third brain injury, 21% had a fourth brain injury, and 11% had a fifth brain injury. Twenty-three percent of the sample had experienced multiple mild brain injuries from physical abuse, fights, or falls.

Self-reported substance use in the past 30 days and over lifetime was compared for participants with ( $N = 31$ ), or without ( $N = 19$ ) a history of TBI. There was a trend for a greater percentage of participants with a TBI when compared to the percentage of participants without a brain injury to be using alcohol, alcohol to intoxication, cocaine, cannabis, more than one substance in a day and more than one substance over the past 30 days (Mann-Whitney  $U$ ,  $p = .033$  and  $p = .021$ ; see Table 1). Examining the number of persons who use substances, the proportion of persons with TBI is consistently greater than the proportion of persons without TBI in each of the categories.

**Table 1**  
**Incidence of substance use and psychological problems in Assertive Community Treatment Team clients with and without history of Traumatic Brain Injury (TBI)**

Variable	With TBI		Without TBI		Mann-Whitney U
	N	percentage	N	percentage	p
	N = 31		N = 19		
Substance use in last 30 days:					
Alcohol (any)	13	46	2	14	ns
Alcohol (to intoxication)	5	19	1	7	ns
Cocaine	6	21	2	14	ns
Cannabis	9	31	3	21	ns
> 1 substance in a day	4	14	0	0	ns
Multiple substance use	9	31	0	0	.021
> 1 substance in a day (lifetime)	10	32	3	17	.033
	N = 21		N = 13		
Problems with (lifetime):					
Mother	13	65	4	33	ns
Father	14	74	2	15	.005
Sibling	14	67	2	17	.020
Close Friends	14	67	1	9	.046
	N = 29		N = 15		
Bothered by:					
Alcohol problems	5	18	0	0	ns
Drug problems	6	21	0	0	ns
Family problems	11	39	2	13	.050
Emotional problems	22	79	4	29	.009
	N = 29		N = 15		
Experience of the following:					
Depression in the last 30 days	19	66	5	33	.045
Depression lifetime	24	83	6	40	.004
Anxiety in the last 30 days	20	69	3	20	.002
Anxiety lifetime	24	83	5	33	.001
Trouble understanding, concentrating and remembering in last 30 days	21	72	4	27	.004
Trouble understanding, concentrating and remembering lifetime	22	76	6	40	.020
Trouble controlling violent behaviour including episodes of rage or violence	15	52	1	7	.004
Suicide attempts—lifetime	14	48	3	20	ns

*Note.* The amount of missing data for each variable varied within each section and across sections. The maximum number of responders is listed as the column head for each section.

Participants with a TBI were also more likely to have spent money on alcohol (Mann-Whitney  $U$ ,  $p = .077$ ) or drugs, to report family and emotional problems, to experience depression, anxiety, problems with comprehension, concentration, remembering, problems in controlling their violent behaviour, and to have had more suicide attempts (Table 1). For the questions asking respondents if they were bothered by problems with alcohol, drugs, family and their emotions, and whether they were interested in seeking treatment in these areas, persons with TBI were more likely to be bothered in these areas but were no more or less likely to seek treatment.

Findings were presented to the ACTT clinicians and met with some initial resistance. The team is focused on psychiatric care and while they found it surprising that so many of the clients reported a history of brain injury, they did not understand the impact of this history on psychiatric care. The team members shared the belief that a psychiatric diagnosis explains all of the symptoms regardless of whether the symptoms of mental illness and brain injury are similar. Given that many of the clients have serious and persistent mental illness, it is not surprising to perceive that ongoing symptoms are those that are resistant to treatment. In addition there were also concerns with the validity and reliability of using a self-report screener.

The manager of the team brought in a brain injury CM from another branch of the agency to provide context for why brain injury screening is relevant and how small changes to service provision can be made to accommodate cognitive impairment. All staff were asked to complete online training through Ohio Valley Centre for Brain Injury Prevention and Rehabilitation (<http://www.ohiovalley.org/informationeducation/>). While the screening and training has increased the awareness of the usefulness of ascertaining whether there is a history of brain injury, there is still more work to be done to integrate the necessary changes into treatment practice that will better support those clients with a history of brain injury.

## DISCUSSION

Homeless persons receiving ACTT services completed screening measures that showed high rates of prior TBI, high rates of current substance abuse, and emotional problems. While this study only screened those persons receiving services from the ACTT team, it is reasonable to expect, given previously published research noted earlier, that these findings could be generalized to include those persons with serious mental illness who had a history of homelessness and received a variety of community-based services.

The participants who reported histories of TBI were more likely to use alcohol, cocaine, cannabis, or a combination of these substances, than participants who did not report histories of TBI. While these trends were not always significant, the results indicate that persons with TBI in this sample were not abstinent as is generally recommended after a brain injury. By continuing to use substances these individuals increase the likelihood of negative impacts on their health and well-being: exacerbation of functional limitations, higher rates of psychiatric morbidity, higher arrest rates, and increased episodes of aggressive behaviour (West, 2011). A large proportion of participants had multiple brain injuries (for some persons, up to five injuries). The finding that persons with a brain injury history in this sample were using multiple substances in a day and over the course of the previous 30 days, and that the Mann-Whitney  $U$  results are significant for these variables, warrants attention from mental health service providers. This finding suggests that persons with a history of TBI can have a complex pattern of substance use, which could lead to challenges in making healthy lifestyle choices.



The findings of greater experience of anxiety and depression, as well as the suggestion of more suicide attempts, are consistent with data collected from persons with TBI history who do not have a history of homelessness. Given that participants with TBI were more likely to report symptoms of cognitive impairment than participants without history of TBI suggests that these participants are living with challenges that can impact their ability to engage in service and/or treatment. Of interest is that persons with TBI in this sample state that they are more bothered by the experience of their problems but are not more likely to seek treatment; this suggests that these persons are likely to remain symptomatic.

Persons in this sample with a history of TBI were more likely to be using multiple substances and have emotional problems; thus, these are individuals who are dealing with many challenges. It is important that service providers be aware of these co-morbidities and that services be adapted to maximize the likelihood of success. Previous studies have reported histories of TBI in persons who are homeless, are current substance users, or have a serious mental illness. Given the vulnerability of the areas of the brain involved in executive functions (management, with regard to control and regulation, of working memory, reasoning, organization, problem solving, and planning and execution) to damage, after even mild injury and remote injury, it is very likely that service providers will need to make some accommodations in their programs and service delivery to increase effectiveness of treatment.

However, mental health clinicians may not be aware of clients' histories of TBI, and may not adapt treatment strategies to compensate for clients' cognitive deficits caused by their TBI (Corrigan, Bogner, & Holloman, 2012; Lafferty, 2010). Useful strategies commonly practiced by brain injury-specialized service providers include providing clients with written plans and schedules, using frequent reminders, conversing in quiet environments with clients one-on-one or in small groups, using simple language and short sentences in verbal and written communication, summarizing conversations, and establishing and maintaining routines. It is important also to be aware of how long a client can maintain attention, how best the client learns and understands communication and how to identify when the client is becoming fatigued. Making requests of clients when they have exceeded their capacity in that moment may lead to disengagement and withdrawal from service.

Similarly, episodes of impulsivity, anger, agitation, and aggression may be the result of brain injury rather than a psychiatric symptom (Sabaz et al., 2014). Approaches developed for use with persons who have a brain injury that take into account their cognitive impairments should be considered (Corrigan & Deutschle, 2008). Clients with a history of TBI and substance use need treatment programs that are designed to compensate for their cognitive impairments. In fact it has been noted that current mental health treatment practices may be a barrier to service engagement for persons with TBI (Corrigan, Bogner, Hungerford, & Schomer, 2010). Some recent as of yet unpublished work by one of the authors suggests that those clients with a history of brain injury are often the most difficult to engage and maintain in treatment. These clients are also often those who come back into treatment many times and who may not necessarily complete a course of treatment. Also anecdotally, aggressive clients are discharged if they threaten staff. Yet given that aggression can be a sequelae of brain injury, it would seem that staff should take this into account before discharging aggressive clients and in their follow up from such behaviour. It would seem that there is a need for specific training available from brain injury specialized clinicians regarding strategies to use to de-escalate aggressive clients (i.e., CPI training), and to identify escalation triggers and signs. These findings taken together suggest that

current practices that likely do not take into account cognitive impairments, executive functioning deficits, and other brain injury sequelae, may not be as clinically and fiscally efficient as possible.

Clinicians have observed that there may be a need to provide some support to get clients ready to participate in interventions and/or tailor interventions (shorter sessions, interventions over a longer period of time and/or treatment booster sessions, fewer group interventions, and reduction of multi-stimulation environments), and to use methods that do not rely solely on verbal exchange. There already exist some resources that can be used to cross train mental health and addiction services providers ([www.subi.ca](http://www.subi.ca) and [www.ohiovalley.org/informationeducation/accommodatingtbi](http://www.ohiovalley.org/informationeducation/accommodatingtbi)) in addition to partnering with local specialized brain injury services providers and resources. There have not been many studies to systematically assess which accommodations will maximize treatment engagement and outcome (Corrigan et al., 2010) and this is an important area for future clinical research that should be undertaken in collaboration with a variety of specialized service providers (e.g., brain injury, mental health, and substance abuse). This type of research may help to break down the resistance that can exist in mental health and addiction settings to identify and accommodate clients who have sustained brain injury.

### LIMITATIONS

This study relied on client self-report, and the sample size was relatively small. Even though some authors have reported that self-report screening findings can be considered reliable and valid (Walker et al., 2007), findings should be regarded with caution until they can be replicated in a larger sample and with use of tools that could corroborate the self-report of brain injury and alcohol and drug use.

### CONCLUSIONS

The large proportion of clients with TBI and the high rate of substance use and emotional problems in these ACTT clients who are homeless suggest that it is important for ACTT clinicians to screen for TBI and to adjust service delivery strategies for clients identified with a history of TBI. It is likely that this finding is applicable for many clients with serious mental illness living in the community. Further research in the complex interactions among homelessness, TBI, mental illness and substance use is important (Topolovec-Vranic et al., 2014), and services for persons living with the effects of these co-morbidities should make modifications to their clinical interventions to more effectively support and treat these persons.

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