

Diagnosing Major Depression Following Moderate to Severe Traumatic Brain Injury – Evidence-based Recommendations for Clinicians

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Abstract

While major depression (MD) is the most common psychiatric disorder following traumatic brain injury (TBI), diagnosing MD can be challenging due to cognitive, emotional and somatic symptoms that overlap with TBI and other psychiatric disorders. Current evidence suggests that the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) works well in the TBI population. The presence of 'organic' TBI sequelae that overlap with DSM-IV MD criteria do not appear to lead to false-positive MD diagnoses. Rumination, self-criticism and guilt may best differentiate depressed from non-depressed persons following TBI. Anxiety, aggression, sleep problems, alcohol use, lower income levels, poor social functioning and negative thinking are primary risk factors for the development of MD following TBI. Current evidence suggests that the Patient Health Questionnaire-9 is the best self-report scale option for depression screening after TBI. Apathy, anxiety, dysregulation and emotional lability require careful clinical consideration when making a differential diagnosis of MD in persons with TBI. Research indicates that asking specific questions about depressed mood, loss of interest or pleasure and psychosocial functioning yields the most accurate diagnosis. Practical recommendations are provided on how clinicians can improve MD diagnostic accuracy.

Keywords

Depression, diagnosis, rehabilitation, traumatic brain injury (TBI), validity

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Psychiatric disorders frequently occur following a traumatic brain injury (TBI) and depression is the most common.^{1,2} When psychiatric diagnostic criteria are used, the prevalence of major depressive episode (MDE) in persons with moderate to severe TBI ranges from 26–36%.^{3–7} A recent study in the *Journal Of the American Medical Association* suggests that the first-year incidence of major depression (MD) following TBI may be as high as 50%.⁸ Despite the high incidence of depression reported in research studies, detecting and diagnosing MD following TBI can be challenging in the neurology clinic. Patients, family members and examining clinicians often recognise the presence of typical indicators of a mood disturbance, such as feeling down or 'blue'. Other diagnostic criteria for a MDE – such as poor concentration, trouble-making decisions, lability, sleep problems, decreased energy and activity and restlessness – may also be due to TBI sequelae, other psychiatric disorders, neuroendocrine dysfunction, pre-injury functioning or medication side-effects.^{9,10}

Establishing a precise differential diagnosis of MD versus other disorders has two important implications for the clinician. First, it will have an obvious impact on the selection of a medication regimen. Further, the diagnosis of MD may alter the interpretation of signs and symptoms associated with TBI, since MD may cause or worsen

problems such as cognitive impairment and somatic symptoms.^{4,6,11–13} These diagnostic and treatment challenges highlight the need to establish an empirical basis to guide the clinical diagnosis of depression after TBI.

This article highlights the most critical findings from a more extensive review on diagnosing depression following TBI and includes updates on recent findings.² First, the current standard for diagnosing MD and research findings on how these symptoms manifest themselves following TBI will be presented. Second, evidence-based risk factors associated with MD following TBI are identified. Third, evidence-based recommendations are provided for the use of self-report depression scales. Fourth, common presentations and differential diagnostic considerations for MD and other common psychiatric conditions following TBI are highlighted. Finally, practical recommendations are provided for clinicians to improve the detection and diagnosis of MD following TBI.

Major Depression – Diagnostic Features

The *Diagnostic and Statistical Manual of Mental Disorders IV* (DSM-IV)¹⁴ provides the current clinical and research standard for diagnosing mood disorders, including MD. A summary of the criteria is given in *Table 1*. A person must have at least five of nine depressive symptoms

Table 1: Diagnostic and Statistical Manual of Mental Disorders IV Criteria for a Major Depressive Episode

DSM-IV Criteria A–E	DSM-IV Guidelines
Criterion A Symptoms	
1. Depressed mood	Sad, discouraged, empty, hopeless, tearful, irritable, frustrated, angry, aggressive, somatic complaints
2. Diminished interest or pleasure	In all activities; including social withdrawal and diminished libido
3. Weight or appetite change	5% change in body weight or decrease or increase of appetite (decrease is more typical)
4. Sleep disturbance	Typically middle or terminal insomnia; difficulty falling asleep (hypersomnia less frequent)
5. Psychomotor agitation or retardation	Observable (not subjective feelings of) restlessness; slowed speech or body movement
6. Decreased energy	Fatigue, loss of energy, excessive tiredness, or reduced efficiency in completing tasks
7. Feelings of worthlessness	Excessive guilt, unrealistic negative evaluations, or delusional self-blame
8. Diminished thinking ability	Poor attention, difficulty making decisions, or memory problems (self-reported problems exceed objective evidence of difficulties)
9. Recurrent thoughts of death	Recurrent thoughts of death or suicide; suicidal behavior
Criterion B	
Not a mixed episode	Meets both major depressive and manic episode criteria daily for one week
Criterion C	
Clinically significant distress or impairment in social, work, or other important areas	Significant relationship problems most common
Criterion D	
Not due to direct physiological effects of a substance or general medical condition	Symptoms count as major depressive episode unless ‘clearly and fully accounted for’ by physiological effects of a traumatic brain injury that begin within three months of injury
Criterion E	
Not bereavement	For persons with acute traumatic brain injury, symptoms begin within two months of consistent memory of loss of loved one

DSM-IV = Diagnostic and Statistical Manual of Mental Disorders IV.

(criterion A). At least one of two primary criterion A symptoms must be present: (A1) depressed mood that impacts all or almost all aspects of life or (A2) markedly diminished interest or pleasure in all or almost all activities. Depressive symptoms must be present most of the day for at least two weeks to meet criterion A. In addition to this, a person must meet four more DSM-IV MD criteria:

- a mixed episode of manic and depressive symptoms must be ruled out (criterion B);
- the severity of depressive symptoms should cause impairment in at least one aspect of daily functioning (criterion C);
- depressive symptoms should not exclusively be due to a general medical condition or substance use (criterion D); and
- depressive symptoms should not be part of bereavement (criterion E).

Depressive symptoms experienced by persons with TBI are generally similar to depressive symptoms reported in the general population. However, research suggests that persons with TBI experience a number of somewhat unique symptoms:

- depressed mood (A1) in persons with TBI may be more frequently manifested by irritability, frustration, anger and aggression than sadness, feeling blue or tearfulness;^{5,15,16}
- self-reports of somatic complaints (A1, A6) and cognitive symptoms (A8) that exceed objective findings following TBI strongly suggest depression as a contributing cause;¹⁵
- poor appetite (A3) is frequently reported by persons with TBI and may be a primary discriminator between depressed and non-depressed patients;¹⁶
- rumination, self-criticism and guilt are closely related to feelings of worthlessness (A7) and appear to highly differentiate depressed from non-depressed persons with TBI.¹⁵ Lack of confidence,

discomfort around others and social withdrawal may be indicators of depressed mood and feelings of worthlessness;^{15,16} and

- depressed persons with TBI are six times more likely than non-depressed persons to threaten self-harm (A9).⁶ Overall, persons with TBI have a four times higher risk of committing suicide than persons in the general population (see Teasdale,¹⁷ Simpson,¹⁸ Wasserman¹⁹ and Hawton²⁰ for reviews on suicide incidence and assessment).

Use of DSM-IV Criteria and the Risk of False-positive Diagnoses of Major Depression Following Traumatic Brain Injury

Concern has been expressed regarding the use of DSM-IV criteria to diagnose MD in persons with TBI due to the overlap of DSM-IV symptoms with the ‘organic’ symptoms of TBI. For example, persons with TBI frequently exhibit lack of initiative, weight loss, low energy, slow movement, attention problems, and sleep difficulties, which could lead to false-positive diagnoses of MD.²¹ Current research indicates there is little evidence that use of DSM-IV criteria increases the risk of false-positive MD diagnoses. Persons with TBI who are depressed appear to self-report greater levels of impairment or difficulty than can be objectively quantified, even when measures of injury severity and/or cognitive functioning do not differ between the depressed and non-depressed groups.^{4,6,11–13}

Even when ‘autonomic’ symptoms from DSM criterion A (e.g. weight change, loss of energy) are not considered in the diagnostic process, MD is diagnosed at virtually the same rate at one, three, six and 12 months post-injury compared with using all nine DSM criteria A symptoms.⁴ Similarly, in a group of older hospitalized patients without TBI, prevalence rates of MD did not differ when DSM-IV MD medically-related symptoms were excluded.²² Negative thinking, characterised by rumination, self-criticism and hopelessness, are

Table 2: Checklist of Risk Factors for Major Depression Following Moderate to Severe Traumatic Brain Injury

Anxiety, panic
Aggression – verbal, physical, chronic agitation, restlessness and frustration
Substance use – alcohol and/or drugs
Sleep difficulties – difficulty falling asleep, early awakening, reduced sleep time
Low income – poverty level, 1–3 times above poverty level, financial problems
Personal relationship problems – lack of intimate partner, no close friends, discord in close relationships
Poor social skills – problem-solving, social withdrawal, lonely, uncomfortable around others
Unemployment – unstable pre-injury work history, post-injury job loss
Negative thinking/rumination – physical symptoms, losses, failures, low self-esteem, hopelessness

core features of MD and may precede or partially account for the markedly higher rates of somatic and cognitive symptoms reported by depressed versus non-depressed persons with TBI.¹²

Associated Disorders/Risk Factors for Major Depression

Research based primarily on univariate analyses of the TBI population and supported with evidence from the general population indicates that nine disorders and psychosocial features have consistently been associated with MD (see *Table 2*).

Anxiety commonly co-occurs with both early- and late-onset depression after TBI, with rates ranging from 41–77%.^{4,23,24} Persons who are diagnosed with both depression and anxiety disorders following TBI have longer symptom duration (7.5 months) than patients with depression alone (1.5 months).²³ Epidemiological research in the general population indicates that anxiety disorders co-occur with depression in about 58% of cases and precede the depressive disorder in 85% of cases.²⁵

Aggression also commonly co-occurs with depression at six, 12 and 60 months post-TBI.^{26–28} Persons who reported irritability and anger soon after injury were at a greater risk of developing post-TBI MD.²⁹ In the general population, impulse-control disorders were the second most commonly co-occurring disorder (17%) in persons with depression, and preceded the depressive disorder in 79% of cases.²⁵

Alcohol abuse is associated with higher rates of depression in the first year post-injury.^{23,30–32} In the general population, substance use was the third most commonly co-occurring disorder (9%) with depression. It preceded depression diagnoses in half (51%) of the cases.²⁵

Sleep disorders are one of nine core symptoms of MD and trouble falling asleep was six times more likely to be reported by depressed than non-depressed persons with TBI.⁶ Objective laboratory studies have confirmed night-time sleep disorders and excessive daytime sleepiness in 25–53% of those self-reporting sleep difficulties.^{33,34} Persons with TBI who had objective findings of sleep maintenance insomnia evidenced moderate to severe Beck Depression Inventory scores.³⁴ Despite this, no association was found between excessive daytime sleepiness and mood.³³ In the general population, growing empirical literature suggests that insomnia is a precipitant of depression^{35–38} and that persons with persistent insomnia were 40 times more likely to develop depression within one year compared with persons with no insomnia.³⁵

Poor social skills and personal relationship problems, including perceived lack of social support and a close confiding relationship, have been associated with greater levels of early- and late-onset MD in persons with TBI.^{4,11,12,23,29,39–41} Current marital status has not been associated with MD after TBI.^{4,6,23} In contrast, divorced, separated or widowed persons in the general population reported higher lifetime and 12-month rates of MD; persons who have never been married had the highest 12-month rate of MD.²⁵

Unemployment and/or unstable work history is consistently associated with higher rates of depression after TBI.^{6,30,42,43} These findings are consistent with research in the general population, which shows that unemployment and disability are significantly associated with increased lifetime prevalence rates of MD.²⁵ Lower income level has a linear association with depression after TBI.^{6,11,41} Similarly, persons in the general population whose income was below the poverty line were four times more likely to report a 12-month rate of depression. Persons who were one to three times above the poverty rate were twice as likely to be depressed.²⁵

Negative thinking reflects a tendency to view one's self as defective or inadequate, a pervasive and absolute evaluation of one's own life experience as resulting in loss or failure and hopelessness regarding the future.^{44–47} Research has found that rumination, self-criticism, distress and guilt were part of a symptom cluster that most differentiated depressed from non-depressed persons after TBI.¹⁵ These findings are consistent with research in the general population indicating that rumination is prevalent in both the development and maintenance of depression. Rumination worsens depressive symptoms over time and is a risk factor for developing future major depressive disorders.^{44,48–50}

Pathophysiology

Lesion location may be related to the development of depression following TBI. Pathophysiology in such patients is similar to the general population, involving the left dorsal lateral frontal cortex and left basal ganglia and, to a lesser extent, focal lesions in the right hemisphere and parieto-occipital region.^{4,23,51–55} Imaging studies have shown that hypometabolism of the lateral and dorsal frontal cortex, especially the dorsal prefrontal cortex and cingulate gyrus, may be associated with depressive symptoms, along with increased activation in the ventral limbic and paralimbic structures, including the prelimbic cortex, amygdale and medial thalamus.^{10,51,56} However, these patterns of anatomical dysfunction are not universally observed in persons with MD and variations between studies are likely attributable to heterogeneity in MD symptoms and the existence of subtypes of depression.^{10,56} For detailed reviews of this topic, see Drevets,⁵⁷ Davidson,⁵⁶ Moldover¹⁰ and Jorge.⁵¹

Pre-injury Psychiatric History

Pre-injury psychiatric history has not been consistently associated with MD after TBI. Three studies found a significant association between history of mood and/or anxiety disorders and the development of post-TBI MD,^{4,12,23} while two studies did not show a similar association.^{11,30} In contrast, a population-based study that assessed the presence of TBI and affective disorders found that persons without a prior psychiatric illness had almost five-times higher rates of affective disorders at seven to 12 months post-TBI. Individuals with TBE were more than twice as likely as the general population to be depressed 13–18 months post-TBI.⁵⁸

Factors Not Associated with Depression

A number of variables have been shown consistently to not be associated with depression following TBI. These include:⁶

- age;
- gender;
- race;
- markers of TBI severity; and
- post-injury functioning: acute care and acute rehabilitation length of stay, duration of coma, duration of post-traumatic amnesia, acute admission Glasgow Coma Scale scores, admission and discharge rehabilitation Disability Rating Scale scores and admission and discharge rehabilitation Functional Independence Measure (FIM) scores.

Use of Self-report Depression Scales in Persons with Traumatic Brain Injury

Early research suggested that persons with TBI underestimate cognitive, emotional and behavioural impairment.⁵⁹⁻⁶² However, scales that used specific versus abstract item content mediated awareness of impairments and improved agreement between patients’ and family’s perceptions of functioning.^{63,64} Best current evidence suggests that persons with TBI and their significant others do not have clinically meaningful differences in perceptions of depressive symptoms when specifically worded depression items are used.^{39,65,66}

Clinicians often use self-report scales to case-find MD and quantitatively monitor changes in symptom severity. A number of scales have been used in clinical practice and research on depression after TBI.

The Beck Depression Inventory–Second Edition (BDI-II), Center for Epidemiological Studies Depression (CES-D) scale, and Zung Self-assessment Depression Scale (SDS) are self-report measures used in primary care and mental health settings. The Patient Health Questionnaire-9 (PHQ-9) is a self-report measure that addresses the nine DSM-IV symptoms of MD. The Hospital Anxiety and Depression Scale (HADS), which is self/patient-rated, and the Hamilton Depression (HAM-D) scale, which is clinician-rated, are frequently used in inpatient medical settings. The Neurobehavioural Functioning Inventory-Depression (NFI-D) scale is designed and validated for persons with TBI.⁶⁷

A review of these assessment scales found that all TBI studies that evaluated the psychometric properties of depression scales had methodological issues that limited the evidence upon which definitive conclusions regarding diagnostic validity could be drawn.² Current evidence based on this review suggests that the PHQ-9 (see Table 3) is the best option for depression screening following TBI. The PHQ-9 acceptably rules out the presence of MD (e.g. minimises false-negative screens) and performs better than all other scales at ruling in the presence of depression (e.g. minimising false-positive screens) in TBI and primary care populations.

The BDI-II, CES-D and NFI-D scales had an acceptable ability to rule out the presence of MD as a screening tool. Only the NFI-D and PHQ-9 demonstrated evidence of acceptably ruling out MD in persons with TBI. The HADS and SDS were found to provide high false-negative screen rates and cannot be recommended for use at this time.

Table 3: Recommended Screening Scale for Major Depression – Patient Health Questionnaire-9

Patient Health Questionnaire-9				
Directions: Over the last two weeks, how often have you been bothered by any of the following problems?				
0 = not at all; 1 = several days; 2 = more than half the days; 3 = nearly every day				
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed or hopeless	0	1	2	3
3. Trouble falling or staying asleep	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite, being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3
10. If you have checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?	0	1	2	3

Note: A total score ≥ 10 on items one to nine indicates a positive screen for a major depressive episode.

Table 4: Symptoms that Differentiate Core Features of Major Depression from Apathy

	Depression	Apathy
Common Presentation		
Attitude	Loss of interest, pleasure	Loss of interests, goals
Activity level	Low energy and activity	Lack of energy, initiative, activity
Physiological	Underaroused	Underaroused
Differential Features		
Mood (frequency, situations)	Sad, irritable, frustrated (constant, global)	Flat, lacks emotion (constant, global)
Awareness	Overestimates problems	Unaware of problems
Cognitions	Ruminate on loss, failures	Lack concern about failure
Coping style	Active avoidance, social withdrawal	Dependent, compliant
Most common DSM-IV diagnoses	Major depressive episode Adjustment Disorder with depressed mood	Personality change due to brain injury – apathetic type Cognitive disorder not otherwise specified

DSM-IV = Diagnostic and Statistical Manual of Mental Disorders IV.

Differential Diagnosis of Major Depression in Persons with Traumatic Brain Injury

Challenges with accurately diagnosing MD are not unique to the TBI population. In the general population, questions also arise regarding the most effective and efficient methods for diagnosing MD and how best to distinguish whether symptoms are related to depression versus co-occurring medical or psychiatric illnesses.²²

Table 5: Symptoms that Differentiate Core Features of Major Depression from Anxiety

	Depression	Anxiety
Common Presentation		
Cognitions	Rumination	Rumination
Awareness	Overestimates problems	Overestimates problems
Coping style	Avoidance	Avoidance
Differential Features		
Mood (frequency, situations)	Sad, irritable, frustrated (constant, global)	Worried, distressed (frequent, situational)
Activity level	Low activity	Restless, 'keyed up'
Physiological	Underaroused	Hyperaroused
Attitude	Loss of interest, pleasure	Over-concern
Cognitions	Focuses on loss, failures	Focuses on harm, danger
Most common DSM-IV diagnoses	Major depressive episode Adjustment disorder with/or depressed mood	Generalised anxiety disorder Adjustment disorder with/or anxiety
	Anxiety disorder not otherwise specified (mixed anxiety and depressive disorder)	

DSM-IV = Diagnostic and Statistical Manual of Mental Disorders IV.

Table 6: Symptoms that Differentiate Core Features of Major Depression from Dysregulation

	Depression	Dysregulation
Common Presentation		
Mood (frequency, situations)	Sad, irritable, frustrated (constant, global)	Frustrated, angry, tense (frequent, global)
Cognitions	Rumination	Rumination
Differential Features		
Activity level	Low activity	Impulsive
Attitude	Loss of interest, pleasure	Argumentative
Physiological	Underaroused	Fluctuating arousal
Awareness	Overestimates problems	Underestimates problems
Coping style	Avoidance, social withdrawal	Uncontrolled outbursts
Most common DSM-IV diagnoses	Major depressive episode Adjustment disorder with/ or depressed mood	Personality change due to brain injury – aggressive type Impulse control disorder not otherwise specified

DSM-IV = Diagnostic and Statistical Manual of Mental Disorders IV.

The DSM-IV provides diagnostic considerations to differentiate MD, mood disorder due to a general medical condition, dementia, bipolar episodes, adjustment disorder with depressed mood, bereavement and, finally, depressive disorder (not otherwise specified). Instructions are also provided for classifying MD as either a single episode or recurrent, determining whether the severity is mild, moderate or severe and whether it occurs with or without psychotic features.¹⁴ Differentiation of MD from a mood disorder due to a general medical condition in persons with TBI should include a thorough review of:^{9,14}

- pre-injury diagnoses and functioning;
- sensorimotor disorders;
- medical disorders;

- neuroendocrine dysfunction (notably testosterone deficiency);
- adverse effects of medication;
- sleep disorders; and
- mood and anxiety.

This article supplements DSM-IV information by presenting four psychiatric conditions that are common to TBI and MD and which require careful clinical consideration when making a differential diagnosis of MD: apathy, anxiety, dysregulation and emotional lability.

Major Depression and Apathy

Apathy is a common comorbidity for those who have sustained TBI – particularly early post-injury.^{52,53} It refers to 'primary motivational loss' that includes lack of behavioural activity, cognitive initiative, and emotional engagement in purposeful activity. Primary apathy-related symptoms, including anhedonia and lack of energy, initiative, and social interaction, are often confused with depression.^{68,69,70} A key differential diagnostic consideration is that those with post-TBI apathy do not show cardinal features of depression, such as sadness, irritability, hopelessness and negativistic thinking. Those who are depressed tend to overestimate and ruminate over their problems; whereas persons with apathy are generally unaware of problems and unconcerned about failure. Individuals with post-TBI apathy are dependent and less likely to use approach-oriented and social support-seeking behaviours; whereas those who are depressed actively resist or withdraw and use avoidant coping strategies.^{68,71-73} Persons with apathy may be given a DSM-IV diagnosis of personality change due to brain injury – apathetic type or, in combination with significant memory and other cognitive impairments such as cognitive disorder not otherwise specified.

Major Depression and Anxiety

Anxiety and MD share a number of overlapping symptoms, including rumination, hypervigilance to problems and using avoidance as a coping style. The core presentation of depression tends to be sadness, irritability and frustration or lack of interest or pleasure, while anxiety is primarily marked by worry and distress. Research in the general population provides strong support that anxiety is differentiated from MD by physiological hyperarousal, whereas depression is differentiated by low pleasurable interactions with others.^{46,74-76} Research also suggests that depressive rumination focuses on personal failure and loss in an overovergeneralised sense. Anxious rumination, on the other hand, focuses on harm and danger in specific situations.^{44,74}

Persons with TBI may meet the full criteria for both depression and anxiety disorders. For individuals who present with mixed features that do not meet the full criteria for either disorder, the DSM-IV offers an experimental diagnosis of mixed anxiety and depression disorder based on the well-supported tripartite model of depression and anxiety.⁷⁴⁻⁷⁶ This disorder is recorded as anxiety disorder not otherwise specified.

Major Depression and Dysregulation

Persons with dysregulation problems or MD after TBI may present with irritability, resentment, hostility and aggression. Those with dysregulation are differentiated from MD by impulsivity, physical aggression, argumentativeness, uncontrolled outbursts and a lack of awareness of difficulties. Persons with MD more typically have low activity, avoid and withdraw from social engagement and ruminate about their difficulties.

Individuals with TBI may receive a dual diagnosis of MD and a dysregulation disorder. Careful consideration of pre-injury behaviour is required to differentiate a diagnosis of personality change due to brain injury (aggressive, disinhibited or combined types) from a pre-existing personality or impulse-control disorder.

Major Depression and Lability

Lability refers to sudden and uncontrollable emotional outbursts, such as pathological laughing or crying that may or may not be consistent with the person's overall mood.^{23,77} With lability, crying outbursts occur spontaneously, are triggered internally or by minor external events and resolve quickly. With MD, tearfulness may be more prolonged and congruent with the person's overall mood. People with post-injury pathological crying are typically given a diagnosis of personality change due to brain injury – labile type.

Recommendations to Improve Diagnosis of Major Depression after Traumatic Brain Injury

Clinicians, including physicians and nurses, must frequently make determinations on the presence of MD and the need for treatment in persons with TBI. Based on this empirical review and experience, the following recommendations are provided for detecting and diagnosing MD in persons with TBI:

- As often as possible, practitioners should directly ask questions of the person with TBI, with family members supplying confirmation or raising points for clarification.
- Asking specific, concrete questions of TBI survivors appears to minimise the potential impact of impaired self-awareness and the validity of self-reported depression symptoms.
- Anxiety, aggression, sleep problems, unemployment, lower income levels, substance use, poor social functioning and negative thinking are primary risk factors for developing MD and should trigger practitioner questions regarding mood. Persons with TBI who do

not meet the criteria for MD but evidence risk factors should be educated, along with a family member if available, on the signs of an emerging depressive disorder and should be clinically followed.

- Periodic sadness as a response to impairments and life changes is normal. Persons who are clinically depressed experience depressive symptoms most of the day every day for at least two weeks, with the severity of symptoms impacting social and/or other everyday functioning.
- Self-report depression scales are best used to 'rule out' the presence of depression. For persons who 'screen positive' for depression, a diagnostic interview for MD is essential.
- Research indicates that clinicians are most likely to get the MD diagnosis correct when they ask specific questions about depressed mood, loss of interest, or pleasure and psychosocial functioning.²²
- While individuals with TBI and in the general population experience depression similarly, depressed mood in those with TBI is more frequently evidenced by irritability, frustration, anger, hostility and aggression than sadness and tearfulness.
- Rumination, self-criticism, distress and guilt are a symptom cluster that may best differentiate depressed from non-depressed persons with TBI. Clinicians should carefully assess the presence and extent of negativistic thinking and rumination, which can both clarify the diagnosis and inform the need for referral for therapy.
- Persons with TBI are at a higher risk of suicidality than the general population. A diagnostic MD interview should include questions regarding suicidal thoughts, behaviour and intent.
- Psychiatric conditions commonly associated with TBI, such as apathy, anxiety, emotional lability and dysregulation, require careful clinical consideration when making a differential diagnosis of MD. It is critical for clinicians to have working knowledge of specific symptoms that either overlap or distinguish between disorders.
- For cases with complicated psychiatric and behavioural symptom presentations, referral to a neuropsychologist or neuropsychiatrist who specialises in TBI may be warranted. ■

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