

In Review

Posttraumatic Stress Disorder in Adults: Impact, Comorbidity, Risk Factors, and Treatment

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During the last 30 years, there has been a substantial increase in the study of posttraumatic stress disorder (PTSD). Several high-profile traumatic events, such as the wars in Afghanistan and Iraq, and the terrorist attacks of September 11 on the World Trade Center, have led to a greater public interest in the risk and protective factors for PTSD. In this In Review paper, I discuss some of the important advances in PTSD. The paper provides a concise review of the evolution of PTSD diagnosis in the Diagnostic and Statistical Manual of Mental Disorders, impact of PTSD in the community, an overview of the established risk factors for developing PTSD, and assessment and treatment. Throughout the paper, controversies and clinical implications are discussed.



Trouble de stress post-traumatique chez les adultes : l'impact, comorbidité, facteurs de risque, et traitement

Au cours des 30 dernières années, l'étude du trouble de stress post-traumatique (TSPT) a connu une croissance substantielle. Plusieurs événements traumatiques importants, comme la guerre en Afghanistan et en Irak, et les attaques terroristes du 11 septembre sur le World Trade Center ont suscité un plus grand intérêt du public pour le risque et les facteurs protecteurs du TSPT. Dans cet article d'In Review, je discute des importants progrès réalisés dans le TSPT. L'article offre un bref survol de l'évolution du diagnostic du TSPT dans le Manuel diagnostique et statistique des troubles mentaux, de l'impact du TSPT dans la communauté, d'un aperçu des facteurs de risque établis pour développer un TSPT, et de l'évaluation et du traitement. Les controverses et les implications cliniques sont discutées dans l'article.



Posttraumatic stress disorder is a prevalent mental health problem associated with substantial psychiatric morbidity. Although PTSD had been observed throughout history, PTSD was first introduced in the third edition of the DSM in 1980, and since, there has been a burgeoning amount of literature on this topic. More recently, there has been a rapid expansion in knowledge and interest in understanding risk factors for PTSD and its treatments. Several systematic reviews on the risk factors for development of PTSD have recently been written. In this paper, I will describe the changes in PTSD diagnosis in the DSM, the impact of PTSD in the community, and the most well-established risk and protective factors for PTSD. Throughout the paper, I will highlight clinical implications and controversies.

How Is PTSD Defined in DSM-5?

PTSD first appeared as a diagnosis in the third edition of the DSM.¹ Online eTable 1 describes the changes in criteria

for PTSD during the course of different editions of the DSM.^{2–5} There have been substantial changes in the criteria for PTSD in the DSM-5. PTSD has been removed from the “Anxiety Disorders” chapter and moved to a new chapter called “Trauma- and Stress-Related Disorders.” Although the exact definition of PTSD has varied across the different editions, 4 core features of PTSD have remained stable:

- 1) experiencing or witnessing a stressful event;
- 2) re-experiencing symptoms of the event that include nightmares and (or) flashbacks;
- 3) efforts to avoid situations, places, and people that are reminders of the traumatic event; and
- 4) hyperarousal symptoms, such as irritability, concentration problems, and sleep disturbances.

In DSM-5, an additional criterion of “negative alterations in cognitions and mood”^{5, p 271} has been added. This criterion includes symptoms, such as persistent negative beliefs and expectations about oneself, persistent distorted blame of self

or others, dissociative symptoms, feelings of detachment and constricted affect.

Clinical Pearls

As PTSD is highly comorbid with other mental disorders, aside from trauma exposure, what differentiates PTSD from other disorders is the re-experiencing symptoms (for example, nightmares and flashbacks). Many of the other symptoms of PTSD, such as hyperarousal, avoidance, and numbing, overlap with other mental disorders, such as generalized anxiety disorder, panic disorder, and depression. Thus it is important to delineate whether the person is re-experiencing symptoms in relation to a traumatic event.

It is also important to underscore that people who do not meet the full criteria for PTSD may have significant impairment that requires intervention. Many studies have demonstrated that people with subthreshold PTSD have intermediate levels of impairment between those with full PTSD and no symptoms.^{6,7} Therefore, dimensional approaches to psychopathology are warranted.

Controversies

There has been substantial dispute about how to define traumatic events.⁸ In earlier editions of the DSM, the external stressor was an event distressing to anyone and outside the range of so-called normal human experience. More recent editions of the DSM have included a broader range of traumatic events, with the inclusion of a criterion that the person’s response include intense fear, horror, and helplessness.⁹ In DSM-5, there has been a substantial change to the stressor criterion from previous editions. The stressor criterion requires exposure to “death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence.”^{5, p 271} A person’s response to the stressor, part of DSM-IV criterion for PTSD, has been removed for DSM-5.

Which Traumatic Events Are Most Likely to Be Associated With PTSD?

Epidemiologic studies from around the world have demonstrated that most people in the community have experienced traumatic events that would fulfill stressor criterion for PTSD.¹⁰⁻¹⁴ In men, the following traumatic events are the most common: witnessing another person being killed or badly injured, being in a life-threatening accident, and being threatened with a weapon. Among women, the following traumatic events are the most

Highlights

- Exposure to traumatic events and PTSD are prevalent in society.
- PTSD is associated with comorbidity with mental and physical health problems and elevates the risk for suicidal behaviour.
- Risk and protective factors for development of PTSD can be conceptualized based on pretraumatic, traumatic event, and posttraumatic factors.
- Psychological interventions are much more effective than pharmacologic interventions for reducing PTSD symptoms.
- Although the first-line pharmacological treatment of PTSD is antidepressants, many patients require additional medications to help with insomnia and nightmares (for example, prazosin).

common: experiencing a natural disaster, witnessing another person being killed or badly injured, and being in a life-threatening accident.¹⁰⁻¹⁴

Among men, the 2 types of traumatic events that have been studied extensively are combat exposure and injuries. Rape, childhood sexual abuse, and intimate partner violence have been studied extensively among women. Although the prevalence rates among different traumatized samples range widely, there is a dose–response relation between severity and duration of traumatic event and the risk for development of PTSD. Dohrenwend et al¹⁵ demonstrated that there was a monotonic increase in the risk for development of PTSD in relation to increasing frequency of traumatic event exposure.

Clinical Pearls

People presenting with PTSD symptoms are often exposed to multiple traumatic events. It is important to understand that the traumatic event that triggers PTSD may be an accumulation of multiple exposures to various traumatic events. Understanding the person’s trauma history and the meaning of the traumatic event on their sense of self and future is important in developing a treatment plan.

Controversies

Delayed-onset PTSD is one of the controversial areas in the literature on PTSD and in clinical practice.¹⁶ The usual course of symptoms is for a person to have the greatest number of symptoms immediately after the trauma and for the symptoms to diminish over time. A systematic review on this issue found that 25% of people with PTSD had delayed-onset PTSD (defined as symptoms met criteria for PTSD at least 6 months after the trauma).¹⁶ The authors concluded that people with delayed-onset PTSD often have subthreshold symptoms after the traumatic event and then have an increase in symptoms that rise above threshold over time. In DSM-5, PTSD with “delayed expression”^{5, 272} has been included when the full diagnosis of PTSD is not met until 6 months after the trauma(s).

Abbreviations

CBT	cognitive-behavioural therapy
DSM	Diagnostic and Statistical Manual of Mental Disorders
PTSD	posttraumatic stress disorder
RCT	randomized controlled trial
TBI	traumatic brain injury

Table 2 General population studies describing the prevalence of posttraumatic stress disorders

Study	Location	Sample size, <i>n</i>	Prevalence, %
Kessler et al ¹⁰	United States	8098	Lifetime 7.8
Stein et al ⁶	Winnipeg	1002	One-month Females 6.0 Males 1.5
Creamer et al ²⁰	Australia	10 641	Past-year 1.1
van Ameringen et al ¹⁸	Canada	2991	Lifetime 9.2 One-month 2.4
Kessler et al ¹⁷	United States	9282	Lifetime 6.8 Past-year 3.5
Darves-Bornoz et al ²¹	Europe	8798	Past-year 1.1
Karam ¹³	11 countries	51 295	Past-year 1.1

How Common Is PTSD and What Is the Impact on Society?

A wide range of prevalence rates is found in PTSD across epidemiologic studies. For example, US and Canadian samples have found lifetime PTSD estimates to range between 6% and 9%,^{10,17–19} whereas Australian samples have found lower rates (1% to 2%).²⁰ Table 2 shows the prevalence of PTSD in some of the nationally representative samples.²¹ It remains unknown whether these differences are due to methodological issues in assessment or true differences across samples. The prevalence of PTSD among certain populations exposed to high rates of traumatic events, including physical injury,²² combat exposure,²³ peacekeeping, disaster,²⁴ and rape,²⁵ have demonstrated much higher rates of PTSD than the general population (prevalence estimates range between 10% and 40%).

PTSD has substantial impact on the individual and society. There has been emerging evidence demonstrating that, among the anxiety disorders, PTSD is one of the most strongly associated with suicidal behaviour, even after adjusting for other axes I and II mental disorders.^{26–28} Data from several cross-sectional and longitudinal studies have replicated this finding.^{26–28} People with PTSD also struggle with interpersonal problems, parenting difficulties, and reductions in household income,²⁹ and have several mental and physical health comorbidities.

Comorbidity with mental disorders is common in PTSD. Epidemiologic samples have demonstrated that over 90% of people with PTSD have at least 1 lifetime comorbid mental disorder.¹⁰ Some of the most prevalent comorbid conditions with PTSD are major depressive disorder, alcohol abuse and (or) dependence, and another anxiety disorder. Self-medication of PTSD symptoms with alcohol and illicit drugs has been demonstrated to be associated with comorbid alcohol or drug use disorders.³⁰ Among Axis II disorders, there has been increasing evidence that PTSD is associated with borderline personality disorder³¹

and antisocial personality disorder.³² It is possible that personality styles associated with impulsivity may put the person at risk of exposure to traumatic situations.

Studies in combat veterans^{33,34} and in the general population have shown that PTSD is associated with several physical health conditions. Mild TBI has been shown to be an important risk factor for development of PTSD.³⁵ Our group demonstrated that, even after adjusting for other Axis I disorders, PTSD was associated with bone and joint disease, neurological conditions, cardiovascular conditions, respiratory conditions, and metabolic disease (odds ratios ranging between 1.5 and 3.0).^{36–37} The mechanisms that underlie these associations between PTSD and physical health problems are not well understood. It is possible that PTSD increases the risk of developing physical health problems through sleep disturbances, physical symptoms, obesity,³⁸ or development of comorbid depression and substance use. Conversely, the sudden onset of a serious life-threatening illness, such as myocardial infarction, may trigger PTSD symptoms. Common factors, such as poverty,^{39,40} environment,⁴¹ and genetics,^{42,43} may also play an important role in developing comorbidity.

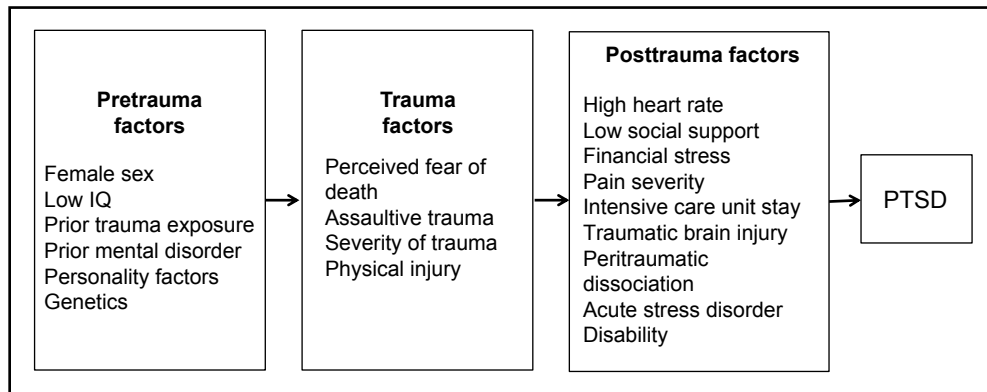
Clinical Pearls

PTSD is common in the community and clinical practice. People often present to physicians and mental health professionals with various physical symptoms, depression, and substance use. It is important to screen for a history of traumatic events and PTSD. In primary care, patients with PTSD often present with headaches, sleep disturbances, and pain. In mental health clinics, people with PTSD often present with depression, substance use, and self-harm.

Controversies

A broad range of prevalence estimates exist for PTSD, depending on the type of sample that has been assessed. For example, North American nationally representative

Figure 1 Empirically-derived risk factors for development of posttraumatic stress disorder (PTSD)



lifetime prevalence rates of PTSD range between 6% and 9%, whereas rates in nationally representative samples of Australians range between 1% and 2%. Similarly, in high-risk groups (for example, exposure to injuries or combat), estimates of PTSD have ranged widely between 1% and 40%.²² It remains unknown whether these differences are due to methodological issues in assessment or true differences across samples.

Suicidal behaviour and comorbid mental and physical disorders are associated with PTSD and traumatic events. It remains unknown whether it is the trauma or the PTSD symptoms that drive the associations with suicidal behaviour. For example, Wilcox et al²⁷ demonstrated that suicidal behaviour was associated with PTSD, but not with exposure to traumatic events. However, other studies have demonstrated that childhood adversities and traumatic events are associated with suicidal behaviour.⁴⁴ Similar issues have been considered in understanding the comorbidity of PTSD with substance use⁴⁵ and physical illness. It seems that both stressful life events and PTSD are independently associated with comorbidity and with suicidal behaviour.

Risk Factors for Development of PTSD

There is a large body of literature on the risk factors for PTSD, and several published reviews of risk factors for PTSD. Two key meta-analyses of PTSD risk factors have been conducted by Brewin et al⁴⁶ and Ozer et al.⁴⁷ Figure 1 shows a summary of the empirically validated risk factors for PTSD that have been demonstrated across various samples.

Several pretrauma risk factors for PTSD have been identified in different populations. Females are at higher risk for PTSD than males. For most traumatic events, women showed greater risk for developing PTSD than men. Age, race, socioeconomic, and marital status have not been strongly associated with risk for PTSD. Cognitive vulnerabilities (for example, low IQ or previous history of head injury) are associated with increased vulnerability for PTSD. Exposure to life stressors (for example, childhood maltreatment or

other adult life stressors) prior to the index trauma (trauma considered by the person as the inciting stressful event) has been associated with an increased risk for PTSD. A pretrauma history of mental disorders, especially mood and anxiety disorders and conduct disorder, is associated with PTSD.^{48–50} Personality factors, such as neuroticism⁵¹ and avoidance coping,^{52,53} have been shown to be associated with increased risk for PTSD, while extraversion has been shown to be protective. There has been an expanding body of literature on the genetic risk factors associated with the development of PTSD. Many genetic markers are currently under investigation, including the serotonin transporter gene,⁵⁴ as well as genes associated with the hypothalamic–pituitary–adrenal axis.⁵⁵

Regarding trauma-related risk factors, many studies have examined the type and severity of trauma as a risk factor for development of PTSD.^{22,56} Most studies have not found a relation between severity of injury^{56–62} and risk for development of PTSD. Intentional or assaultive injury has shown to be a risk factor for onset of PTSD.⁵⁶ There has also been some evidence suggesting that TBI, especially mild TBI, is specifically linked to PTSD.^{58–60} There has been some work suggesting that self-perceived fear of death during the traumatic event has been associated with PTSD.⁶¹ Peritraumatic dissociation has also been shown to be a consistent risk factor for PTSD.⁶²

Numerous posttrauma risk factors for PTSD have been identified. Multiple studies have shown that a high heart rate (>95 bpm) at first presentation to an emergency department is a risk factor for PTSD among people with physical injury.⁶³ Acute high levels of pain have been linked to PTSD among patients with severe physical injury.⁶⁴ There is a substantial body of evidence that PTSD and pain are often comorbid through mutual maintenance. Asmundson et al⁶⁵ suggest that pain is a reminder of the traumatic event that triggers flashbacks. PTSD symptoms, such as insomnia, reduce the threshold for pain.⁶⁶ Further, although length of hospitalization has not been shown to be a strong predictor of mental health problems,⁶⁷ admission to an intensive care unit⁶⁷ has been indicated in one study to be a risk factor

for PTSD. The level of physical disability and lack of ability to return to work have been shown to be associated with increased risk for PTSD.^{68–72} Social supports during the posttrauma period have been shown to be a protective factor in PTSD.⁷¹ Financial stress⁵⁶ and legal involvement owing to trauma have been shown to be important in risk for PTSD.

Clinical Pearls

From a clinical perspective, posttrauma low social supports, and pain are strongly associated with PTSD. Interventions aimed at reducing pain⁷² and improving social supports⁷³ lower the likelihood of PTSD. Understanding the nature of the trauma, appraisals of the risk of death associated with the trauma, and concerns about the meaning of the trauma on a person's future capacity to work and function are important in the clinical assessment of people with PTSD.

Controversies

There is substantial interest and controversy in the ability of DSM-IV acute stress disorder (symptoms of PTSD and dissociation within the first month of the traumatic event) to predict long-term PTSD symptoms.⁷⁴ However, the literature is largely mixed about the clinical utility of this diagnosis in predicting PTSD.^{75,76} Other indicators of adjustment following traumatic experiences may be more powerful predictors of PTSD. Recently, a 10-item scale, the Post-Traumatic Adjustment Scale, has shown good sensitivity and specificity in predicting PTSD and depression in a sample of physically injured patients.⁷⁷ Future work needs to consider whether this measure can be used as a predictor of PTSD in noninjured samples. DSM-5 has made substantial changes to the acute stress disorder criteria. The mandatory need requirement of dissociative symptoms present in DSM-IV has been removed.

Literature Limitations on the Epidemiology and Risk Factors for PTSD Development

Although there has been expansion of our understanding of PTSD during the last 30 years, numerous questions remain about the epidemiology and risk factors for development of PTSD. Basic questions about how common PTSD is remain unanswered. Most of the studies on the prevalence of PTSD have used general population or military veteran samples. The prevalence of PTSD among vulnerable groups, such as children and adolescents,⁷⁸ elderly, ethnic minorities, refugees, and First Nations, Inuit, and Metis populations, has not been well established. Future work needs to address these important gaps. Although, there are numerous well-established, population-level risk factors for development of PTSD, the estimation of risk for PTSD at an individual level is lacking. Future studies should consider developing prediction algorithms for the development of PTSD among certain professions that have a high likelihood of exposure to traumatic events (for example, police officers, military personnel, and rescue workers). Such prediction algorithms have been developed for heart disease (for example, the

Framingham Heart Study^{79,80}) and depression.⁸¹ Further, the longitudinal course of PTSD has not been well established. One epidemiologic study of young adults found that 50% of people with a PTSD diagnosis continued to meet criteria 3 years later.⁸² However, there is a need for longitudinal research on the course and predictors of chronic PTSD.

Clinical Assessment and Treatment of PTSD

There is an enormous body of literature and several practice guidelines on this topic.^{83–88} Here, a general overview of assessment and treatment of PTSD is provided. A careful assessment of the person presenting with PTSD needs to be done in a sensitive manner. People suffering with PTSD symptoms often are reluctant to speak about the details of the traumatic event. The psychiatric assessment should carefully consider the impact of the PTSD symptoms on the person's sleep patterns, relationships, and functioning.^{83–86} A careful assessment of comorbid mental disorders and physical health problems at the time of presentation is required for planning appropriate treatment. The assessment of safety and suicide risk is important in the assessment and ongoing treatment. Inpatient, day program, and outpatient treatment settings should be considered based on the severity and comorbidity of the presentation.^{83–86} To monitor progress in treatment, brief self-report measures of symptoms of PTSD should be routinely used. The 17-item PTSD Checklist,⁸⁹ and the Impact of Events Scale⁹⁰ are 2 commonly used scales for monitoring PTSD symptoms.

Similar to other common mental disorders, the treatment of PTSD usually requires a combination of psychological and pharmacological treatment. Psychological treatments for PTSD are considered first-line treatment for PTSD and have been shown to have larger effect sizes in RCTs than pharmacotherapy.^{83–86} CBT, prolonged exposure, and eye movement desensitization and reprocessing therapy have all had multiple RCTs that have shown large reductions in PTSD symptoms.^{83–86} However, for most patients with PTSD, access to evidence-based therapies is not easy owing to a limited number of trained therapists. There is an urgent need to consider novel ways to make CBT more accessible. Recently, a large US RCT in primary care demonstrated the effectiveness of delivering CBT for anxiety disorders by minimally trained clinicians.⁹¹ The primary care clinicians had minimal training in CBT and delivered CBT with the assistance of a computer program.⁹¹ These types of novel approaches for delivering evidence-based therapies to large populations require replication in Canadian settings.

Pharmacotherapy for PTSD

The pharmacotherapy trials in PTSD have shown smaller effect sizes (0.3 to 0.8) than psychological interventions (>1.0). Selective serotonin reuptake inhibitors, such as fluoxetine, sertraline, and paroxetine, and serotonin norepinephrine reuptake inhibitors, such as venlafaxine, have demonstrated efficacy in reducing PTSD symptoms and are considered first-line medication treatments for PTSD.^{92,93} However, antidepressants alone are not usually

effective in treating the insomnia and nightmares associated with PTSD.⁹³ There is often a need for additional medication that improves sleep. Prazosin, trazodone, zopiclone, and atypical antipsychotics are options in treating insomnia and nightmares associated with PTSD. Several studies have demonstrated the efficacy of prazosin (2 to 20 mg per day), an alpha one-adrenergic blocker in reducing nightmares, and hyperarousal related to PTSD.^{94,95} Although there is less controlled evidence for the use of trazodone and zopiclone, these agents are often used by clinicians in treating PTSD and are recommended in practice guidelines. There are mixed findings on the use of atypical antipsychotics in the treatment of PTSD. The largest RCT in this area did not show beneficial effects of risperidone in treating PTSD.⁹⁶ Also, owing to the metabolic and extrapyramidal side effects associated with atypical antipsychotics, these agents should be used judiciously. If the symptoms of PTSD are refractory to other medications and comorbid borderline personality traits are present (for example, impulsivity and anger), atypical antipsychotics may be considered. Several other agents, such as valproic acid, lithium, and lamotrigine, are considered third-line treatments in PTSD. There is increasing awareness of the strong comorbidity between PTSD and alcohol and drug use disorders.⁸⁷ A recent large RCT demonstrated the effectiveness of naltrexone (an opioid receptor antagonist) in combination with prolonged exposure therapy in reducing PTSD symptoms and alcohol use among patients with PTSD and alcohol dependence.⁹⁷ Readers interested in a more comprehensive review of the treatment of PTSD are referred to the following articles.^{83–87}

Conclusions

In summary, PTSD is a common mental health problem that has a substantial impact on the individual and society. There is increasing evidence that PTSD is associated with suicidal behaviour and comorbidity with mental and physical health conditions. Finally, a large body of literature has distinguished the pretrauma, trauma, and posttrauma risk factors for PTSD. Clinicians and policy makers need to consider these factors in developing optimal interventions and maximizing clinical outcomes.

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