

## GUEST EDITORIAL

# Stress and dementia

The causes of dementia continue to be the subject of huge research efforts, and post-traumatic stress disorder (PTSD) has recently gained attention as a possible contributor. PTSD is considered to be present if the sufferer develops persistent re-experiencing, avoidance and emotional numbing and symptoms of increased arousal not present before the sufferer was exposed to a traumatic incident. PTSD is now classified in DSM-5 as a trauma- and stressor-related disorder, unlike DSM-IV where it was previously categorized as an anxiety disorder, lending it more prominence now as a stress-related condition. However, it remains placed near the anxiety, obsessive compulsive and dissociative disorders in recognition of the close relationship with these other diagnoses. The nosology of PTSD is interesting as the symptoms can vary considerably. Some individuals with PTSD exhibit anxious or fear-based symptoms, while others can experience anhedonic, dysphoric, aggressive or dissociative symptoms (American Psychiatric Association, 2013).

The diagnostic criteria now identify the trigger to PTSD as exposure to actual or threatened death, serious injury or sexual violation resulting from directly experiencing the traumatic event, witnessing the traumatic even in someone else, learning that the traumatic event occurred to a close family member or close friend, or experiencing first-hand repeated or extreme exposure to aversive details of the traumatic event (not through media, pictures, television or movies unless work-related). While this exposure can be once only, it is now appreciated that repeated exposure could be particularly harmful.

PTSD is also associated with impaired cognition in domains of attention, working memory, verbal memory, new learning, and executive functions. The cognitive changes seen in PTSD may in fact be very early markers for dementia developing among PTSD sufferers. PTSD and dementia share common risk factors such as traumatic brain injury, low IQ, limited education, substance abuse, and risk factors for vascular disease. PTSD is regarded as a stress-related condition, and chronic stress could predispose people to dementia through its association with alterations in the hypothalamic-pituitary-adrenal axis function and raised pro-inflammatory cytokines. Reduced cortisol levels and

allosteric down regulation of glucocorticoid system leads to chronic CNS inflammation and increased cognitive decline.

So far there has been no evidence of a causal link between PTSD and dementia but intriguing associations have been reported. Recent studies have shown increased risk of dementia among veterans diagnosed with PTSD (admittedly in studies based on administrative datasets, not epidemiological studies) (Yaffe *et al.*, 2010; Weiner *et al.*, 2013). The risk of dementia was nearly double the risk in non-PTSD affected veterans. These studies have led to increased efforts to understand the mechanisms underlying any links between the two disorders. The topic is of particular interest to the military as Traumatic Brain Injury (TBI) and PTSD are experienced by significant numbers of military personnel in modern warfare (Weiner *et al.*, 2013). However, among civilian populations the most common causes of PTSD are severe traffic and other accidents and sexual abuse. Severe physical trauma to the brain is less likely (although not unknown) in these settings. Increasing numbers are also experiencing PTSD as a result of severe weather events (cyclones, bushfires, famine) and natural (earthquakes, tsunamis) and man-made disasters (civil war).

The link between brain injury and dementia in boxers has been known for some time (dementia pugilistica). It is true that PTSD and TBI can occur together for example as a result of the concussive effects of exposure to Improvised Explosive Devices and it would seem possible that in some cases the putative effects of stress on later cognitive impairment are really the effects of physical brain trauma. However Qureshi *et al.* (2010), in a US male veteran population was able to exclude TBI as a confounder for the association between PTSD and dementia.

We have known about the deleterious effects of too much stress on our health. What is intriguing is that the time span between injury and subsequent cognitive decline can be substantial, with some studies even showing increased risk of cognitive impairment in later life among those experiencing childhood trauma (Burri *et al.*, 2013).

Some people are more resilient in the face of adversity than others, and there may be some common underlying factor such as limited

intellectual capacity or cognitive reserve that means some are particularly vulnerable to PTSD and cognitive impairment. We also know that neuropathology is not the whole story as the most common neurological disorders are influenced by lifestyle choices as much as by genetics. We need to identify those most at risk of PTSD and those with risk factors for development of dementia, and understand how to protect and build resilience among these people, not only in the military but in civilians as well. For those already experiencing dementia, behavioral and psychological symptoms of dementia are amenable to psychosocial interventions, so people with a history of PTSD and physical aggression can be managed through psychosocial interventions as successfully as with psychotropic medication in some instances.

The proposed association between PTSD and dementia is the latest in accumulating evidence that lifestyle and life experiences can lead to cognitive impairment, and conversely, by engaging in more of some lifestyle activities (such as exercise) and less of other activities (such as smoking) we can protect not only our physical health but also mental health across the lifespan (Paulus, 2014). Health promotion campaigns encourage being physically active, and maintaining mental and social stimulation in order to reduce our risk of cognitive decline. We know that stress can be deleterious to health, and the relationship between extreme stress and the volume of brain structures such as hippocampus is being studied. What we need to understand more is how the physical and social environment can ameliorate and prevent further decline in people with symptoms of dementia, and how managing symptoms of PTSD across the lifespan can lead to longer-term benefits

including potential delay in cognitive impairment and even dementia in later life.

### Conflict of interest

None.

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