

Complex Post-Traumatic Stress Disorder and Child Abuse

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Abstract

Child abuse is a global challenge with long-term detrimental effects on children's development, growth, and functions. Several studies have highlighted the impact of childhood exposure to abuse on developing complex interruptions of neurosequential and neurological deficits linked to physical and mental health issues. Complex post-traumatic stress disorder is an interpersonal trauma that starts in early life with profound psychopathological effects. Studies have revealed that the survivors of traumatic events present complicated symptoms such as psychiatric disorders such as antisocial personality disorders, dissociation, substance abuse, sexual disorders, somatoform, eating and affective disorders, and health issues. This review was mostly about how the hypothalamic-pituitary-adrenal axis, the hippocampus, the amygdala, and the prefrontal cortex are involved in the link between child abuse and the development of complex post-traumatic stress disorder.

Keywords: complex post-traumatic stress disorder, abuse, childhood, psychiatric, brain.

Introduction

The recent rise in the interest of several biomedical scientists in trying to evaluate the link between childhood exposure to abuse and the inevitable long-term neuropsychological consequences has been witnessed in recent years across the globe. In the past few years, efforts have been made to try to unravel the rapid progress in the understanding of early exposure to traumatic events leading to the development of subsequent neuropsychological disorders in children. Complex post-traumatic stress disorder was first described as a syndrome experienced by survivors of childhood repeated, continued trauma like anxiety, behavioral impulsivity, aggression, hypervigilance, hyperactivity, apathy, depression, sleep difficulties, tachycardia, or hypertension and involving changes in affect regulation, self-perception, and consciousness relationships with the offender. This symptom involves three main domains, such as re-experience, sense of threat, and avoidance. Padmanabhanunni and Edwards (2012) reported that child abuse has become highly prevalent, particularly in Southern Africa with child rape below the age of 16, which is seen to occur over some time in multiple episodes. The authors reported that many of these child abuses involve substance abuse and complex post-traumatic stress disorder with physiological hyper-arousal, intrusive re-experiencing, and avoidance of reminders of the trauma. Ombok et al. (2013) highlight that after an experience with traumatic events, particularly in children, complex post-traumatic stress disorder can develop. From their results, it was revealed that there is a high prevalence of complex post-traumatic stress disorder among sexually abused children in the sampled population of Kenyatta National Hospital Nairobi-Kenya. Child abuse has been reported to have a significant impact that follows into adulthood. Exposure to childhood trauma affects brain development, neural growth, and multiple deficits in neurobiological function. Some of the pathophysiological effects include increased malleability of neurons, abnormal neurogenesis, dysfunctional synapse development, and impaired neural circuit structure. Cross et al. (2017) reported that during the formative years of childhood

development, overexposure to abuse may cause permanent damage and change to the brain functions, causing alteration in the neural pathways controlling neurocognitive, psychiatric, and emotional and adaptive strand responses or control. According to the World Health Organization (2015), the global occurrence rates of abuse are 9.6% for child abuse, 29.1% for childhood emotional abuse, 22% for childhood physical abuse, 18.4% for childhood emotional neglect, and 16.3% for childhood physical neglect. In New Zealand, studies have revealed that about half of all abused children are under the age of five, which significantly affects their development. Childhood trauma is referred to as the most reliable risk factor for psychopathology. Cozolino (2014) reported that complex post-traumatic stress disorder due to childhood trauma may result in personality deficits owing to maladaptive survival strategies and hyperarousal state, thereby impairing the individual's ability to self-regulate, possibly averting the ability to support vegetative activities required for daily functioning. The formation of negative self-thoughts and concepts like shame, depression, disgust, self-criticism, self-denigration, a distorted perception, suicidality, self-harm, and feelings of guilt is facilitated by early childhood trauma and abuse. This further aggravates social inhibitors and restrictive tendencies like avoidance, social phobia, and social anxiety. Many children have undergone adversities like emotional, behavioral, and cognitive anomalies, and their survival may lead to sadness, anxiety, sensitivity to rejection, abandonment difficulties, insecure relationships, mood disorders, aggression, attachment issues, criminality, trouble trusting, reckless or destructive behavior, sleep difficulties, aggression, hypervigilance, drug addiction, and memory issues. Globally, the prevalence of complex post-traumatic stress disorder in different countries has just begun, but in high-income countries like the UK, USA, Israel, and Germany, the incidence of complex post-traumatic stress disorder ranges from 2–12.7%, whereas in low-income countries like Kenya, Nigeria, and Ghana, it accounted for about 30.6–37.0% (Wolfe, 1999). This review was mostly about how the hypothalamic-pituitary-adrenal axis, the hippocampus, the amygdala, and the prefrontal cortex are involved in the link between child abuse and the development of complex post-traumatic stress disorder.

Complex post-traumatic stress disorder

Cantor and Price (2007) reported that cross-species analysis and evolutionary theory were utilized in their study to elucidate the effects of complex post-traumatic stress disorder and behavioral patterns. In their study, the authors revealed that victims of complex post-traumatic stress disorder may develop Stockholm syndrome (which is a specific behavioral response to domestic abuse and hostage-taking) with a neurobiological basis in the brain. The authors showed that victims of this complex post-traumatic stress disorder had paradoxically positive relationships with their oppressors. These have been shown to help the victims cope and develop more complex survival skills. tenacious symptoms, diffuse, characteristic personality changes, and vulnerability to repeated harm beyond release. The distinguishing feature of complex post-traumatic stress disorder is long-term complex experiences of recurring traumatic events. In early childhood, chronic exposure to persistent and repetitive trauma has been identified to affect three main areas: emotional regulation, self-identity, and relational capabilities. According to the current National Incidence Study of Child Abuse USA report, biological parents are accountable for about 81% of abuse and neglect situations, while caregivers and other relatives are liable for about 16% of these issues (Sedlak et al., 2010). The neurobiology of complex post-traumatic stress disorder is very important for its diagnosis and treatment strategies. Thus, the maladaptive development of various parts of neurons is very vital to our understanding. Therefore, early exposure to abuse has a significant impact on neuronal development like speech, social, emotional, motor function, and behavioral patterns, and the formation of complex post-traumatic stress disorder due to

the developmental stage and malleability of the neurons. So, time and the order in which patterns develop must be taken into account to understand the neurobiology of complex post-traumatic stress disorder.

Synaptogenesis is a micro-neurodevelopmental process that is very sensitive to disrupting or organizing inputs. Studies have shown that several neurotransmitters, neuromodulators, and neurohormone signals control these micro-neurodevelopmental processes, helping to assist neurons in migration, dendritic tree sprouting, differentiation, and the development of synaptic connections with target cells. The monoamine neuron-producing cells such as norepinephrine, serotonin, and dopamine have been targeted for these physiological roles like communication, coordination, and organizing functions during development and adulthood. Many of these neurons are domiciled in the lower part of the brain, hence the upper part relies on the lower part of the brain for information and chemicals to function. Also, the upper area may mimic the lower part in the event of severe dysregulation, inconsistency, and impairment. The monoamine brain systems are vital parts of the brain's stress-control neural networks in which the neuropsychiatric symptoms linked to things like threats, chaos, fear, trauma, and stress are caused by use-dependent changes in the brain. When a child is threatened and the stress response is triggered for an extended period, the brain neural networks thus regulate this adaptive mechanism to undergo a "use-dependent" change. These result in changes or alterations in molecular properties, dendritic trees, synaptic patterns, and microchemical and microstructural elements, thus shifting the sensitivity and activity of the traumatized child's stress response systems' baseline. These events or programming cause a reset in the brain's neural system, so the affected individual frequently feels threatened. et al. (2016) reported that the hypothalamic-pituitary-adrenal axis represents an important area where physiological stress-related reactions occur. Thus, alterations to this axis by childhood trauma can significantly affect stress response and maladaptive developmental functions. The neuroendocrine contributions of the hypothalamic-pituitary-adrenal axis play a major role in the biological response to stress through the release of corticotropin-releasing hormone, adrenocorticotrophic hormone, and cortisol. Complex post-traumatic stress disorder makes the hypothalamic-pituitary-adrenal axis overactive and increases the baseline for cortisol. Studies have revealed that cortisol is a neurotoxic agent in early childhood development and growth, particularly in the brain area where high levels of glucocorticoid receptors are well expressed. The areas of the brain where glucocorticoids are expressed and are damaged due to complex post-traumatic stress disorder are the prefrontal cortex, the limbic system like the amygdala, and the hippocampus. Thus, these areas have been found to play a significant role in the pathogenesis of complex post-traumatic stress disorder, affecting adulthood emotional behaviors like dissociative amnesia, depersonalization-derealization disorders, and dissociative identity disorders, as well as cognitive functioning. The hippocampus deals with learning and memory functions; the prefrontal cortex performs future memory, cognitive regulation, and data attribution; and the amygdala connects new information to prior experiences. If there is a threat, the prefrontal cortex responds to it by sending excitatory neurotransmitters to other brain parts like the locus coeruleus to generate noradrenaline that will activate the limbic system. Continuous secretion of cortisol and stimulation of the hypothalamic-pituitary-adrenal axis in childhood will predispose the individual to several triggers such as events, sights, dates, tastes, thoughts, behaviors, and noises. Reports suggest that these reflexes or reactions may have been useful in coping mechanisms during childhood, but they may also reduce the individual's social and personal lifestyle in adulthood and hinder the developmental processes. The physiological mechanism involved in the structural impairment of the brain in complex post-traumatic stress disorder is through the elevation of cortisol levels, resulting in a reduction in the hippocampus, cerebral and corpus callosum volume, prefrontal cortex deficiency, and learning difficulties. The amygdala is known to

transmit dangerous information or signals to the hypothalamic-pituitary-adrenal axis to cause elevated cortisol levels, suppression of immune response, secretion of catecholamine, inflammatory response, susceptibility to seizures, reduced DNA content, neuronal irritability, suppressed cell growth, and enhanced glucose secretion. This event will cause your heart rate, blood pressure, force, breathing rate, hyperaroused state, and fight-or-flight systems, like arousal, attention, readiness, and alertness, to go up significantly.

Diagnostic considerations

Studies have indicated that the age of onset of complex post-traumatic stress disorder varies, yet individuals affected may not realize they have the trauma until they are reintroduced to events in their past. According to the National Child Traumatic Stress Network, the age of onset is five years, with females expressing a higher level of depression and dissociation in most sexually abused cases compared to males. Complex post-traumatic stress disorder affects the child's neurobiological development through the Limbic-Hypothalamic-Pituitary-Adrenal axis in a developing child. The amygdala plays a major role in the consciousness of threat, while the thalamus and insula help to filter sensory input. If you don't have any control over your ability to analyze and process the information, you might have an emotional breakdown that leaves you feeling angry and hopeless.

Child abuse includes childhood neglect, re-victimization, and sexual abuse.

Alexander et al. (2021) revealed that the occurrence of traumatizing experiences among children has become highly prevalent across the globe, ranging from 10–30%. These traumatizing experiences include emotional abuse, sexual abuse, and neglect, having detrimental effects on the mental health of such an individual, which can lead to different symptoms of complex post-traumatic stress disorder such as re-experiencing, sense of current threat, avoidance, disturbances in self-organization (DSO), negative emotions entailing affective dysregulation, disturbances in relationships, and self-concept. Some literature has listed child abuse to include the following: emotional abuse; physical abuse; sexual abuse; physical neglect; emotional neglect; mental illness in the household; mothers treated violently; household substance abuse; and parental separation. The International Society for the Prevention of Child Abuse and Neglect recently analyzed the definitions of abuse from 58 countries and found some commonalities. Thus, Child abuse or maltreatment constitutes all forms of physical or emotional ill-treatment, sexual abuse, neglect, negligent treatment, or other exploitation resulting in potential harm to the child's health, survival, development, or dignity in the context of a relationship of responsibility, trust, or power. Physical abuse is defined in the context of the caregiver inflicting physical harm on the child, while sexual abuse is a case in which the caregiver uses the child for sexual gratification or pleasure. Emotional abuse is the failure of the caregiver to provide support for the emotional development and mental health of the child, such as restricting a child's movements, ridicule, denigration, threats, intimidation, rejection, hostility, and discrimination. Neglect manifestations include non-compliance or failure to provide appropriate health care needs, inadequate protection, abandonment, food, and educational deprivation, and failing the child to thrive socially, mentally, and physically. Studies have shown that psychological abuse has received less attention globally when compared with sexual or physical abuse. This may be a result of difficulties in the global definition of psychological abuse based on age and cultural practices across different countries. Many things, like the child's age, special traits, family and caregiver traits, sex, family resources or structure, family household or size composition, behavior or personality traits, history of abuse, violence at home, poverty, and social factors (Madu and Peltzer, 2000), have made the child more likely to be abused.

As a result of complex post-traumatic stress disorder, children are neglected, re-victimized, and sexually abused.

Alexander et al. (2021) reported that some foster children who developed complex post-traumatic stress disorder did so as a result of severe maltreatment even though the mechanism of action has not been elucidated. From their analysis, it was revealed that complex post-traumatic stress disorder is central to a child's complex psychopathology, involving some mediating factors. The mechanisms by which complex post-traumatic stress disorder due to child abuse results in negative mental and social well-being include disruption in neurodevelopment, cognitive impairment, development of health risk behaviors, disability, diseases, social problems, and finally early death. Martine and Laetitia (2020) say that abuse victims can develop complex post-traumatic stress disorder as a result of traumatic events that happened when they were young. This can lead to changes in developmental processes like regulation, self-concept, and relationships. Studies have revealed that in revictimization in adulthood, childhood exposure to traumatizing events is a predisposing factor and often at higher risk. Most often, childhood survivors of abuse are re-victimized as adults, reflecting a shift from childhood to adulthood interpersonal trauma psychopathological components. This shows the role of complex post-traumatic stress disorder where victims feel a sense of shame, disgust, and guilt for their childhood abuse. A study was conducted by Haselgruber et al. (2019) who highlighted the samples from Austrian foster children and suggested that children with complex post-traumatic stress disorder have more childhood trauma, dissociation, depression, emotional control difficulties, anxiety, and other physiological impairments. The authors discovered that 31% of these children were either abused by their caregiver or guardian, thus posing a high risk of developing complex post-traumatic stress disorder. Studies have revealed that re-victimization is the exposure of an individual who was earlier victimized during the childhood stage to the same traumatic events (Dias et al., 2017). Matthias et al. (2019) reported that dysfunctional self-organization and post-traumatic stress disorder as a result of complex post-traumatic stress disorder are not yet fully understood but have been linked to the path involving adult interpersonal re-victimization and emotion regulation. The authors reported that in the diagnosis of complex post-traumatic stress disorder, approaches involve focusing on the core symptoms of post-traumatic stress disorder like re-experiencing, sense of ongoing threat and avoidance, dysregulated self-organization, disturbances in relationships, and negative self-concept. Studies have described the different parts of the brain involved in self-other distinction, such as the ventral premotor, superior temporal sulcus, extrastriate body area, and posterior parietal cortex. The neurons in the brain are molded based on experiences occurring throughout the lifespan. At a particular stage, the experience can be either sensitive or critical. The neuronal myelin sheaths in the brain, particularly the corpus callosum, are susceptible to the early impact of exposure to stress hormones, which are thus revealed to suppress the glial cell division necessary for the formation of myelin sheaths. Ieva et al. (2021) revealed that repeated and chronic traumatic events are linked and also pose risk factors for complex post-traumatic stress disorder in adolescents and have negative consequences such as re-victimization, criminal behavior, health problems (depression, dissociation, suicidality, personality disorders, aggression, and substance abuse), and reduced social and economic well-being. Recently, many preclinical studies in animals have been conducted to understand the basic neurophysiological mechanisms between trauma incidents and neurobiological events and behaviors like cognition, aggression, emotion regulation, and impulse control. Also, traumatized children have been shown to suffer from unpredictable emotional reactivity and terror, with intense anxiety resulting in immobilization. Carsten et al. (2009) reported that there is strong evidence between childhood maltreatment and adult somatization. The authors further explained that child neglect and abuse have been strongly associated with somatization

disorders, complex post-traumatic stress disorders, and conversion. Somatization, dissociation, feelings of guilt, social isolation, shame, distrust, hostility, and affect regulation are associated with complex post-traumatic stress disorders. Catarina et al. (2021) reported that the anatomy of the brain is usually altered in childhood traumatic events, resulting in reduced brain volume and adulthood vulnerability to psychiatric disorders like complex post-traumatic stress disorders and depression. Glaus et al. (2022) demonstrated that somatization is an expression of physical symptoms due to psychological stress linked to childhood trauma based on low educational levels, socioeconomic disadvantage, and cultural idioms of distress. Studies have shown that more than 70 % of individuals across the globe experience traumatic events during their lifetime without developing complex posttraumatic stress disorders. Many authors have alluded to the fact that complex posttraumatic stress disorders are caused by childhood maltreatment, resulting in cognitive dysfunction, brain alteration, and neurocognitive alterations. It is thought that having a basic understanding of how neurons and brains work can help treat people and improve their outcomes.

Management approach

There are different approaches and strategies to facilitate recovery and reduce the symptoms of complex post-traumatic stress disorder. Different methods that help people learn more about homeostasis and how the body responds to signals have been successful in showing how trauma is stored in the body.

Yoga

Yoga is a mindfulness-based technique with a bottom-up approach that is currently being utilized to treat complex post-traumatic stress disorder. Yoga uses postures and concentration to manage past experiences through meditation, thereby facilitating safe surrender and absolute relaxation. In yoga, rather than avoiding painful memories, victims think about how to confront them and gain emotional control.

Eye Movement Desensitisation and Reprocessing

This is a bottom-up therapeutic approach for addressing the symptoms caused by complex post-traumatic stress disorder. This approach helps to modify the way traumatic events are stored in the brain through rhythmical stimulation. This process can restructure a victim's self-perception, reduce emotional distress, and reduce psychological arousal.

Cognitive-behavioral therapies

This is very effective in treating complex post-traumatic stress disorder. Through exposure therapy, cognitive processing therapy, prolonged exposure, and cognitive restructuring, this type of psychotherapy can change the way a person thinks.

Use of pharmaceutical measures (antidepressants-Selective serotonin reuptake inhibitors), which are drugs that are utilized for the treatment of depression, anxiety, bulimia nervosa, autism spectrum disorders, eating disorders, menopausal vasomotor symptoms, premenstrual syndrome, myocardial infarction, nociceptive pain, gastrointestinal disorders, and obsessive-compulsive disorder. The mechanism of action of these drugs involves the inhibition of the presynaptic reuptake of serotonin involving serotonin transporters, facilitating a rise in serotonin at the post-synaptic membrane in the serotonergic neuron (Edinoff et al., 2021). Also, traditional psychotherapeutic approaches and personalized medicine are utilized to decrease symptomology.

Conclusion

Complex post-traumatic stress disorder is described as a general term for an individual's reaction to traumatic events that change the ability to respond to stress. This has to do with the comprehensive nature of the traumatic event, the individual's environment, and changes in the neurochemical cascade in the brain. Generally, adults and children are susceptible to alteration in the hypothalamic-pituitary-adrenal axis neurochemical dysregulation due to traumatic events, thereby changing the developmental trajectory by impairing myelination. Having been abused or mistreated as a child has been linked to complex post-traumatic stress disorder and being abused again.

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