

An Analysis of the Etiology of Post-Traumatic Stress Disorder

Kexin Hu

College of Humanities, Wenzhou-Kean University, Wenzhou, 325060, China

Abstract. This paper provided a comprehensive overview of Post-Traumatic Stress Disorder (PTSD), which is a severe mental health condition after experiencing or witnessing a traumatic event. PTSD is marked by persistent, distressing recollections of the traumatic incident, which includes flashbacks, nightmares, and severe anxiety, along with uncontrollable thoughts about the event. This paper discussed the various etiology, manifestation and treatments associated with PTSD. Key symptoms are outlined, aligning with the DSM-5 criteria for diagnosis. Treatment options, including psychotherapy and medication, are explored, alongside the challenges faced in treatment accessibility and effectiveness. Additionally, this paper delves into emerging research in PTSD, exploring new therapeutic approaches and future directions in understanding and managing the disorder. This overview aims to shed light on the complexities of PTSD, advocating for increased awareness and support for those affected by this challenging mental health condition. Future studies should delve into the mechanisms of PTSD and try developing more effective therapies

1 Introduction

PTSD is the most complex and challenging mental disorder people facing in today's society because the etiology of PTSD encompasses a variety of factors, which includes genetic predisposition, environment factors and psychological vulnerabilities. Based on Yehuda et al., being exposed to or experiencing an extremely terrible or traumatic events like war, violence between people, nature disasters and so on can cause an unhealth mental condition, which called Post-Traumatic Stress Disorder (PTSD). The manifestation of PTSD is as diverse as its etiology. Obsessing over previous pain, poor sleep quality, frequent nightmares, heightened attention to potential dangers around the environment, an inability to concentrate, all of these are the symptoms of PTSD [1]. These symptoms can accompany with anxiety, depression, and vigilance, which can influence individual's normal life. So, it is necessary to explore the nuanced understanding of its presentation. The key point for this exploration is to learn the current treatment modalities for PTSD. Treatment approaches range from cognitive behavioral therapies to exposure therapy and pharmacological intervention. These treatments are not useful for all the people, which means it is of great importance for people to find personalized and adaptable treatments plans.

This paper discussed the etiology, symptoms, and treatment of post-traumatic stress disorder. The purpose of this article is to provide a comprehensive overview of PTSD, to highlight the challenges in understanding and treating PTSD, and to highlight the impact of mental health on family treatment.this problem.

2 Methodology

This paper looked for twenty-seven research papers and reviewed them with the aim of answering questions about the etiology, manifestation, and treatment for Post-Traumatic Stress Disorder. The search was conducted in both international electronic databases and Google Scholar by using bilingual keywords around 'etiology' and 'treatment'. And DSM-5 was used to clarify the symptoms of PTSD.

3 Etiology

The etiology of PTSD is understood through a combination of biological, psychology and social factors, which can interact individuals in complex ways to influence the risk and severity of the disorder after being exposed to trauma. Just as mentioned by Keane et al., the etiology of Post-Traumatic Stress Disorder is multifaceted, which can be biological, psychological, and environment factors [2]. And based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), to have a better understanding of the etiology of PTSD, the genetic, neurobiological, psychological, and environmental factors should be considered.

3.1 Biological and genetic factors

Research suggests a genetic predisposition to PTSD, which showed that people with a family history of PTSD or other stress-related disorders may be have high

Corresponding author: 1162442@wku.edu.cn

possibility of developing PTSD [3]. This is similar with the research conducted by Keane et al., which indicated that a familial history of psychological disorders may increase the risks of PTSD [2]. Also Stein et al. focusing on twins showing a slight genetic predisposition to PTSD risk, with estimates between 30% and 70% [3]. In addition, some genetic changes, such as genetic changes that affect the activity of the hypothalamic-pituitary-adrenal axis (HPA) studied by Yehuda, Halligan, and Grossman [4] and stress-induced neurotransmitters, such as serotonin and dopamine, cause PTSD related to. [5].

From biological aspects, biological predispositions play an important role. PTSD is related to genetic predispositions and neurobiological changes, especially the part of amygdala, hippocampus, and prefrontal cortex, which are connected with an individual's memory [2].

3.2 Neurobiological factors

Research within the field of neurobiology has significantly increased the understanding of the structural and functional alterations in the brain associated with Post-Traumatic Stress Disorder (PTSD). Central to this body of research are the amygdala, hippocampus, and prefrontal cortex, each of them respectively plays a pivotal role in fear conditioning, memory formation, and executive function [6,7]. Based on Rauch et al., individuals with PTSD often demonstrate pronounced activity in the amygdala when exposed to trauma-related stimuli, which is an indication of an amplified fear response [8]. This heightened amygdala activity is a cornerstone of the neurobiological framework of PTSD, as it directly correlates with the intensity of fear and anxiety responses to traumatic cues.

Conversely, Bremner and Shin et al. found that among the PTSD patients, their prefrontal, a region integral to emotion regulation and the suppression of fear responses were observed being diminished functionality [9,10]. This reduction in prefrontal cortex activity may decrease people's ability of regulating emotions effectively, keeping the cycle of fear and anxiety characteristic of PTSD. Additionally, changes in the hippocampus, particularly reduced volume, have been documented in individuals with PTSD [11]. The hippocampus's role in memory consolidation is crucial for contextualizing and processing traumatic memories, thus, its compromise can significantly impair the capacity to integrate and make sense of past traumatic events.

To clarify the neurobiological basis of PTSD, the methods used in the research conducted by Etkin and Wager primarily included neuroimaging techniques, such as functional magnetic resonance imaging (fMRI) and positron emission tomography (PET) [12]. These techniques can directly observe the brain activity and structural changes in response to trauma-related stimuli, this offers invaluable insights into the neurobiological mechanisms that contribute to PTSD.

To summarize, the increased researches for PTSD in the aspect of neurobiological has significantly enhanced

the understanding of the disorder, highlighting critical changes in brain structure and function. Although the methodological challenges and limitations, this research underscores the importance of the amygdala, hippocampus, and prefrontal cortex in the pathophysiology of PTSD, offering promising avenues for targeted therapeutic interventions.

3.3 Psychological factors

From psychological aspects, which plays a significant role in the beginning and persistence of the PTSD is the psychological aftermath of trauma exposure [2]. Keane et al. suggested that during and after the traumatic events, people's cognitive and emotional reactions such as negative mood, helplessness, and fear can increase the possibility of diagnosing PTSD [2].

The psychological landscape of Post-Traumatic Stress Disorder (PTSD) research is rich with theories that aim to unpack the complex mechanisms underpinning the disorder. Among these, cognitive theory offers a compelling lens, suggesting that PTSD emanates from the negative appraisals of the trauma and its sequelae, which foster a pervasive sense of current threat [13]. Empirical evidence supporting this theory includes studies by Ehlers, Clark, Hackmann, McManus, and Fennell, who found that altering maladaptive appraisals in PTSD patients led to significant symptom reduction, illustrating the impact of cognitive restructuring on the disorder's persistence [14]. This aligns with the notion that distorted perceptions, such as viewing the world as excessively dangerous and oneself as utterly powerless, solidify the disorder within the psyche by preventing the integration of traumatic experiences into one's existing mental framework, thus perpetuating psychological distress and hypervigilance.

Parallel to cognitive theory, the emotional processing theory offers a different perspective, positing that the crux of PTSD lies in the incomplete processing of traumatic emotions [15]. This suggests that avoidance behaviors, which prevent engagement with traumatic emotions, play a crucial role in the persistence of PTSD symptoms.

The methodologies employed to explore these theories largely involve clinical and observational studies, as well as cognitive-behavioral experiments that assess how individuals with PTSD perceive, remember, and react to trauma-related stimuli compared to controls [16]. Psychological assessments and self-report measures, alongside physiological markers of stress and fear responses, have been instrumental in elucidating the cognitive and emotional dimensions of PTSD.

However, these approaches have some limitations. A significant challenge is the subjective nature of psychological assessments. This can lead to bias and variability in the interpretation of results [17]. Furthermore, the complexity of PTSD, a disorder influenced by a network of genetic, biological, environmental and psychological factors, means that it is difficult to disentangle the effects of cognitive processes. . And emotions can be difficult. Furthermore,

this is because the theories themselves sometimes overlap in predictions. Therefore, it is difficult to clearly test one theory against another. Without a comprehensive and multifaceted research plan.

Furthermore, the reliance on retrospective self-reports for understanding the cognitive and emotional responses to trauma can be problematic due to memory distortions and the influence of current mood and mental state on recall [18]. This highlights a critical need for longitudinal studies that can track cognitive and emotional responses from pre- to post-trauma, providing a more nuanced and dynamic understanding of PTSD's development.

In summary, although theories of cognitive and emotional processing have greatly enhanced the knowledge of PTSD, the investigation into these theories highlights the intricacies involved in diagnosing and managing this disorder. Future studies should focus on merging these psychological insights with neurobiological data, providing a comprehensive understanding of PTSD that can inform the creation of specific and successful treatments.

3.4 Environmental factors

Environmental and social factors are considered central to the development and persistence of post-traumatic stress disorder (PTSD) and underpin the complexity of PTSD. Research has focused on the characteristics of the traumatic event itself—particularly its severity; Duration and proximity to the event and victim are strong predictors of PTSD risk [18]. For example, people who have been directly exposed to chronic life-threatening trauma or traumatic events are more likely to develop PTSD symptoms than people with mild or indirect trauma.

The role of social support after post-trauma is another critical factor influencing PTSD outcomes. The absence of a supportive social network post-trauma can significantly exacerbate PTSD symptoms, while the presence of strong, positive social connections can serve as a protective buffer, mitigating the risk of developing the disorder [19]. This dichotomy highlights the therapeutic potential of social support systems in the aftermath of trauma, emphasizing the need for integrated social and psychological interventions in PTSD treatment protocols.

Moreover, experiences of childhood adversity, including abuse, neglect, and initial encounters with violence, are recognized as major contributors to the likelihood of developing PTSD in adulthood. Traumatic events in early life can modify how individuals respond to stress and cope with it, establishing a foundation for increased susceptibility to PTSD after experiencing further trauma as adults [20]. The link between stress in early life and the subsequent risk of PTSD emphasizes the necessity for early intervention and prevention efforts aimed at young populations considered to be at risk.

Research methods used to assess the effects of environmental and social elements on PTSD primarily

involve longitudinal cohort studies. These studies allow for the examination of how trauma exposure, social support, and childhood adversity are temporally related to the onset of PTSD, offering strong evidence of the crucial influence of environmental and social environments on PTSD vulnerability and resilience.

To sum up, existing research strongly highlights the importance of environmental and social influences in the genesis and maintenance of PTSD. It points out the necessity for holistic strategies in preventing and treating PTSD, which should encompass the psychological, biological, and notably, the environmental and social dimensions of an individual's life. Future investigations should concentrate on deciphering the pathways through which environmental and social factors affect PTSD risk and resilience, thereby facilitating the creation of more precise and effective therapeutic measures.

3.5 Stress and trauma exposure

The risk of developing PTSD is also influenced by the nature of the traumatic event itself. Not all individuals exposed to trauma develop PTSD, it is the subjective perception of the event as threatening life or integrity that is critical. The risk is higher for traumas involving interpersonal violence, such as assault or military combat, compared to other types of trauma like accidents or natural disasters. Repeated or prolonged exposure to traumatic events, as seen in first responders or military personnel, also increases the risk.

The susceptibility to Post-Traumatic Stress Disorder (PTSD) is intricately linked to the intrinsic characteristics of the traumatic event itself, highlighting a nuanced understanding of trauma and its psychological aftermath. Notably, it is not merely exposure to trauma that predicates the onset of PTSD, but rather the individual's subjective perception of the event as being profoundly threatening to their life or personal integrity [19]. This distinction underscores the importance of subjective experience in the development of PTSD, indicating that the psychological impact of trauma is deeply personal and varies significantly from one individual to another.

Studies indicate that the type of traumatic event significantly influences the likelihood of developing PTSD. Incidents involving interpersonal violence, such as assault, sexual violence, or military conflict, carry a greater risk of leading to PTSD than non-interpersonal events like accidents or natural disasters [21]. This difference implies that traumas resulting from intentional harm or threats by others have a distinct psychological impact, perhaps due to the undermining of basic beliefs in safety and trust.

Additionally, the risk of PTSD increases with continuous or extended exposure to traumatic events, a circumstance frequently encountered by first responders, military members, and people in conflict areas [22]. This effect of cumulative exposure highlights the erosion of psychological resilience and the growing challenge of mentally detaching from the ongoing threat of trauma.

Research into how trauma characteristics affect PTSD risk has utilized longitudinal studies, cross-sectional surveys, and clinical interviews. These methods have been crucial in pinpointing and measuring the link between various trauma types and the probability of developing PTSD. Longitudinal studies, for instance, which follow individuals over a period, provide valuable data on the progression of PTSD symptoms after exposure to diverse forms of trauma.

To conclude, the relationship between the nature of the traumatic event and the risk of developing PTSD highlights the critical role of individual perception and the specific characteristics of the trauma. While interpersonal violence and repeated exposure to traumatic events are identified as high-risk factors, the subjective experience of the trauma remains a key determinant in the development of PTSD. Future research should aim to further disentangle the complex interplay between trauma characteristics, individual perceptions, and resilience factors to enhance the understanding and treatment of PTSD.

3.6 Protective factors

Just as there are factors that increase the risk of PTSD, certain protective factors may mitigate the impact of trauma and reduce the likelihood of developing PTSD. These include positive coping strategies, resilience, a sense of coherence or meaning in life, and positive social support. Psychological interventions aimed at enhancing these protective factors may be effective in preventing the onset of PTSD symptoms after trauma.

Positive coping strategies, which include problem-solving skills, emotional regulation, and the use of adaptive coping mechanisms, are crucial in managing the stress and emotional turmoil following a traumatic event [23]. Resilience, or the ability to bounce back from adversity, plays a pivotal role in moderating the response to trauma and reducing the risk of PTSD by fostering a strong sense of self-efficacy and an optimistic outlook on life [24].

A sense of coherence or finding meaning in life, even in the face of trauma, can provide individuals with a conceptual framework to understand and integrate their experiences, offering a pathway to psychological healing and growth [25]. Positive social support, characterized by meaningful connections with family, friends, and community, has been consistently shown to provide emotional comfort, practical assistance, and a buffer against the isolating effects of trauma, thereby reducing the severity of PTSD symptoms [18].

The exploration of protective factors against psychological stressors has increasingly employed a mix of quantitative and qualitative research methodologies, including longitudinal studies, randomized controlled trials (RCTs) of psychological interventions, and narrative interviews. These methods have shed light on the mechanisms through which protective factors such as positive coping strategies, resilience, a sense of coherence or meaning in life, and positive social support

exert their beneficial effects. For instance, cognitive-behavioral therapy (CBT) has been shown to effectively enhance positive coping strategies and resilience by teaching individuals to identify and challenge maladaptive thoughts, thereby promoting healthier ways of coping with stress [26]. Additionally, social support interventions, which can range from community support groups to structured peer-support programs, have been documented to bolster positive social support, significantly impacting mental health outcomes [27]. These targeted interventions highlight the potential for enhancing protective psychological factors through specific, evidence-based strategies.

However, the research on protective factors and their role in preventing PTSD is not without challenges. One limitation is the inherent difficulty in isolating the effects of individual protective factors due to their interrelated nature. Additionally, the effectiveness of psychological interventions in enhancing these protective factors can vary widely among individuals, influenced by factors such as the nature of the trauma, the individual's previous mental health history, and cultural context.

Research into the protective factors that mitigate the risk of Post-Traumatic Stress Disorder (PTSD) faces notable challenges, particularly in delineating the distinct effects of each factor due to their interconnectedness. The efficacy of psychological interventions aimed at bolstering these protective elements also demonstrates considerable variability across individuals. This variability can be attributed to a range of factors, including the specific nature of the trauma experienced, the individual's mental health history prior to the trauma, and the cultural context within which they operate. These complexities underscore the necessity for future research to adopt a more nuanced approach. Future studies could benefit from examining the influence of protective factors on PTSD outcomes within the context of specific types of trauma or under conditions where other variables are tightly controlled. Such research could elucidate the differential impact of protective factors across diverse trauma scenarios and individual backgrounds, offering tailored insights into intervention strategies. This direction promises to refine the understanding of how protective factors function and how they can be most effectively leveraged in PTSD prevention and treatment, taking into account the individual's unique circumstances and the specificities of their traumatic experiences.

In summary, understanding the protective factors that mitigate the impact of trauma and reduce the likelihood of developing PTSD is a vital component of trauma research. This body of work highlights the potential of psychological interventions aimed at bolstering resilience, coping strategies, a sense of coherence, and social support as preventative measures against PTSD. Future research should continue to refine the understanding of these protective factors and develop interventions that are tailored to the needs of diverse

populations, with the goal of enhancing resilience and reducing the burden of PTSD.

4 Limitations

Investigating Post-Traumatic Stress Disorder (PTSD) across different aspects—its causes, symptoms, and treatments—reveals significant challenges. One major issue is the complexity of distinguishing the impact of specific factors, as they are often interconnected, which muddles the understanding of their individual contributions to the onset and maintenance of PTSD. Moreover, the success of psychological treatments for PTSD can greatly differ among individuals, affected by various elements like the type of traumatic experience, the person's prior mental health status, and their cultural background. This diversity highlights the importance of creating personalized and flexible treatment approaches but also complicates the task of applying research conclusions broadly across different groups.

Methodological limitations also emerge, particularly in neurobiological and psychological research, where the reliance on neuroimaging studies and subjective psychological assessments introduces challenges related to interpretation and the potential for bias. The subjective nature of psychological assessments and the retrospective reliance on self-reports for understanding cognitive and emotional responses to trauma further complicate data accuracy due to potential memory distortions. Moreover, the cross-sectional nature of many studies limits the ability to infer causality or the directionality of observed changes, highlighting the critical need for longitudinal studies that can elucidate the temporal relationship between trauma exposure, neurobiological alterations, and the development of PTSD.

To encapsulate, the intricacies of PTSD as a condition stem from an interplay of genetic, biological, environmental, and psychological elements. Future studies should strive to overcome these complexities with refined and comprehensive research designs, incorporating varied methodologies for a more complete perspective on PTSD. Such an approach will improve the precision of research outcomes and facilitate the creation of targeted, effective interventions that cater to the specific requirements of those impacted by PTSD.

5 Conclusion

To make a summary, the etiology of PTSD has lots of different factors, which involves genetic predispositions, neurobiological changes, psychological processes, and environmental influences. This complexity emphasizes the need for a comprehensive approach to prevention, assessment, and treatment. Understanding the causes and mechanisms of PTSD is important for developing effective interventions and support systems for those affected by this challenging disorder. As research advances, it is hoped that more precise and personalized

treatments can be developed to help individuals recover from the profound impact of trauma.

References

1. R. Yehuda, C. W. Hoge, A. C. Mcfarlane, E. Vermetten, R. A. Lanius, C. M., Nievergelt, S. E. Hobfoll, K. C. Koenen, T. C. Neylan, S. E. Hyman. *Nat Rev Dis Primers*. **1**, 1-22, (2015)
2. T. M. Keane, A. D. Marshall, & C. T. Taft. *Annu Rev Clin Psycho*. **2**, 161-197 (2006)
3. M. B. Stein, K. L. Jang, S. Taylor, P. A. Vernon, & W. J. Livesley. *Am J Psychiat*. **159**, 1675-1681, (2002)
4. R. Yehuda, S. L. Halligan, R. Grossman. *Dev Psychopathol*. **13**, 733-75, (2001)
5. I. T. Kolassa, V. Ertl, C. Eckart, F. Glöckner, S. Kolassa, A. Papassotiropoulos, D. J. F. de Quervain, & T. Elbert. *J Clin Psychiat*. **71**, 543-547, (2010)
6. L. M. Shin, & I. Liberzon. *Neuropsychopharmacol*. **35**, 169-191, (2010)
7. S. K. Pitman, A. M. Rasmusson, K. C. Koenen, L. M. Shin, S. P. Orr, M. W. Gilbertson, ... & I. Liberzon. *Neuroscience*. **13**. 769-787 (2012)
8. S. L. Rauch, L. M. Shin, & E. A. Phelps. *Biol Psychiat*. **60**, 376-382, (2006)
9. J. D. Bremner. *Neuroimag Clin N Am*. **17**, 523-538, (2007)
10. L. M. Shin, C. I. Wright, P. A. Cannistraro, M. M. Wedig, K. McMullin, B. Martis, ... & S. L. Rauch. *Arch Gen Psychiat*. **62**, 273-281, (2005)
11. J. D. Bremner, B. Elzinga, C. Schmahl, & E. Vermetten. *Prog Brain Res*. **167**, 171-186, (2007)
12. A. Etkin, & T. D. Wager. *Am J Psychiat*. **164**, 1476-1488, (2007)
13. A. Ehlers, & D. M. Clark. *Research and Therapy*. **38**, 319-345, (2000)
14. A. Ehlers, D. M. Clark, A. Hackmann, F. McManus, & M. Fennell. *Behav Res Ther*. **43**, 413-431, (2005)
15. E. B. Foa, & M. J. Kozak. *Psychol Bull*. **99**, 20-35, (1986)
16. M. Creamer, P. Burgess, & P. Pattison. *J Abnorm Psychol*. **110**, 454-463, (2001)
17. B. O. Olatunji, J. M. Cisler, & D. F. Tolin. *Clin Psychol Rev*. **27**, 572-581, (2007)
18. C. R. Brewin, B. Andrews, & J. D. Valentine. *J Consult Clin Psych*. **68**, 748-766, (2000)
19. E. J. Ozer, S. R. Best, T. L. Lipsey, & D. S. Weiss. *Psychol Bull*. **129**, 52-73, (2003)
20. A. Danese, & B. S. McEwen. *Physiol Behav*. **106**, 29-39, (2012)
21. P. A. Resick, C. M. Monson, & K. M. Chard. *Cognitive processing therapy for PTSD: A comprehensive manual*. New York City: Guilford Publications

22. R. H. Pietrzak, R. B. Goldstein, S. M. Southwick, & B. F. Grant. *J Anxiety Disord.* **25**, 456-465, (2011)
23. G. A. Bonanno, M. Westphal, & A. D. Mancini. *Annu Rev Clin Psycho.* **7**, 511-535, (2011)
24. S. M. Southwick, G. A. Bonanno, A. S. Masten, C. Panter-Brick, & R. Yehuda. *Eur J Psychotraumatol.* **5**, 25338, (2014)
25. R.G.Tedeschi., & L.G. Calhoun. *Psychol Inq.* **15**, 1-18, (2004).
26. D. Meichenbaum. *The Evo Cogn Behav Ther.* 101-104 (2017)
27. J. Holt-Lunstad, T. B. Smith, & J. B. Layton. *PLoS Med.* **7**, (2010)