

Description of Post-Traumatic Stress Disorder in Tsunami Natural Disaster Victims in Asia: A Scoping Review

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ABSTRACT

Objective: This study aims to provide an in-depth understanding of the psychological impact of tsunamis, particularly focusing on Post-Traumatic Stress Disorder (PTSD), and to assist in developing effective interventions to support mental recovery for disaster victims. **Method:** A scoping review methodology was employed to examine the literature on PTSD caused by tsunamis in Asia. Relevant studies were identified through the Web of Science database using the keywords "PTSD AND Tsunami" and "Post Traumatic Stress Disorder." **Results:** The synthesis revealed the prevalence and symptoms of PTSD among tsunami survivors, as well as the risk and protective factors influencing its development. Key risk factors included the loss of family members or close friends, feelings of helplessness during the disaster, and the quality of post-disaster social support. **Novelty:** This article highlights the specific psychological challenges faced by tsunami survivors in Asia, particularly following catastrophic events such as the 2004 Indian Ocean tsunami. It emphasizes the need for targeted mental health interventions and contributes valuable insights for enhancing recovery efforts in disaster-prone regions.

INTRODUCTION

Post-Traumatic Stress Disorder (PTSD) is a serious psychological disorder that can develop after someone experiences or witnesses a traumatic event. One of the significant and widely impactful traumatic events is a natural disaster, such as a tsunami. In recent decades, Asia has experienced a significant number of devastating tsunami disasters. One of the most notable was the 2004 Indian Ocean tsunami, which resulted in the deaths of hundreds of thousands of people and left many others with deep trauma [1]. Research shows that victims of natural disasters, including tsunamis, have a high risk of developing PTSD [2]. This condition can affect an individual's quality of life, impact social and work functions, and have long-term effects on physical and mental health [3]. PTSD is a mental disorder characterized by symptoms such as flashbacks, nightmares, severe anxiety, and uncontrollable thoughts and feelings about the event. This definition is important to provide a clear understanding of the condition that will be further discussed in the context of natural disasters. It is urgent to explore various factors that contribute to the development of PTSD in tsunami victims in Asia. These factors include the intensity and duration of exposure to the disaster, the social support available after the disaster, and the mental and physical health conditions of the victims before the disaster occurred [4].

After experiencing a natural disaster such as a tsunami, many factors can influence a person's risk of developing PTSD. One significant factor is the individual's experience

during the disaster itself. A study by Kessler et al, shows that victims who experienced the loss of family members or close friends during the tsunami tend to have a higher risk of developing PTSD [5]. This underscores the importance of personalization factors and the individual impact of the loss experienced in assessing the risk of post-disaster PTSD. Individuals who feel they have little control or feel trapped in a threatening situation during the tsunami tend to experience higher levels of PTSD [6]. This factor demonstrates the complexity of the interaction between psychological and situational factors in determining an individual's trauma response. Social support also plays a crucial role in influencing post-disaster PTSD outcomes. Research by Ozer et al, found that the level and quality of social support received by victims after the tsunami can significantly moderate the severity of PTSD symptoms experienced [7]. This emphasizes the importance of effective social intervention strategies in supporting the mental recovery of disaster victims.

RESEARCH METHOD

This research uses the scoping review method to explore the depiction of Post-Traumatic Stress Disorder (PTSD) as an impact of the tsunami natural disaster in the Asian region. The scoping review method was chosen because it allows researchers to systematically identify, review, and synthesize literature relevant to this topic. The scoping review process begins with the identification of the research question, namely "What do you know about PTSD as a consequence of tsunami natural disasters in the Asia region?". This question serves as a guide in determining the keywords and search strategies used during the literature search process. The researcher used the Web of Science database to search for relevant literature. The keywords used in this search are "PTSD AND Tsunami" and "Post Traumatic Stress Disorder."

This search is designed to find studies that specifically examine PTSD as an impact of the tsunami natural disaster in the Asian region. The literature found through this search is screened based on titles and abstracts to ensure relevance to the research topic. Relevant studies were then selected based on inclusion criteria, which included studies focusing on PTSD as an impact of tsunami natural disasters in the Asian region, as well as studies published in English or Indonesian. Data from the selected studies were extracted to obtain information about the research design, the population studied, PTSD measurement methods, and the main findings. The results of this scoping review are synthesized to provide a comprehensive overview of PTSD as an impact of tsunami natural disasters in Asia. This synthesis includes the prevalence and symptoms of PTSD reported in these studies, as well as the risk and protective factors contributing to the development of PTSD. This analysis is expected to provide deeper insights into how tsunami natural disasters affect the mental health of the impacted individuals, as well as assist in the development of more effective interventions to support their recovery.

RESULTS AND DISCUSSION

Out of a total of 26 related articles that were screened, eight articles were eliminated in the first filter stage, none were eliminated in the second filter stage, and nine were eliminated in the third filter stage, leaving nine relevant articles that can be used as sources for the scoping review.

Table 1. Summary of research articles on natural disasters and Post-Traumatic Stress Disorder (PTSD).

Author	Title	Article Type	Population
Inoue, Y., Stickley, A., Yazawa, A., Aida, J., Kawachi, I., Kondo, K., & Fujiwara, T. (2017) [8]	Adverse childhood experiences, exposure to a natural disaster and posttraumatic stress disorder among survivors of the 2011 Great East Japan earthquake and tsunami	Epidemiological study with survey design	580 parents aged 65 years or older living in Iwanuma City, Miyagi Prefecture, Japan
Exenberger, S., Riedl, D., Rangaramanujam, K., Amirtharaj, V., & Juen, F. (2019) [9]	A cross-sectional study of mother-child agreement on PTSD symptoms in a south Indian post-tsunami sample	Epidemiological study with survey design	A total of 164 South Indian children aged between 8 and 17 years participated in this study
Yazawa, A., Shiba, K., Hikichi, H., Okuzono, S., Aida, J., Kondo, K., Sasaki, S., & Kawachi, I. (2023) [10]	Post-Disaster Mental Health and Dietary Patterns among Older Survivors of an Earthquake and Tsunami	Cohort study	1,375 survivors of the 2011 Great East Japan Earthquake and Tsunami, aged between 65–89 years
Yazawa, A., Koichiro, S., Okuzono, S.,	Bidirectional associations between post-	Cohort study	Elderly survivors of the 2011 Great East Japan

Hikichi, H., & Kawachi, I. (2023) [11]	traumatic stress symptoms and sleep quality among older survivors of the 2011 Great East Japan Earthquake and Tsunami		Earthquake and Tsunami
Kino, S., Aida, J., & Kondo, S. (2020) [12]	Long-term Trends in Mental Health Disorders After the 2011 Great East Japan Earthquake and Tsunami	Quantitative cohort study	Elderly survivors of the 2011 Great East Japan Earthquake and Tsunami
Heir, T., Hussain, A., Kristensen, P., & Weisæth, L. (2021) [13]	Delayed post-traumatic stress and memory inflation of life-threatening events following a natural disaster: prospective study	Quantitative questionnaire	Norwegian tourists over 18 years old who visited Khao Lak, Phi Phi Island, Krabi Province, or Phuket in Thailand during the 2004 Indian Ocean tsunami
Frankenberg, E., Sumantri, C., & Thomas, D. (2020) [14]	Effects of a natural disaster on mortality risks over the longer term	Mixed-methods	Data from the 2004 Indian Ocean tsunami victims in Indonesia and interviews with survivors aged 35 years and older at the time of the event
Yazawa, A., Aida, J., Kondo, K., & Kawachi, I. (2022) [15]	Gender differences in risk of posttraumatic stress symptoms after disaster	Cohort study	Elderly survivors of the 2011 Great East Japan Earthquake and

	among older people: Differential exposure or differential vulnerability?		Tsunami
Harigane, M., Nakajima, S., Takebayashi, Y., Maeda, M., Nakano, H., Yasumura, S., Yabe, H., Ohira, T., & Kamiya, K. (2022) [16]	Posttraumatic stress response following the loss of significant close others in the Great East Japan Earthquake: Fukushima Health Management Survey	Quantitative questionnaire	73,569 participants from areas in Japan: Hirono, Naraha, Tomioka, Kawauchi, Okuma, Futaba, Namie, Katsurao, Iitate, Minamisoma, Tamura, and Kawatama

The results of the research related to the depiction of PTSD from those articles were then summarized as follows.

Table 2. Overview of PTSD findings in studies related to natural disasters.

Article	Overview of PTSD
Adverse childhood experiences, exposure to a natural disaster and posttraumatic stress disorder among survivors of the 2011 Great East Japan earthquake and tsunami	There is a significant correlation between adverse childhood experiences (ACEs) and the risk of PTSD among survivors of natural disasters. Individuals with more traumatic childhood events are likely to exhibit more severe PTSD symptoms after experiencing the earthquake and tsunami. Furthermore, exposure levels during the disaster, such as home destruction and loss of loved ones, contribute to PTSD severity. These findings support the idea that childhood trauma exacerbates the negative impact of natural disasters on mental health.
A cross-sectional study of mother-child	The level of agreement between mothers

agreement on PTSD symptoms in a south Indian post-tsunami sample

and children regarding PTSD symptoms after the tsunami in South India is low and not influenced by the child's age, gender, or living situation. PTSD symptoms in mothers significantly affect the assessment of children's symptoms; if mothers experience significant PTSD symptoms, discrepancies in assessing children's PTSD symptoms are more likely. Continuous evaluation of maternal PTSD symptoms is crucial, as maternal responses to disasters impact how children's symptoms are assessed.

Post-Disaster Mental Health and Dietary Patterns among Older Survivors of an Earthquake and Tsunami

Individuals with PTSD tend to have unhealthy dietary patterns, particularly increased consumption of carbohydrate-rich foods and alcoholic beverages. The findings indicate that PTSD influences dietary habits, raising the risk of cardiovascular and metabolic diseases.

Bidirectional associations between post-traumatic stress symptoms and sleep quality among older survivors of the 2011 Great East Japan Earthquake and Tsunami

There is a bidirectional relationship between post-traumatic stress symptoms and sleep quality among older survivors of the 2011 Great East Japan Earthquake and Tsunami. Those with sleep problems before the disaster are more likely to experience post-traumatic stress after disaster exposure, while individuals with sleep issues after the disaster are less likely to recover from PTSD and more likely to develop late-onset PTSD 5 years post-disaster. Additionally, those who recovered from PTSD remain at slightly higher risk for sleep issues 9 years post-disaster.

Long-term Trends in Mental Health Disorders After the 2011 Great East Japan Earthquake and Tsunami

PTSD symptoms and depression persist more than 5 years after the disaster. While about half of the victims recover, the prevalence of depression remains

Delayed post-traumatic stress and memory inflation of life-threatening events following a natural disaster: prospective study

stable between pre- and post-disaster data. These findings suggest that the community is relatively resilient to disasters, though mental health symptoms persist in some individuals.

This study found that delayed PTSD differs from early-onset PTSD. Individuals with delayed PTSD tend to exhibit lower trauma expression and milder peritraumatic stress responses than those with early-onset PTSD. Additionally, delayed PTSD is associated with psychological traits such as neuroticism and a tendency for memory inflation of life-threatening events, rather than higher trauma exposure. Overall, delayed PTSD has a distinct profile influenced by psychological factors like neuroticism and memory inflation tendencies.

Effects of a natural disaster on mortality risks over the longer term

Residents in communities affected by the tsunami are more likely to die in the long term, particularly older men with poor psychosocial health post-tsunami. This contrasts with earlier findings showing higher survival rates in tsunami-affected communities in the short term. These results highlight the long-term health impacts of tsunami trauma, especially on older men.

Gender differences in risk of posttraumatic stress symptoms after disaster among older people: Differential exposure or differential vulnerability?

The study found a higher prevalence of PTSD symptoms in women than in men, with women being 1.6 times more likely to develop PTSD. Women were more likely to experience loss of relatives and home destruction, while men were more likely to experience home destruction and job separation. The study also indicated that decreased social support

Posttraumatic stress response following the loss of significant close others in the Great East Japan Earthquake: Fukushima Health Management Survey

from non-relatives significantly explained gender differences in PTSD. These findings highlight women's vulnerability to PTSD post-disaster due to both higher exposure and social support disparities.

The study found that losing significant close others during the disaster was associated with increased PTSD symptoms. The bereaved group exhibited more severe PTSD symptoms compared to the non-bereaved group. The risk of PTSD increased if the deceased was a spouse, child, or friend, with close relationships being a significant factor in explaining the heightened PTSD risk.

From various research articles on PTSD and its impact after natural disasters, there are several significant findings. First, adverse childhood experiences (ACEs) are associated with a higher risk of experiencing post-disaster PTSD. This indicates that childhood trauma can worsen the response to natural disasters in adulthood. Second, PTSD symptoms in mothers affect the assessment of PTSD symptoms in children, emphasizing the importance of continuous evaluation of the mother's condition in the post-disaster recovery process. Furthermore, unhealthy eating patterns and sleep problems are also associated with PTSD, indicating that this disorder can have a wide-ranging impact on physical and mental health. Furthermore, the differences between early-onset PTSD and delayed PTSD show distinct profiles in trauma expression and stress response, which can be influenced by psychological factors such as neuroticism. Additionally, gender and social factors also play a role in the severity of PTSD, with women and individuals who have lost loved ones tending to experience more severe symptoms. Overall, this study highlights the complexity of post-disaster PTSD and the importance of culturally sensitive approaches and sustained support in aiding the recovery process of communities affected by natural disasters.

CONCLUSION

Fundamental Finding: Natural disasters like tsunamis significantly increase the risk of PTSD among survivors, with key contributing factors such as disaster exposure intensity, personal experiences, and post-disaster social support. Childhood adversity, maternal mental health, and dietary habits also emerge as critical influences on PTSD

severity. Gender disparities and delayed PTSD onset highlight the complexity of trauma responses and underscore the importance of comprehensive mental health evaluations. **Implication :** The findings underscore the urgent need for culturally sensitive and targeted mental health interventions to support disaster survivors. These interventions should address the prolonged effects of trauma, incorporate strategies to enhance social support, and account for individual differences such as age, gender, and prior adversities to improve recovery outcomes and reduce long-term health risks. **Limitation :** While the studies provide valuable insights, they are limited by geographic focus on Asia and reliance on retrospective data, which may affect generalizability. Variations in assessment methods and the absence of longitudinal studies further constrain the ability to fully understand the long-term impact of PTSD and delayed-onset stress in diverse populations. **Future Research :** Future studies should prioritize longitudinal designs to track the trajectory of PTSD symptoms over time and explore cross-cultural variations in trauma responses. Additionally, investigating the role of innovative interventions, such as digital mental health tools, and their efficacy in disaster-affected populations could provide actionable insights to enhance recovery strate.

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