



Original Research

THE PSYCHOLOGICAL IMPACT OF SURVIVORS OF THE EARTHQUAKE, TSUNAMI, AND LIQUEFACTION

Nur Arifah^{1*}, Ismunandar Ismunandar¹, Gustini Gustini², Sukmawati Sukmawati¹, Dian Kurniasari Yuwono¹, Nitro Galenso¹, Helena Pangaribuan¹

¹Department of Nursing, Health Polytechnic of the Ministry of Health Palu, *Central Sulawesi*, Indonesia

¹Department of Nursing, Stikes Bala Keselamatan Palu, *Central Sulawesi*, Indonesia

ARTICLE HISTORY

Received: July 2, 2023

Revised: August 2, 2023

Accepted: Mei 5, 2024

Available online: September 01, 2024

CORRESPONDING AUTHOR

Nur Arifah

[nurarifabachtiar@gmail.com](mailto:nurarifahbachtiar@gmail.com)

Health Polytechnic of the

Ministry of Health Palu, Central

Sulawesi, Indonesia

ABSTRACT

Introduction: Mental health is still a significant problem in the world because health is not only seen as free from disease but also includes all aspects of human life, physical, emotional, social, and spiritual. The purpose of this study is to describe the attitudes and behavior of individual patients with mental disorders in the community.

Method: This study used a quantitative descriptive design. The population in this study were people in three RWs in one urban village of Surakarta with a total of 4,465 people. The sample used in this study was 99 respondents using simple random sampling. The analysis used is univariate analysis with a central tendency. The instrument used individual characteristics, attitudes and behavior toward mental patients.

Results: Based on the results of research on 99 respondents, it was found that the characteristics of the majority of respondents were female (64,6%), age 36-45 years (38,4%), being high school education level (53,5%) and the majority working as laborers (23,2%). The attitude of respondents to patients with mental disorders is negative or less supportive (52,52%), while the behavior of respondents to patients with mental disorders is considered less good (79,8%).

Conclusions: The community still had negative attitudes and poor behavior toward people living with mental illness. This result indicated the need for intervention and promotion of mental illness in the community setting.

Keyword: attitude; behavior; community; individual; mental illness

Cite this as:

Arifah, N., Ismunandar, I., Gustini, G., Sukmawati, S., Yuwono, D. K., Galenso, N., Pangaribuan, H. (2024). *The Psychological Impact of Survivors of the Earthquake, Tsunami and Liquefaction*. *Psych. Nurs. J.*, 6(2). 53-61. doi.org/10.20473/pnj.v6.i2.48029

1. INTRODUCTION

Central Sulawesi is an area that has the potential to cause many earthquakes. One of the major events that occurred in Central Sulawesi was an earthquake measuring 7.4 SR in the coastal area of Palu Bay which was followed by a tsunami and liquefaction in 2018. The tsunami that hit Palu City reached a height of 11.3 meters, causing an earthquake. ship to be lifted ashore. At the same time, a liquefaction phenomenon occurred. Liquefaction is a phenomenon of reducing the strength and stiffness of soil due to earthquake shocks (Geng, Yang, Nadimi, Han, & Huang, 2023). The

Kaili tribe people call this liquefaction phenomenon "Nalodo" which means collapsing and being sucked up by mud.

The earthquake, tsunami, and liquefaction caused 2,227 people to die, 965 people were declared missing 2,537 people were injured and there was a lot of infrastructure damage. The number of fatalities was influenced by several factors such as the failure of the tsunami early warning system, lack of community preparedness in facing disasters, lack of public knowledge regarding the risk of liquefaction disasters, and lack of effective coordination between

the central government, regional government, and the community. A powerful earthquake accompanied by a tsunami and liquefaction has the potential to cause psychological disorders (Puechlong, Weiss, Le Vigouroux, & Charbonnier, 2020)

Exploring the psychological impacts experienced by survivors of earthquakes, tsunamis or liquefaction is necessary to maximize social support and improve mental health to recover from trauma and be able to move on with life. The psychological impact after a disaster is influenced by the level of damage, the time that has passed after the disaster, and the type of disaster (Suriastini, Sikoki, Sumantri, & Umaroh, 2022). People who experience earthquakes, tsunamis, and liquefaction, suffer serious injuries, and lose family members will have the potential to experience anxiety disorders, depression, and even post-traumatic stress disorder (Guo et al., 2016; Hashemi Dezaki, Eyni, & Ebadi Kasbakhi, 2021; Hu et al., 2016; Ma, Chang, Wu, & Lin, 2020). Earthquake survivors are likely to be injured again in the future due to long-term psychological stress, especially those who have had severe traumatic experiences (Wahyono & Wiwik Astuti, 2021).

Five years have passed after the tsunami and liquefaction disaster, but the people of Central Sulawesi who experienced it directly still clearly remember the disaster that occurred in 2018. Disaster survivors had a direct impact on psychological disorders. The results of a meta-analysis of 46 studies found that as many as 23.7% of post-earthquake psychological disorders overall occurred in these individuals (Dai et al., 2016). Post-disaster psychological symptoms can affect activities, including in the social environment or at work. Post-disaster psychological symptoms such as insomnia, difficulty concentrating, excessive fear, excessive vigilance, and frequent memories of the 2018 disaster (Dell'Osso et al., 2019). Symptoms of post-traumatic stress disorder are generally grouped into four types, namely intrusiveness, avoidance, negative changes in thinking and mood, and changes in physical and emotional reactions (American Psychiatric Association, 2013). Symptoms of post-traumatic stress disorder can vary over time and individual characteristics (El Hajj, 2021). This qualitative research aims to explore the psychological impact experienced by survivors of the earthquake, tsunami, and liquefaction in Central Sulawesi. To be more specific, this research aims to provide an overview of the psychological experience of the earthquake and liquefaction or tsunami from the perspective of survivors, during and after they survived the disaster, including a description of the psychological impact,

social support, and health service support to improve survivors' mental health.

2. MATERIALS AND METHODS

2.1 Design

This study uses a qualitative design with a phenomenological approach. This design was chosen to explore participants' experiences more deeply to reveal the psychological impact of disaster survivors. A research method using a phenomenological approach was used to explore the phenomena experienced by disaster survivors because each survivor has a perception of life experienced by their view of the disaster they experienced.

2.2 Population and Sampling

Participants in this research were survivors of the 28 September 2018 earthquake who had directly experienced earthquakes, liquefaction, and tsunamis. The sampling technique used a purposive sampling technique with inclusion criteria, namely participants aged > 18 years, willing to become participants, and experiencing earthquake, liquefaction, and tsunami disasters directly.

2.3 Variable

The qualitative variable of this research is the experience of survivors of the earthquake, tsunami, and liquefaction disaster that occurred in Central Sulawesi in 2018.

2.4 Instrument

The research instrument or research tool in qualitative research is the researcher himself. Apart from researchers as research instruments, other data collection tools that support the research process are in-depth interview guides, field notes, and recording equipment. Before the interview, we provided them with an interview guide and highlighted the information they should obtain from the participants. We intend to make the interview a semi-structured conversation so that participants can tell about their experiences starting by asking "Can you tell me about the incident, from before the incident to how you feel now?" Follow-up questions were based on the participant's initial story and the aims of the research. The interview process was audio recorded. The researcher also took field notes to write down the participants' nonverbal responses or the condition of the surrounding environment during the interview.

2.5 Procedure

Interviews were conducted by the research team and two volunteers from the disaster area. Before the interview, we provided them with an interview guide and highlighted the information they should obtain from the participants. We used a semi-structured interview guide. Before the interview, the interviewer explained the purpose of the interview to the participants and they read the consent form. The number of participants who were willing to be respondents was 18 people consisting of 16 women and 2 men with ages ranging from 24 to 65 years. Interviews were conducted at permanent shelters and temporary shelters for disaster survivors. We interviewed participants face-to-face with audio-recorded interviews ranging in length from 30 to 60 minutes. We used pseudonyms instead of participants' names to protect confidentiality. The results of the interviews in the audio recording were transcribed and then a member check was carried out to confirm the results of the interviews that had been conducted.

2.5 Analysis

Data analysis was carried out using the Van Manen Method. Analysis was carried out by making interview transcripts and categorizing the findings from the interviews. Then categories of findings were grouped based on the suitability of meaning which were referred to as subthemes. All subthemes that have been identified are grouped based on similarities in coverage to become major themes. Test the validity of the data using member checking and triangulation. Member checking is useful for finding out how accurate the results obtained from research are. Meanwhile, triangulation is where the data is examined along with the data source to build justification. In this method, themes can also be developed based on the data source and the subject's perspective.

2.6 Ethical Clearance

According to (Surahman et al., 2016) health research ethics in its application is carried out with three main principles, namely beneficence, respecting human dignity, and getting justice. The researcher collected data by explaining the research before informed consent. the researcher gave freedom to prospective respondents to participate or refuse to become respondents and the confidentiality of the respondents was maintained by writing their initials on the questionnaire.

3 RESULTS

The participants in this research were 18 survivors who were survivors of the earthquake, tsunami, and liquefaction on 28 September 2018.

Theme 1: Post-Disaster Grief Phase

Grief is a psychological impact felt by survivors of the 7.4 magnitude earthquake, tsunami and liquefaction disaster that occurred on 28 September 2018 at 18.02 WITA. The perceived stages of grief varied greatly among the participants. Not everyone experiences this or experiences the stages in the same flow or order. The grieving phase can last up to 6 months or even years. This is illustrated in the subthemes, namely: 1) rejection stage; 2) anger phase; 3) bargaining stage; 4) depressive phase; 5) acceptance phase. Each subtheme will be explained as follows:

Subtheme: Denial phase

The denial phase is the first stage of grieving. At this stage, someone tends to deny that liquefaction and tsunami disasters can occur in Central Sulawesi. The denial phase occurs immediately during the disaster until 2 weeks after the disaster. When an earthquake occurs, survivors immediately evacuate themselves by leaving the house immediately until they feel safe. An earthquake with very strong shaking can cause the pore pressure of water to increase to exceed the frictional strength of the soil or is called "moving soil" or liquefaction. An earthquake with a magnitude of 7.4 caused liquefaction in Petobo Village, Jono Oge, Sigi, Palu - Central Sulawesi. Disaster survivors said that they did not know and had never been educated about the liquefaction phenomenon.

"When liquefaction occurs, the ground suddenly splits, swallowing everything above it, then closes again. The incident was very terrible. I really didn't think that this liquefaction phenomenon could happen. "We found out about the liquefaction phenomenon after witnessing the incident firsthand." (P3)

Survivors on the coast did not realize that there would be a tsunami disaster because there was no early warning in the form of sirens from the BMKG. This is what caused the people of Palu City to be late in evacuating themselves. Apart from that, there is an inaccurate perception among the Kola Palu Community that the bay coastal area is not at risk of experiencing a tsunami which could have a worse impact.

"The city of Palu is on the bay coast, not the open sea, so there is no thought of a tsunami" (P12).

Subtheme: anger phase

The anger phase is the second phase which is characterized by being more irritable. Disaster survivors express their anger toward God, themselves, and others. Public anger was due to a system failure which resulted in the tsunami early

P	Gender	Age	Education Level	Occupation	Disaster Experience	Occupancy Type	Disaster Impact		
							House damage	Family Injury	Family Death
P1	Woman	44	High School	Merchant	Earthquake and tsunami	Permanent housing	Yes	Yes	Yes
P2	Woman	24	High School	Household	Earthquake and tsunami	Temporary shelter	Yes	No	Yes
P3	Woman	65	High School	Pensioner	Earthquake and liquefaction	Permanent housing	Yes	No	No
P4	Woman	55	Middle school	Labor	Earthquake and liquefaction	Permanent housing	Yes	Yes	Yes
P5	Woman	32	High School	Household	Earthquake and tsunami	Permanent housing	Yes	Yes	Yes
P6	Woman	64	High School	Tailor	Earthquake and liquefaction	Permanent housing	Yes	No	No
P7	Woman	62	Middle school	Household	Earthquake and liquefaction	Permanent housing	Yes	Yes	Yes
P8	Man	49	College	Employed	Earthquake and tsunami	Permanent housing	Yes	Yes	Yes
P9	Woman	60	Elementary school	Labor	Earthquake	Temporary shelter	Yes	Yes	No
P10	Woman	36	High School	Merchant	Earthquake and tsunami	Temporary shelter	Yes	No	No
P11	Woman	45	College	Household	Earthquake	Temporary shelter	Yes	No	No
P12	Woman	55	Elementary school	Labor	Earthquake and tsunami	Temporary shelter	Yes	No	No
P13	Man	34	Middle school	Merchant	Earthquake and tsunami	Permanent housing	Yes	No	Yes
P14	Woman	44	High School	Household	Earthquake and tsunami	Permanent housing	Yes	Yes	Yes
P15	Woman	37	High School	Household	Earthquake and tsunami	Permanent housing	Yes	Yes	Yes
P16	Woman	60	College	Pensioner	Earthquake and liquefaction	Permanent housing	Yes	Yes	Yes
P17	Woman	32	High School	Household	Earthquake and tsunami	Temporary shelter	Yes	No	No
P18	Woman	58	High School	Household	Earthquake and liquefaction	Permanent housing	Yes	No	No

The results of this research were analyzed according to the Van Manen method, four themes and fifteen subthemes were found.

Theme	Sub-Theme
Theme 1: Post-Disaster Grieving Phase	<ol style="list-style-type: none"> 1. Denial phase 2. Angry phase 3. Bargaining phase 4. Depressive phase 5. Receiving phase
Theme 2: Post-Traumatic Stress Disorder (PTSD)	<ol style="list-style-type: none"> 1. Intrusive 2. Avoid 3. Negative changes in thinking and mood 4. Changes in physical and emotional reaction
Theme 3: Social Support	<ol style="list-style-type: none"> 1. Information support 2. Business Assistance 3. Social assistance 4. Provision of permanent and temporary housing
Theme 4: Health Service Support	<ol style="list-style-type: none"> 1. Psychological counseling 2. Cognitive therapy

warning system not functioning so it was too late to evacuate.

"Since the previous week there have been frequent earthquakes of small magnitude, but because there

was no warning or sound of sirens, we continued our activities as usual and it was too late to save ourselves." (P4)

"In my opinion, this is because there was no early warning from the government, so we were all slow to save ourselves" (P8)

Subtheme: bargaining phase

In the bargaining phase, participants had thoughts about the malfunction of tsunami detection equipment and the lack of optimal delivery of early warning information.

"Try like now, if there is an earthquake, there will be immediate notification or early warning via cellphone message. If there is information about an earthquake, we will definitely still have time to evacuate and save the things we can carry. (P10)

Subtheme: depressive phase

Participants showed symptoms of depression, especially when telling or experiencing situations that were almost the same as what happened 5 years ago.

"If the tsunami story happened, I would cry. There is still trauma because eleven family members disappeared and died. "If it rains heavily accompanied by strong winds, I feel like I want to run to higher ground, I immediately remember the previous tsunami incident" (P1)

Subtheme: Acceptance phase

Five years have passed after the disaster, the survivors have accepted and accepted the loss of family members, relatives and property.

"God willing, we can't do anything. So we who are safe are given the opportunity to improve ourselves, be more obedient in worship and share more. This disaster could have happened because we made a lot of mistakes, lessons to be more self-aware, self-improvement. Maybe we are survivors not because we are good but because we were given the opportunity to improve ourselves. This is a second chance" (P4)

Theme 2: Post Traumatic Stress Disorder (PTSD)

Post Traumatic Stress Disorder (PTSD) is a psychological disorder experienced by participants that occurred after experiencing the earthquake, tsunami and liquefaction disaster in 2018 in Central Sulawesi. This is illustrated by the subthemes, namely: 1) intrusive thoughts; 2) avoidance; 3) negative changes in thinking and mood; 4) changes in physical and emotional reactions. Each subtheme will be explained as follows:

Subtheme: disturbing

Almost five years have passed but disaster survivors often remember or remember the earthquake, tsunami and liquefaction disasters.

"Even though it happened a long time ago, I still remember it and always cry. Moreover, there were eleven families who were victims. "The body of one of the family members was found with a distended stomach, perhaps because there was mud on his stomach which was very black." (P1)

Subtheme: avoidance

Disaster survivors avoid coastal areas or areas that have experienced liquefaction because trauma can reappear.

"Since the liquefaction incident in 2018, I no longer want to see the former housing because I remember exactly how the house seemed to be swallowed by the ground. it was as if the earth had swallowed them up." (P3)

Disaster survivors are reluctant to talk about what they experienced during the 2018 earthquake, tsunami and liquefaction because the trauma could resurface.

"I always cry when I hear or tell about that incident." (P8)

Sub Theme: Negative changes in thinking and mood

There are disaster survivors who experience changes in negative thought patterns so that they more easily experience excessive fear.

"My little sister ran away in fear every time she heard the sound of water spilling from the shelter or the sound of water roaring because she thought it was the sound of a tsunami." (P1)

Sub Theme: Changes in physical and emotional reactions

Disaster survivors experience symptoms of changes in emotional and physical reactions characterized by difficulty sleeping, always being alert and feeling guilty for not being able to save their family members.

"When the incident happened I felt guilty because I couldn't save my grandmother. I wanted to run to save grandma but everyone had collided with each other upstream far from the coastal area so I couldn't save grandma either because I was evacuating the children." (P13)

Theme 3: Social support

Disaster survivors really need social support so they can continue to live a decent life like before the disaster. This is illustrated in the subthemes, namely: 1) sharing information; 2) business assistance; 3) social assistance; 4) permanent housing assistance and temporary housing. Each subtheme will be explained as follows:

Subtheme: sharing information Disaster survivors support each other by sharing information through social media groups to increase closeness

"Whenever there are activities such as health education, self-evacuation education, gymnastics or other activities, they are always informed about them through social media groups so that friendship is created between neighbors." (P.16)

Sub Theme: Business Assistance

Several disaster survivors have received counseling, training and financial assistance for micro, small and medium enterprises (MSMEs).

"We were given business assistance funds in stages. Can be used for food stalls, grocery stores or craft stores. We receive guidance, training and business capital. "Today I was invited to a socialization

activity for micro, small and medium enterprises (MSMEs) from a humanitarian organization." (P10)

Sub Theme: Social Assistance

Disaster survivors feel cared for because they continue to receive social assistance, in the form of food or cash, from the government, humanitarian organizations and local communities.

"Until now, even though it is rare, we still receive basic food assistance. So we feel that the government is taking care of us because we continue to provide assistance." (P14)

Sub-Theme: Provision of permanent and temporary housing

Disaster survivors receive support from the Indonesian government and humanitarian organizations to obtain adequate housing in the form of permanent housing.

"Yesterday I noted that there were around 120 heads of families living in temporary housing. We are still here waiting for a permanent house to be built." (P10)

Theme 4: Health service support

Survivors receive support from health services as one of the post-disaster psychological management efforts. Until now, trauma healing activities have only focused on children's mental health. This is illustrated by the subthemes, namely: 1) psychological counseling efforts; 2) cognitive therapy. Each subtheme will be explained as follows:

Sub Theme: Psychological Counseling Efforts

Disaster survivors said that psychological counseling activities were only carried out several months after the disaster. Currently, disaster survivors no longer receive psychological counseling visits.

"First I received counseling in Makassar, because I was pregnant with my second child, I was asked about it. After counseling, I still often cry when I remember the previous incident. There is still a feeling of sadness. Even though it happened a long time ago. a long time ago but I still remember and always cry." (P1)

Sub Theme: Cognitive Therapy

Children who are disaster survivors receive cognitive behavioral therapy as treatment for Post Traumatic Stress Disorder (PTSD) after the disaster.

"Trauma healing activities for children are often carried out in the hall or school. Usually children are asked to gather and read stories or fairy tales so they don't think about disasters. Children are asked to sing for those who like singing." (P11)

3. DISCUSSION

Nearly five years have passed but disaster survivors still clearly remember the earthquake, tsunami and liquefaction. During the interview process, female survivors showed more sadness than men. Women significantly have negative/poor mental

health (Fatema, East, Islam, & Usher, 2021). The survivors were devastated by this incident because it caused them to lose many family members, their homes and other possessions. Early after the disaster, survivors who saw the liquefaction disaster directly felt confused as to how it was possible that after an earthquake with very strong shaking, the phenomenon of the ground suddenly splitting and then swallowing many victims was accompanied by a torrent of mud that rolled up and swallowed everything above it. Survivors described the story as like the end of the world. Disaster characteristics are one of the main predictors of post-traumatic stress disorder (Bromet et al., 2017; Sepahvand, Hashtjini, Salesi, Sahraei, & Jahromi, 2019). This shows that the earthquake, tsunami and meltdown disasters were disasters that were so terrible for survivors who witnessed them directly that they caused trauma. post-disaster and deep sadness. Survivors experience excessive fear, especially when they hear the roar of the water because it reminds them of the tsunami they experienced. Post-traumatic stress disorder is a psychological disorder that occurs as a result of experiencing a traumatic event which can have a negative impact on quality of life (Fong et al., 2022).

During the interview process, the survivor showed a sad expression and even cried when telling about the incident and stated that such memories often recur. Disaster survivors who experienced the loss of family members felt more prolonged sadness, as experienced by one participant who lost 11 family members (siblings, nephews and parents). Survivors blame themselves for not being able to save other family members. In the weeks following a disaster, many disaster survivors blame themselves, others, and even God. Traumatic loss is associated with high rates of post-traumatic stress disorder and appears to inhibit the natural process of grieving, meaning that someone who experiences post-traumatic stress disorder after a traumatic loss is also at risk of experiencing prolonged grief

During the interview process, the survivor still clearly remembers the incident he experienced but begins to accept it and as time goes by the trauma he feels decreases, although sometimes he still feels sad when he recalls the incident. Six months after the disaster, survivors are trying to accept and try to get back on their feet and carry out activities to continue their lives. 1 month after the disaster, the children resumed their school activities even though they used emergency schools made of bamboo or commonly called bamboo schools. Positive coping mechanisms to help them adapt to post-disaster situations. Schools play a role in providing post-disaster education (Herdiana & Lakoro, 2022).

Immediately after the disaster, survivors experienced difficulty sleeping, felt weak, and were afraid to hear the sound of roaring water. Disaster survivors experience symptoms of post-traumatic stress disorder, especially those experiencing adverse effects. The incidence of post-traumatic stress disorder symptoms is higher immediately after a

disaster (Dai et al., 2016). Sleep disorders are one of the symptoms of post-traumatic stress disorder that disaster survivors still experience today, especially when they remember the disaster. Post-traumatic stress disorder sufferers experience significant sleep disturbances, especially in the rapid eye movement (REM) phase (Koffel, Khawaja, & Germain, 2016). Sleep disorders are one of the symptoms that are often experienced, such as difficulty starting to sleep, difficulty maintaining sleep, recurring nightmares (Barone, 2020).

When an earthquake occurred, people on the coast evacuated in the dark and without any directions. Everyone only thought about running up the mountain to avoid the tsunami water. For 3 days on the mountain, everyone felt helpless because they didn't get food and drink and shelter in tents. All are in a state of lost hope living in fear, hunger and thirst and cold. Symptoms of depression are characterized by feelings of sadness, tending to feel trapped in a hopeless situation, without help, or feeling worthless, difficulty sleeping, feeling tired or losing strength, excessive feelings of guilt (Rasido & Patodo, 2020).

Five years have passed but survivors sometimes suddenly cry when they remember the incident. After the disaster, survivors became more afraid, especially when they heard the sound of roaring water, especially when it rained, even though it wasn't like this before. The permanent housing as social assistance provided to survivors is on a hill far from the coast so there is no risk of a tsunami. But even so, survivors still often think about what if a tsunami like before occurs again. There are still excessive concerns felt by survivors. Natural symptoms of post-traumatic stress disorder are characterized by sleep disturbances; anxiety symptoms characterized by feelings of worry, fear of repeated events (Rasido & Patodo, 2020).

Apart from losing their beloved family, many survivors also experienced the loss of their homes and other possessions. Liquefaction survivors have lost homes swallowed by moving soil. All houses in areas prone to liquefaction sank and were razed to the ground. The survivors only had clothes attached to their bodies when they evacuated themselves. Survivors really need help to be able to move on with their lives. Social support is expected to improve the quality of life so that it can survive after a disaster in the form of instrumental support, information, appreciation and emotional support (Hu et al., 2016; Swann, Crust, & Allen-Collinson, 2016; Wakhid & Hamid, 2020).

After the disaster, survivors returned to see the house and tried to save the remaining items but everything had been carried away by the tsunami. This makes it difficult to live life after a disaster. The severity of damage or loss is a predictor of post-traumatic stress disorder after a disaster (Bromet et al., 2017). The government together with national and international humanitarian organizations have built thousands of permanent shelters. Until now, the government is still continuing to carry out

development even though it was hampered by the pandemic. It is hoped that this assistance can improve economic status. The social services case management (SSCM) approach with the provision of permanent housing can be one of the supports for preventing post-traumatic stress disorder (Cohen et al., 2019). After a disaster, it is difficult for society to restore economic stability. Efforts made by the government and related agencies to overcome this problem include training activities and capital assistance for micro, small and medium enterprises (MSMEs).

Psychological support is provided by the health service through screening and counseling activities, especially for pregnant women and children. Post-disaster psychological counseling is very important, especially for vulnerable groups such as children, pregnant and breastfeeding women and the elderly (Abu-El-Noor et al., 2022). Efforts to treat trauma in children are carried out through play therapy activities carried out during evacuation, at permanent residences and at current schools. Play therapy is carried out using several methods such as storytelling. Cognitive therapy has a very positive impact in the treatment of trauma in children and adults (Xian-Yu et al., 2022).

Efforts made by survivors include increasing social activities to date through regular monthly recitations. This shows that it is very important to have interventions to increase the spirituality of disaster survivors (Sipon et al., 2015). Prayer, religious rituals, and participation in faith-based community activities help to feel connected to other survivors and ease feelings of loneliness. Belief in God's greater power helps survivors navigate the recovery process with more confidence. Acceptance of fate and belief in justice helps them overcome feelings of confusion and anger about their circumstances (Pratama, 2023).

4. CONCLUSION

This research provides an in-depth understanding of the psychological impacts experienced by survivors of the earthquake, tsunami and liquefaction disasters which are reflected in four themes and 15 sub-themes. In this research, disaster survivors stated that the natural psychological impacts greatly influenced their lives after the disaster. The survivors felt cared for because they had been cared for by the government because they were given permanent housing and business assistance, even though not all of the disaster victims were there. Not only focusing on social assistance, screening and interventions for treating chronic psychological disorders after a disaster also need to be carried out to improve mental health status and quality of life.

5. REFERENCES

Abu-El-Noor, M. K., Abu-El-Noor, N. I., Alswerki, M., Naim, F. N., Elessi, K. A., Al-Asmar, Y. Z., & Afifi,

- T. (2022). Post-traumatic stress disorder among victims of great march of return in the Gaza Strip, Palestine: A need for policy intervention. *Archives of Psychiatric Nursing*, 36(November 2021), 48–54. <https://doi.org/10.1016/j.apnu.2021.10.009>
- American Psychiatric Association. (2013). APA PTSD Fact Sheet. *Diagnostic and Statistical Manual of Mental Disorders (5th Edition)*, 5–6. Retrieved from http://www.dsm5.org/Documents/PTSD_Fact_Sheet.pdf Barone, D. A. (2020). Dream enactment behavior—a real nightmare: a review of post-traumatic stress disorder, REM sleep behavior disorder, and trauma-associated sleep disorder. *Journal of Clinical Sleep Medicine*, 16(11), 1943–1948. <https://doi.org/10.5664/jcsm.8758>
- Bromet, E. J., Atwoli, L., Kawakami, N., Navarro-Mateu, F., Piotrowski, P., King, A. J., ... Kessler, R. C. (2017). Post-traumatic stress disorder associated with natural and human-made disasters in the World Mental Health Surveys. *Psychological Medicine*, 47(2), 227–241. <https://doi.org/10.1017/S0033291716002026>
- Cohen, G. H., Tamrakar, S., Lowe, S., Sampson, L., Ettman, C., Kilpatrick, D., ... Galea, S. (2019). Improved social services and the burden of post-traumatic stress disorder among economically vulnerable people after a natural disaster: a modelling study. *The Lancet Planetary Health*, 3(2), e93–e101. [https://doi.org/10.1016/S2542-5196\(19\)30012-9](https://doi.org/10.1016/S2542-5196(19)30012-9)
- Dai, W., Chen, L., Lai, Z., Li, Y., Wang, J., & Liu, A. (2016). The incidence of post-traumatic stress disorder among survivors after earthquakes: A systematic review and meta-analysis. *BMC Psychiatry*, 16(1). <https://doi.org/10.1186/S12888-016-0891-9>
- Dell’Osso, L., Cremone, I. M., Carpita, B., Dell’Oste, V., Muti, D., Massimetti, G., ... Gesi, C. (2019). Rumination, posttraumatic stress disorder, and mood symptoms in borderline personality disorder. *Neuropsychiatric Disease and Treatment*, 15, 1231–1238. <https://doi.org/10.2147/NDT.S198616>
- El Hajj, M. (2021). Prevalence and associated factors of post-traumatic stress disorder in Lebanon: A literature review. *Asian Journal of Psychiatry*, 63(June), 102800. <https://doi.org/10.1016/j.ajp.2021.102800>
- Fatema, S. R., East, L., Islam, M. S., & Usher, K. (2021). Health impact and risk factors affecting south and southeast asian women following natural disasters: A systematic review. *International Journal of Environmental Research and Public Health*, Vol. 18. <https://doi.org/10.3390/ijerph182111068>
- Fong, K. N. K., Law, Y. M., Luo, L., Zhao, Z. E., Chen, H., Ganesan, B., ... Shum, D. H. K. (2022). Post-traumatic stress disorder (PTSD) after an earthquake experience: A cross-sectional survey of Wenchuan earthquake victims with physical disabilities 10 years later. *International Journal of Disaster Risk Reduction*, 80, 103225. <https://doi.org/10.1016/J.IJDRR.2022.103225>
- Geng, F., Yang, W., Nadimi, S., Han, B., & Huang, G. (2023). Study for predicting the earthquake-induced liquefaction around the monopile foundation of offshore wind turbines. *Ocean Engineering*, 268(November 2022), 113421. <https://doi.org/10.1016/j.oceaneng.2022.113421>
- Guo, J. C., Tian, Z. L., Wang, X. D., Guo, M., Li, M. Y. W., Gao, Y. S., ... You, L. (2016). Post-traumatic stress disorder after typhoon disaster and its correlation with platelet 5-HT concentrations. *Asian Pacific Journal of Tropical Medicine*, 9(9), 913–915. <https://doi.org/10.1016/j.apjtm.2016.07.011>
- Hashemi Dezaki, Z., Eyni, S., & Ebadi Kasbakhi, M. (2021). Life satisfaction of veterans with post-traumatic stress disorder: The predictive role of cognitive flexibility and alexithymia. *Annales Medico-Psychologiques*, 179(10), 901–906. <https://doi.org/10.1016/j.amp.2021.02.007>
- Herdiana, I., & Lakoro, R. (2022). Psychosocial Issues Following Natural Disaster in Palu Central Sulawesi: A Case Study on Adolescents. *Journal of Educational, Health and Community Psychology*, 11(2), 424. <https://doi.org/10.12928/jehcp.v11i2.23474>
- Hu, X., Cao, X., Wang, H., Chen, Q., Liu, M., & Yamamoto, A. (2016). Probable Post-Traumatic Stress Disorder and Its Predictors in Disaster-Bereaved Survivors: A Longitudinal Study After the Sichuan Earthquake. *Archives of Psychiatric Nursing*, 30(2), 192–197. <https://doi.org/10.1016/j.apnu.2015.08.011>
- Koffel, E., Khawaja, I. S., & Germain, A. (2016). Sleep disturbances in posttraumatic stress disorder: Updated review and implications for treatment. *Psychiatric Annals*, 46(3), 173–176. <https://doi.org/10.3928/00485713-20160125-01>
- Ma, I. C., Chang, W. H., Wu, C. L., & Lin, C. H. (2020). Risks of post-traumatic stress disorder among emergency medical technicians who responded to the 2016 Taiwan earthquake. *Journal of the Formosan Medical Association*, 119(9), 1360–1371.

<https://doi.org/10.1016/j.jfma.2019.11.021>

- Pratama, D. A. (2023). The role of religion in dealing with natural disaster trauma: a case Study of the survivor of Aceh's Earthquake and Tsunami in 2004. *Empirisma: Jurnal Pemikiran Dan Kebudayaan Islam*, 32(2), 287–316. Retrieved from <https://jurnalfuda.iainkediri.ac.id/index.php/empirisma/article/view/1104>
- Puechlong, C., Weiss, K., Le Vigouroux, S., & Charbonnier, E. (2020). Role of personality traits and cognitive emotion regulation strategies in symptoms of post-traumatic stress disorder among flood victims. *International Journal of Disaster Risk Reduction*, 50(May), 101688. <https://doi.org/10.1016/j.ijdr.2020.101688>
- Rasido, I., & Patodo, M. (2020). Post disaster: Earthquake, tsunami, liquefaction mental health prevalence of Tadulako University students. *Enfermeria Clinica*, 30, 214–218. <https://doi.org/10.1016/j.enfcli.2019.10.071>
- Sepahvand, H., Hashtjini, M. M., Salesi, M., Sahraei, H., & Jahromi, G. P. (2019). Prevalence of post-traumatic stress disorder (PTSD) in Iranian population following disasters and wars: A systematic review and meta-analysis. *Iranian Journal of Psychiatry and Behavioral Sciences*, 13(1), 1–12. <https://doi.org/10.5812/ijpbs.66124>
- Sipon, S., Sakdan, M. F., Mustaffa, C. S., Marzuki, N. A., Khalid, M. S., Ariffin, M. T., & Nazli, N. N. N. (2015). Spirituality and Social Support in Flood Victims. *Procedia - Social and Behavioral Sciences*, 185, 361–364. <https://doi.org/10.1016/j.sbspro.2015.03.409>
- Suriastini, N. W., Sikoki, B., Sumantri, C., & Umaroh, R. (2022). Longitudinal outcomes of post-traumatic stress disorder among the Indian Ocean tsunami survivors in Indonesia. *International Journal of Disaster Risk Reduction*, 82, 103358. <https://doi.org/10.1016/J.IJDRR.2022.103358>
- Swann, C., Crust, L., & Allen-Collinson, J. (2016). Surviving the 2015 Mount Everest disaster: A phenomenological exploration into lived experience and the role of mental toughness. *Psychology of Sport and Exercise*, 27, 157–167. <https://doi.org/10.1016/j.psychsport.2016.08.012>
- Wahyono, U., & Wiwik Astuti, N. M. (2021). What we can learn from 2018 liquefaction in Central Sulawesi: Stories from the survivors. *Journal of Physics: Conference Series*, 2126(1). <https://doi.org/10.1088/1742-6596/2126/1/012023>
- Wakhid, A., & Hamid, A. Y. S. (2020). Family resilience minimizes post-traumatic stress disorder: A systematic review. *Enfermeria Clinica*, 30, 1–5. <https://doi.org/10.1016/j.enfcli.2020.01.002>
- Xian-Yu, C. Y., Deng, N. J., Zhang, J., Li, H. Y., Gao, T. Y., Zhang, C., & Gong, Q. Q. (2022). Cognitive behavioral therapy for children and adolescents with post-traumatic stress disorder: meta-analysis. *Journal of Affective Disorders*, 308(March), 502–511. <https://doi.org/10.1016/j.jad.2022.04.111>