

DYNAMICS OF COPING STRESS POST LIQUEFACTION NATURAL DISASTER IN PALU CITY

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ABSTRACT

This study was conducted to determine the dynamics of coping with stress after the natural liquefaction disaster in Palu. This incident happened for the first time in residential areas in Palu, on September 28, 2018, which claimed many lives, so that survivors experienced stress, and the stress-coping methods were also different. This research method uses qualitative by using a psychological phenomenology approach. While data analysis techniques are carried out in several stages: data reduction, data display, and concluding/verification. The findings of this paper indicate that the dynamics of coping with stress experienced by survivors of the liquefaction natural disaster in Palu on September 29, 2018, are different or varied. But at the stage that the individual leads to a gradual effort to reduce the stress experienced. In negative coping, individuals directly involved with the liquefaction natural disaster experience stress, confusion, shock, and a sense of wanting to die, after the disaster, there is still trauma. In positive coping, individuals directly involved with the natural liquefaction disaster appear to be trying to save themselves by running and looking for a way out until they finally survive. After the natural liquefaction disaster, individuals reduce their stress by working, entertaining themselves by worshipping God, always gather with family as a strength that adds to the spirit, and always be grateful.

Keywords: Coping Stress Dynamics, Natural Disasters, Liquefaction, Palu City

INTRODUCTION

Earthquakes rank second among the most natural disasters lethal effect on humans (Wirtz et al., 2014). The number of deaths from natural disasters can vary greatly from year to year; Several years passed with very few deaths before a major catastrophic event claimed many lives. On average over the past decade, about 45,000 people in the world die from natural disasters each year. This represents about 0.1% of global deaths (Dollet & Guéguen, 2022). Earthquakes are one of the most fatalities and cause complex problems. The impact of the earthquake not only caused physical damage but also the mental and psychological health of the victims.

Earthquakes cause victims anxiety, stress, depression, and trauma

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(Acharya Pandey et al., 2023). In fact, the most extreme impacts occur in children when the aftermath of an earthquake such as, irritability, self-deprecation, and behavioral changes such as symptoms; Having dreams about earthquakes, fear of staying indoors, being disturbed with sudden noises and noises, after sleep difficulties, unwillingness to go to school and join games (Bedriye, 2014).

Indonesia has the potential for natural disasters in each region, such as the natural disaster that occurred on September 28, 2018, namely the liquefaction disaster (Abdullah & Abdullah, 2020). Natural disasters, according to the Law on Disaster Management, are a series of events that can threaten and disrupt the lives and livelihoods of the community (Ali et al., 2019). Both natural and non-natural factors cause casualties, environmental damage, property losses, and psychological impacts. In addition, liquefaction disasters are natural phenomena that occur when the soil is saturated by forces caused by stresses such as earthquake vibrations. For example, the incident occurred in the Central Sulawesi region by causing uplift, such as in Balaroa in the Palu City area; as a result, as many as 1,045 houses were destroyed, with an affected area of 47.8 hectares. Likewise, in the Petobo area of Palu City, as a result, as many as 2,050 houses were destroyed, with the affected area reaching 180 hectares. Finally, in the Jono Oge, Sigi area, as a result, as many as 366 houses were destroyed, with an affected area of 202 hectares.

This research focuses on the dynamics of coping with stress after the liquefaction natural disaster in Palu because it caused damage and loss of property, and there were relatives who became casualties. Liquefaction natural disasters also cause excessive anxiety for fear of a recurrence of the incident; other consequences are psychological disorders, trauma, emptiness, and not feeling happy. Stress depends on the extent to which the event is perceived as a threat or challenge (Zhang, 2022). event, which is generally divided into three categories, namely: physical-biological stressors (heat, cold, body pain, and the like); psychological stressors (fear, worry, anger, and the like); and socio-cultural stressors (unemployment, bad environment, divorce, and the like) (Housen et al., 2019; Liu et al., 2020; Wang et al., 2013). From this, it can be understood that liquefaction natural disasters are part of socio-cultural stressors.

In addition, coping with stress generally shows the extent of changes that occur in individual well-being when assessing and coping with stress, depending on the nature of the stressor and the resources possessed. Because coping is a way or effort to overcome problems, coping with stress aims to reduce things that are dangerous in situations and environmental conditions by adjusting (Lopez-Vazquez & Marvan, 2012).

However, there are stress and coping studies related to liquefaction natural disasters, such as research by Muhammad Basir-Cyio, Mahfudz, Isrun, and Zelfitni (Basir-Cyio et al., 2021), which focused on discussing the attitudes of farmers in Jono Oge, Sigi, and Central Sulawesi regarding land affected by liquefaction natural disasters and resulted in farmers continuing to farm on land affected by liquefaction but refusing to consume their agricultural products for reasons that the community remained buried under the land and also refused to be relocated. The research of Ihlas Rasido, Andi Zulkifli, Veny Hadju, Indar, and Abdullah Naser (Rasido et al., 2021) focused on the effectiveness of psychological first aid (PFA) interventions to reduce symptoms of mental disorders in students of Tadulako University, Central Sulawesi, after the natural disasters of earthquakes, tsunamis, and liquefaction. Edy Yulianto's (Yulianto et al., 2021) research et al. look more at community adaptation and action in dealing with natural disasters, influenced by experience and understanding of the phenomena that occur, the character of the community, and the availability of local resources. Siti Hajar's (Salawali et al., 2020) research et al. looked at the experiences of adolescent survivors of earthquakes, tsunamis, or liquefaction through posttraumatic growth (PTG) exploration, the results of the PTG that trauma is the basis of the meaning of life and running from disasters is a chance of survival, the rest is mental health support by nurses with cognitive therapy (CT) and acceptance commitment therapy (ACT).

For this reason, this study looks more at the psychological side of victims after being affected by liquefaction natural disasters, which is directed at the dynamics of coping with stress because everyone has different actions in overcoming stress according to the level of problems faced. The explanation of some of the studies above shows that the topic of coping dynamics of stress after liquefaction natural disasters is still not studied, but some of these studies are an important consideration that this study has a gap that coping stress through the experiences of disaster survivors needs to be further explored into two aspects, namely primary appraisal (primary assessment) as an individual process in interpreting or evaluating traits certain, as well as the demands of a particular event that can be at stake and secondary appraisal (second assessment) as an assessment or prediction of the resources possessed in overcoming a problem, both of which are used to see individuals in dealing with an event (McMordie, 2021).

In the context of primary appraisal, according to Lazarus and Folkman stress assessment includes harm, threat, and challenge. To discuss this, the researcher mapped out two sub-themes of discussion consisting of informant demographics and informant background: In the context of secondary appraisal, it is the process of determining the type of coping that can be done in dealing with situations or conditions that can be threatening, namely through stress coping strategies (Biggs et al., 2017).

RESEARCH METHOD

Research is qualitative research that specifically leads to uncovering the content and meaning of a problem or phenomenon thoroughly through the process of asking questions, collecting data, and analyzing the life or social experience of informants (John W. Creswell, 2015). This study uses a psychological phenomenology approach because it is related to efforts to describe life experiences faced by informants (Suratman & Arif, 2020). The main focus of this study is the dynamics of coping stress in middle-aged adults who survived the liquefaction disaster in Palu City in 2018. Middle adults are here because they see research on human development in life-cycle theory by Erikson's divided into eight stages, one of which is middle adulthood with ages between 40 and 65, and each stage has psychological problems. Middle adulthood is a period of higher fulfillment in life, so this period is characterized by individuals who are fairly financially secure, healthy, and happy. It can be said that middle adulthood is the time when individuals begin to take part in society by being responsible for the trust given by society. For this reason, informants in this study are specifically middle-aged adults aged 40–60 years from the people of Palu who live in environments affected by liquefaction natural disasters.

Data collection techniques include improvised or semi-structured interviews (Ichsan et al., 2019). This is done through an interview process with three people. This number is because victims affected by liquefaction disasters are still experiencing deep trauma, and the average victim is not ready to be asked for interviews related to the phenomenon that took place when the liquefaction natural disaster combed the environment of the Palu community at that time. Therefore, here researchers are more trying to get data obtained by having similar results or having reached a saturation point. Location determination is also required for data collection. In data analysis, the author data reduction stage, data exposure, conclusion, and verification. The credibility of the data is used for the validity of the research findings, namely: first, it describes in detail the informant's background, including age, gender, place, date, and birth, last education, occupation, and religion. Second, spend prolonged time in the field. Third, use peer debriefing to enhance the accuracy of the account (Ichsan et al., 2019; John W. Creswell, 2015).

RESULT AND DISCUSSION

Several research related to stress and coping in the context of natural disasters, such as the research of Yunere, Sari, and Tusadiah (Yunere, Falerisiska, Yuli Permata Sari, 2018) looks more at the relationship between coping mechanisms as a risk of depression in seeing victims after the shop fire disaster in the upper market of Bukittinggi City in 2018. Research by Asnayanti, Lucky Kumaat, and Ferdinan Wowiling (Asnayanti, Asnanyanti, Lucky Kumaat, 2013) looked at the relationship between coping mechanisms and stress categories after the natural disaster of the Mount Gamalama eruption in the Tubo Village community in Ternate City. Polizzi, Lyn dan Perry's (Polizzi, Craig, Andrew Perry, 2020) research that discusses stress and coping during COVID-19 includes strategies that may be effective in managing distress and recovery, namely behavioral action, acceptance-based coping, mindfulness practice, and loving-kindness practices. All of that is to manage stress, increase resilience, and recover.

Result

The explanation above shows that the impact of natural disasters shows stress responses, trauma, and so on, and the stress coping carried out is also different for individuals who experience it directly, such as three intermediate adult informants who experienced liquefaction natural disasters directly. The assessment stage in the primary appraisal, namely the demographics of informants and the results of the distribution of demographic data.

Table 1. Research demographics

No	Information	Informant 1	Informant 2	Informant 3
1	Initials	P	SL	SH
2	Age	62	46	52
3	Gender	Male	Female	Female
4	Place, Date, Birth	Toraja	Palu	Palu
5	Recent Education	S1	Junior High School	High School
6	Work	Pensioner	Housewives	Housewives
7	Religion	Christian	Islam	Islam

Informant 1 P (62) and Informant 2 SL (46) are residents living in the Petobo area, the description of the location is as follows:

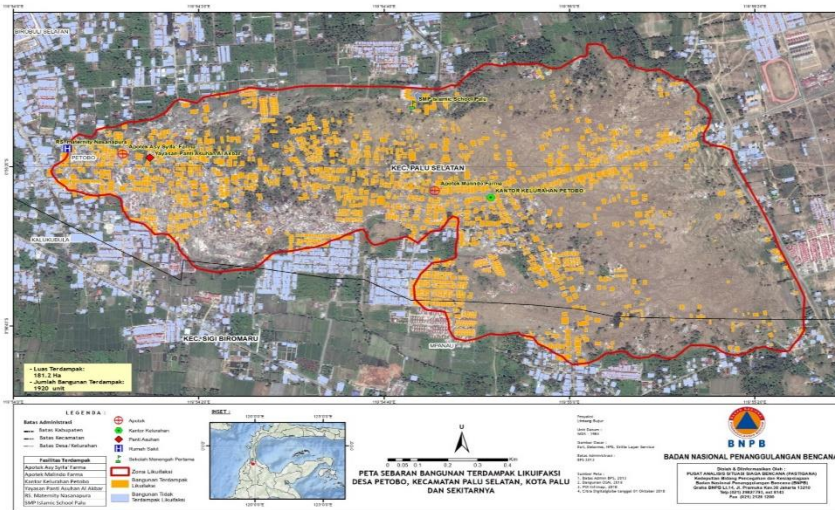


Figure 1. Map of Liquefaction and Affected Buildings in Petobo
 Source: Author's Documentation

Informant 3 SH (52) is a native living in the Balaroa area, the description of the location is as follows:

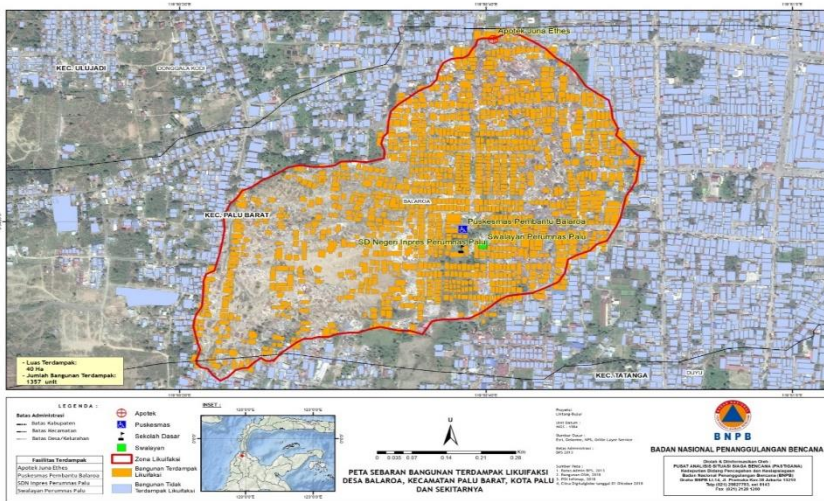


Figure 2. Map of Liquefaction and Affected Buildings in Balaroa
 Source: Author's Documentation

The explanation above appears to indicate that the condition of the area or the state of residence previously entered the liquefaction natural disaster area. Furthermore, the background of the informant, namely:

- 1) Informant P (62) is a Christian, retired originally from Petobo, and has been living for about 40 years. P described the conditions and sketches about the Petobo area. According to him, Petobo is an area inhabited by the majority of the Muslim population, and at the same time, the majority population there has a harsh nature and character, and the youth or children there are naughty and can influence the attitude of parents to interfere. For example, when a resident dies, the road is partially closed, and passersby or those who deliberately bypass the road are immediately affected by being beaten by residents. The environment of Petobo is not too densely populated, but now it has begun to be dense because, according to P, about 40 years ago, Petobo was still covered by forests or coconut trees. The livelihood of Petobo residents in general is farming, so the results of farming are marketed in Biromaru's blood. The Petobo region has never experienced a natural disaster in the past; according to him, since P lived in Petobo, it has never experienced any natural disasters, except for earthquakes. According to him, the background of natural disasters does exist in certain areas, but not in Petobo. When a natural disaster occurs, liquefaction is generally P, and the population does not know what disaster is happening, so their opinion assumes that the disaster is a "land tsunami," and when a few days pass, just call it liquefaction. This is a new one in P's experience when facing natural disasters, so when the earthquake is over, P and his wife do not immediately enter the house but anticipate it by half an hour in an empty field because there are signs that the next disaster will appear.

- 2) Informant SL (46) is a Muslim housewife from Petobo who had three children, one of whom died due to the natural disaster Liquefaction. The husband is still there, and SL is a native of Petobo. According to SL, the Petobo area before the Likuifaki natural disaster was normal, such as the activities carried out by residents as their livelihood was farming, and there were also employees even though the majority were farmers. The Petobo area has houses, most of which have rice fields behind them. The Petobo area used to be an area full of water, so SL assumed to have lived on water because it was hollow below and there were many injection wells. Each house has existed because, according to the Japanese people, the embankment was not cast down, so it can be seen left and right, which causes water to seep in. According to SL, because he was born in the 1970s, he has seen the embankment that he jumped from as a child. Regarding Petobo, not much is told, but before Liquefaction, SL felt a very strong earthquake before 3 p.m. and actually felt an earthquake a week before, both large and small earthquakes. It's just that SL felt events like this have been common in Palu.

Informant 1 (P) and Informant 2 (SL) both live in Petopo Village, The conditions before and after the disaster in Petobo Village can be illustrated as follows:

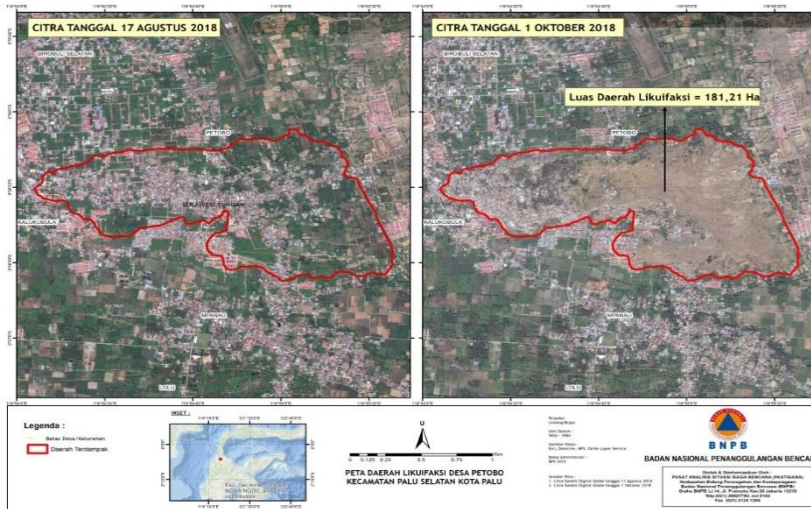


Figure 3. Conditions Before and After Being Affected in Petobo

Source: Author's Documentation

3) Informant SH (52) is a Muslim, a housewife, and a widow who was originally a domestic helper (PRT) in the national housing, such as washing clothes. The background of Balarooa, according to SH, was originally named “Karui”. She did not know where the background of the name “Karui” became Balarooa; it’s just that Balarooa consists of a name “*Bala-Rame*,” which means many thorny trees, and many have converted to Islam in the city of Palu, especially Balarooa, so the name “Karui” changed to Balarooa. According to SH, Balarooa, especially Perumnas, was affected by the liquidation disaster because the land is a land that rides many rice fields, sagun trees, and swamps, and there is a center through the center of the sea. Moreover, the national housing was originally rice fields, so finally the government took the initiative to make settlements by hoarding land, and the land in the hoarding had an average injection well. So that successive disasters from earthquake, wind, and liquefaction, initially on Thursday had earthquakes, then on Friday morning twice, and the third time in a row was destroyed because after the earthquake, SH and families came out of the house and saw wooden trees, electricity poles pulling each other, and water coming out in front of the door of the house.

Regarding natural disasters, according to him, there was never a liquefaction disaster, but there was only a large tsunami in the Balaesang Mapaga area and an earthquake in Palu that was not too big.

In Balaroa, there was no disaster at all, and SH's 50 years of life had never felt such a devastating earthquake. Before the Liquefaction disaster, there had actually been earthquakes before, but SH was not too big; it's just that at 3 p.m. the earthquake began to feel big until finally the average Balaroa resident ran out of the house. After the liquefaction natural disaster, SH, who was originally a domestic worker such as a mobile laundry in Perumnas to provide for the family because of SH's status as a widow, finally did not work or work was not very clear because the economy since the liquefaction disaster has become paralyzed. When in the tent, SH experienced 1 tent with 13 family cards (KK), and after 2 weeks, she got a tent from Palang Merah Indonesia (PMI). Informant 3 (SH) lives in Balaroa Village. For more details, see a map of conditions before and after the disaster in Balaroa Village, as follows:

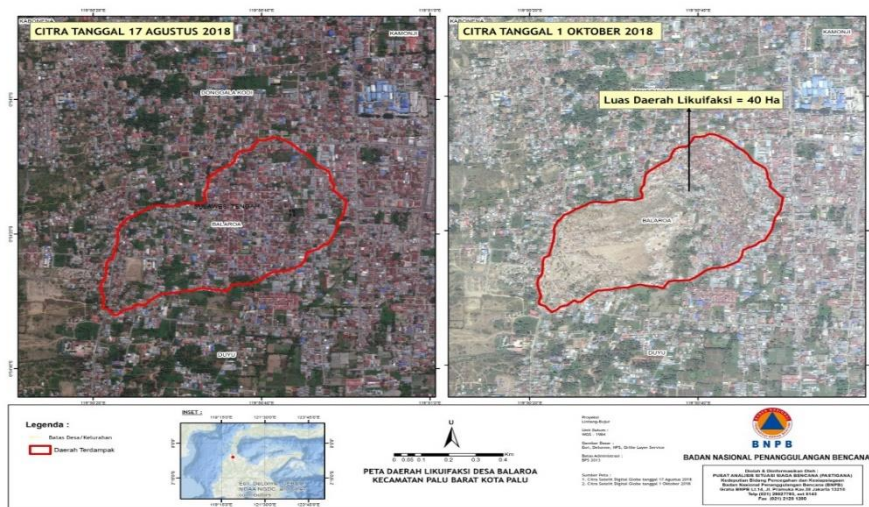


Figure 4. Conditions Before and After Being Affected in Balaroa

Source: Author's Documentation

Researchers see that the informants above know and understand the problems that have occurred, so at the primary appraisal stage they discuss more about the condition of the area or state of residence and things that can be used as problems. The informants experienced stress because there were informants who considered that the event was a threat, and some received severe injuries in the legs. There were even loved ones who became victims of harm or loss when the liquidation disaster appeared in residential areas

Discussion

The explanation above can be illustrated by the fact that in the cognitive assessment stage, the three informants both know and understand that their respective territories have a very close relationship with the emergence of liquefaction natural disasters, so that after the disaster, the informants try to re evaluate the possibilities that arise due to the disaster.

Stages in secondary appraisal, namely the process of determining the type of coping that can be done in dealing with situations or conditions that can threaten. These strategies include problem-focused coping and emotion-focused coping.

1. Problem-Focused Coping and Emotion-Focused Coping on P (62)

Informant P (62): The strategy carried out by P (62) in dealing with stress by looking at the problems that exist (problem-focused coping), such as before the natural disaster Liquefaction appeared, the Petopo area received an earthquake, and the residents of Petobo came out of their homes and gathered on empty land. From there, P went out of the house while the wife was still in the house because she could not leave the house because in an earthquake, leaving the house is creeping and throwing. After the earthquake was over, P and his wife were finally able to gather on the vacant ground. Usually, after an earthquake, residents immediately return to their homes. While P and his wife did not return home because for half an hour they were outside, there followed a roar such as wind or water that was very loud, and P saw the situation first by focusing on what problems occurred. Finally, P saw the neighbors go up the stairs, and P also saw smoke and the ground going up and down bumps, which caused the ground and the house to run. More than that, P saw mud going up and down the open ground and so on, as well as seeing some residents piled into the ground. P also saw a neighbor who was pinched next to the body, and when he saw it, he just ran and looked around him, like looking back and seeing that the ground was still in an open undulating state like being evicted. P and his wife at that time just stayed in place and watched the events before their eyes. After that, from here, P and his wife continued to run and use the fence and concrete that collapsed to climb, until finally the bumpy and walking ground stopped, and finally, towards the road of Dewi Sartika, the land stopped wavy and walked as had been witnessed before. After the liquefaction stopped, P looked for the displaced house at midnight, but at dawn, the house he was looking for had moved away. At first, P saw this incident, feeling shocked and confused and even experiencing stress after seeing the concrete collapse and experiencing a feeling of wanting to die.

However, P's strategy when experiencing stress is emotionally focused, coping only by running, even though he is injured. Even after being in the refugee camp, P felt resigned because he was confused about food issues and only hoped to wait for

help to arrive. The problem experienced by P and his wife was one of them not eating and drinking for a day until the arrival of social assistance because all the characters found a basic food shop after the liquefaction incident. In addition to controlling the emotional response caused by the impact of the liquefaction natural disaster, P refocused on studying the problem to find a problem-focused coping strategy by finding a family home that provides temporary shelter to bathe and can provide food. But after a few weeks after the disaster, P received volunteer assistance from the Toraja Church Organization to provide assistance in the form of shelter or temporary housing.

2. Problem-Focused Coping & Emotion-Focused Coping on SL (46)

SL Informant (46) The strategy carried out by SL (46) in dealing with stress is to look at masalah (problem-focused coping), as before the Liquefaction natural disaster appeared, the Petopo area received an earthquake, and Petobo residents came out of their homes and gathered on vacant land. From there, SL, his children, and his grandchildren also ran out of the house and saw the mud spinning like a blender, and many residents who drowned in SL could only stand in place. Only after his son had drowned in the mud, SL and his grandson also surrendered and did not avoid the mud that sucked inside. After the liquefaction had stopped and SL managed to get out of the mud and soil suction as deep as 10 meters, SL then dug up his grandson, who had been flooded in the mud, and wiped his grandson's body while advising his grandson to always say *Astagfirullahaladzim*. Finally, SL and his grandson managed to save themselves.

After being evacuated, SL and his family faced new problems, such as social assistance and huntara. Then SL took the initiative to go alone to the disaster site and look for his house to make a tombstone because one of his children died from the liquefaction natural disaster. More than that, SL and his family also took the initiative to open sales, such as mangoes, around the disaster area to support the family. SL's pasra attitude when in a state of liquefaction around him was a form of emotion-focused coping; controlling emotional responses at that time was just surrendering and always saying *Astagfirullahaladzim*. After 9 months from that incident, SL remembered it again and always cried because of how he felt when he was spun by the ground and sucked by mud with his children and grandchildren. SL personally was devastated and felt guilty that his son had died, and he remembered that his son was really sorry for being buried in the ground.

But SL always felt that he had been given the opportunity to live in the absence of one of his children, making him more diligent in praying because,

for him, it was a rebuke. SL also still feels sad even though he is sincere; sometimes he still remembers the Liquefaction incident, so from the escape, SL always worships so that his heart is always comforted.

3. Problem-Focused Coping & Emotion-Focused Coping on SH (52)

Informant SH (52) in dealing with stress such as seeing problems (problem-focused coping) such as calm during the earthquake on Friday morning, SH still had time to pray and cook in the kitchen room. After his children shouted, SH came out of the house and saw that around him had been destroyed like trees and electricity poles pulling and slamming each other and all power lines were all cut off. SH also saw water coming out of the front door of the house through the ground.

After that, SH ran out of the house by pulling her sick ex-husband to run out of the house until the intersection. SH received advice from BMKG (Meteorology, Climatology, and Geophysics Agency) not to go to the field because water in the field had appeared. SH and her family, while carrying her sick ex-husband, who was sick and difficult to walk, ran in other directions, such as heading to BMKG . When SH was in front of the BMKG along with other survivors still following the advice of the BMKG, they moved in the morning to the nephew's house. Then SH and the victim built a tent in anticipation of being protected from sunlight. SH also stayed for 2 weeks, and after that, they only got a tent from PMI. In addition, SH does not sleep well because it is always anticipated, such as when there is a small earthquake and SH wakes up from sleep several times. This is to maintain safety. SH is also in a state of liquidation, a state that is able to control emotional responses (emotion-focused coping).

At the time of liquidation, his children really wanted SH, and the family ran towards an empty field, but SH diverted his children's advice to follow BMKG's advice to run in other directions, such as evacuating in front of BMKG. SH and his family controlled their emotions when they gathered together with the survivors piled up at BMKG. They controlled their emotions to survive until the morning and then moved to the nephew's house. SH at the time in the tent had no appetite because he always remembered the disaster experienced, let alone the lights out, and there was no network, not even distant family, but SH survived to always be able to survive and survive by eating what was there and was always grateful.

After the incident, Liquefaction SH experienced trauma, but she was also always grateful for safety and enthusiasm because the most important thing was to be together with family. The explanation above has described how the dynamics of coping stress experienced by informants, some assessments (appraisals) on each

coping stress mechanism that occurs in each informant vary according to the level of events experienced.

CONCLUSION

Based on the results of the research that has been explained, the dynamics of the coping stress of victims who survived the liquefaction natural disaster in Palu in 2018 varied according to the level of events experienced by individuals or informants. However, informants who experience it try to reduce the impact, as seen in the first stage (primary appraisal), because they all know the background of the area affected by the disaster, such as the land that is mostly around it, injection wells, in which there is water sourced from the sea, and swamps. Furthermore, in the second stage (secondary appraisal), each informant has a different strategy for coping, so it is inseparable from his strategy that uses problem-focused coping and emotional-focused coping strategies. This study has limitations related to informant sources, therefore future research discusses earthquakes in the wider community. In addition, the authors provide recommendations for future research to conduct research on other natural disasters to see a comparison of stress coping dynamics.

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