

FAMILY RESILIENCE, COPING AND DISASTER PREPAREDNESS IN THE COASTLINE AREA: ONE AND A HALF YEARS POST-EARTHQUAKE IN LOMBOK

Sriyono Sriyono¹, Nursalam Nursalam², Hamzah Hamzah³

¹Doctoral Student, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

²Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia

³Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

ABSTRACT

Lombok earthquake was different than any other earthquake that ever happened in Indonesia recently. The study aimed to analyze factors that contributed to family resilience, coping and disaster preparedness. Using a quantitative design with cross-sectional and observational approach, 585 respondents were included of this research with snowball sampling. Data were collected through an online Walsh Family Resilience Questionnaire, the ways of coping questionnaire, and disaster preparedness guidance questionnaire. Questions were distributed using Google Forms with an informed consent form at the beginning of the online form. Statistical analysis used descriptive statistics and ordinal regression. The highest phase reached by the respondents was acceptance (259/585, 44.3%). The family coping rate found was low coping mechanism and also they had low level of preparedness (301/585, 51.5% vs. 375/585, 64.1%). The income factor had higher

correlation with family resilience (OR=131.220, CI=0.852–0.446, P=0.000). Educational background has 93 times greater coping mechanism than age, gender, income and occupation (OR=93.996, CI=0.765-1.153, P = 0.000) and worship culture had higher correlation with disaster preparedness (OR=72.529, CI=1.126–1.800, P = 0.000). Family resilience in coastal area in acceptance phase with family coping and disaster preparedness is in the low level category. Income factor has the highest association with family resilience, the same as educational background with coping and for the disaster preparedness with worship culture.

Keywords: Coping, Disaster Preparedness, Family Resilience

Correspondence:

Nursalam Nursalam

Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia
nursalam@fkip.unair.ac.id

INTRODUCTION

Lombok earthquake in 2018 was different than any other earthquake that ever happened in Indonesia recently. The seismicity pattern was peculiar, there was a moment when it was up high and there was a moment when it was a calm earthquake. People living in Lombok, Bali, and Sumbawa was scared and confused. They were scared to stay but at the same time they feared that the earthquake would get stronger. Approximately, there were six earthquakes recorded with magnitude more than 5.5 on the Richter scale. The first earthquake of the series was a magnitude of 6.4, which happened in July 2018 and the biggest earthquake of the series was a 6.9 Richter scale on the 5th August, 2018. The Indonesian Meteorology Climatology and Geophysics Council (BMKG) reported a total of 2000 series of earthquakes happened. The epicentre was 18km northwest of the Lombok island. There was a warning for tsunami along the northern coast of North Lombok Regency [1].

A magnitude 7 earthquake occurred in Lombok, West Nusa Tenggara, on August 5, 2018 after a series of earthquakes since early July 2018. About 390 people died, 1447 were injured, 67,875 houses were damaged, 468 schools were damaged, and 352,793 people were displaced [2]. A survey shows that, after a catastrophic event, around 15-20% experience mild or moderate mental disorders, while 3-4% will experience severe disorders [3]. Mental disorders are influenced by the number of stressors experienced by a person, and disaster events are major acute stressors. Research conducted in Thailand showed that 78% (4,224 deaths) of the 2004 Tsunami disaster centered on one region, the Phang Nga province. The survey results show the high number of disaster victims is related to the low level of community disaster preparedness in the province with only 14.4% of residents having prepared for disaster and being resilient families [4].

Families who are at high risk of experiencing a disaster require a high level of preparedness. Unfortunately disaster preparedness is not an easy and inexpensive case.

The family needs to act collectively to be prepared, not forgetting to use energy and resources. For example, in China, even though families are living in an area are at risk of experiencing a variety of disasters, they argue that buying disaster insurance is not so important on the grounds the government should cover their losses due to the disaster. The family's decision to buy insurance relates to their opinion whether it is important and a coping mechanism or not [5]. In the case of Lapindo mudflow, families of victims of the mudflow tried to use the disaster as temporary livelihoods by opening Lapindo mud tourism [6], [7]. Coping plays a role in forming the same perception in the family so that preparing for disaster is a priority. According to Patterson's family resilience theory the family is able to act if the family is well-organized [8]. A well-organized family is able to set family goals and achieve them, one of which is to aim to prepare for disasters. Family resilience has a role to balance the coping balance so that families reach adaptive coping faster [9]. Adaptive coping with families at risk of disaster will help them prepare for disaster because disaster preparedness is a priority for every vulnerable community. With respect to people living in disaster prone locations, measurements need to be taken from the level of disaster preparedness, coping levels, and also the level of family resilience. Therefore, this study aims to analyze the factors that contribute to family awareness, family resilience, coping and disaster preparedness.

METHODS

A quantitative design with cross-sectional and observational approach was conducted in North Lombok Regency, West Nusa Tenggara Province, Indonesia. A total 585 respondents were included of this research with snowball sampling and inclusion criteria being: 1) People can access to the internet; 2) Age more than 18 years; and 3) Able to understand Bahasa. Data were collected through an online questionnaire containing semi-structured questions. Questions were

distributed using Google Forms with an informed consent form at the beginning of the online form. The link of the questionnaire was sent through WhatsApp and other social media to the investigators' contacts from 21st December, 2019 at 8am (UTC+08:00) and closed on 6th February, 2020 at 9pm (UTC+08:00).

We were able to collect data from across various villages in North Lombok Regency, West Nusa Tenggara Province, Indonesia. The predictor factors/independent variables included were area of residence, age, gender, occupation, salary, education, and Islamic ritual routine. The response factors/dependent variables were family resilience, coping, and disaster preparedness. The online self-reported questionnaire was developed by the researchers with validity and reliability test in the first study. Family resilience questionnaire was using Walsh Family Resilience Questionnaire (WRFQ) (Walsh, 2016). Coping questionnaire was using The Ways of Coping Questionnaire (WCQ) [10]. Disaster preparedness questionnaire utilized the BNPB disaster guidance (BNPB, 2017). Research obtained evidence of ethical qualification from the Faculty of Nursing, Airlangga University, with the number 1882-KEPK. The inferential statistical analysis used ordinal regression and data presented with standard deviation and proportions have been used to estimate the results of the study.

RESULTS

The characteristics of respondents and dependent variables

The survey conducted showed that participants were heads of households with the majority being male (497/585, 85.0%). The majority of respondents came from Medana village, the majority age group was 31 - 40 years and the highest level of education was senior high school (125/585,

21.4%; 125/585, 21.4%; 221/585, 37.8%, respectively). The majority of income was average 1 - 2 million (245/585, 41.88%) and almost worked in the private sector (238/585, 40.7%). The majority of practicing Islamic religious worship was always doing everyday (249/585, 42.6%), which included always praying five times a day, reciting the Koran and dhikr (Table 1).

The family resilience measurements found that there were no families that reached the highest phase or also called Phase 5: Helping Others. The highest phase reached by the respondents was Phase 3: Acceptance (259/585, 44.3%). The family coping rate found was low coping mechanism and they also had low level of preparedness (301/585, 51.5% Vs. 375/585, 64.1%) (Table 2).

Analysis of Variables to Predict Family Resilience, Coping and Disaster Preparedness

A multivariate analysis of demographic variable to family resilience, coping and disaster preparedness resulted that some of the variables had significant association. Family resilience after adjusted with demographic factors showed that village, gender, income, occupation and worship culture have correlation with family resilience (all P value <0.05). Moreover village, gender, occupation and worship culture have correlation; the higher correlation was income with 131 times family resilience (OR=131.220, CI=0.852-0.446, P = 0.000). Educational background had 93 times higher coping mechanism than age, gender, income and occupation (OR=93.996, CI=0.765-1.153, P = 0.000), while village and worship culture had no significant correlation. The disaster preparedness among respondents showed that worship culture has higher correlation than educational background, income and occupation, the result showed 72 times association with disaster preparedness (OR=72.529, CI=1.126-1.800, P = 0.000).

Table 1. The Characteristics of Respondents

Variable	Sub-variable	Frequency (n=585)	%
Gender	Male	497	85.0
	Female	88	15.0
Village	Jenggala	90	15.4
	Tanjung	110	18.8
	Sokong	68	11.6
	Medana	125	21.4
	Sigar Penjalin	33	5.6
	Tegal Maja	85	14.5
	Teniga	74	12.6
Age	20 - 30	82	14.0
	31 - 40	237	40.5
	41 - 50	173	29.6
	>50	93	15.9
Education	No formal education	55	9.4
	Elementary	216	36.9
	Middle high	63	10.8
	Senior high	221	37.8
	Higher education	30	5.1
Income	0	97	16.58
	1 Million - 2 Million	245	41.88
	2 Million - 3 Million	79	13.50
	3 Million - 4 Million	7	1.20
	4 Million - 5 Million	50	8.55
	> 5 Million	107	18.29
Occupation	Unemployed	97	16.6
	Civil servant	26	4.4
	Private sector	238	40.7

Variable	Sub-variable	Frequency (n=585)	%
Worship Culture	Entrepreneur	224	38.3
	Sometimes	90	15.38
	Often	246	42.05
	Always	249	42.56

Table 2. Family Resilience, Coping and Disaster Preparedness of Respondents

Variable	Sub-variable	N	%
Family Resilience	Phase 1: Survival	53	9.1
	Phase 2: Adjustment	142	24.3
	Phase 3: Acceptance	259	44.3
	Phase 4: Growing Stronger	131	22.4
	Phase 5: Helping Others	0	0.0
Coping	Low	301	51.5
	Medium	263	45.0
	High	21	3.6
Preparedness	Low	375	64.1
	Medium	210	35.9
	High	0	0.0

Table 2. Ordinal regression statistical analysis predicts family resilience

Variable	Family Resilience			Coping			Disaster Preparedness		
	P value	CI	OR	P value	CI	OR	P value	CI	OR
Village	0.000*	0.084–0.252	15.367	0.058	0.003–0.182	3.603	0.544	0.070–0.133	0.368
Age	0.750	0.155–0.216	0.102	0.000*	0.662–1.115	59.116	0.732	0.185–0.264	0.118
Gender	0.000*	1.184–2.248	39.955	0.000*	0.543–1.710	14.324	0.579	0.427–0.765	0.308
Educational Background	0.453	0.093–0.208	0.562	0.000*	0.765–1.153	93.996	0.017*	0.041–0.408	5.735
Income	0.000*	0.852–0.446	131.220	0.000*	0.363–0.670	43.602	0.000*	0.462–0.811	51.298
Occupation	0.000*	1.270–1.807	39.526	0.000*	0.275–0.672	21.883	0.002*	0.135–0.588	9.757
Worship culture	0.000*	1.278–.807	130.779	0.031	0.026–0.540	4.643	0.000*	1.126–1.800	72.529

* Significant P Value < 0.05

DISCUSSION

A Description of Family Resilience, Coping and Disaster Preparedness

The best family resilience phase for families living in disaster prone areas, namely North Lombok District, is the Growing Stronger phase. Not yet found are families who have reached the highest family resilience phase, helping others. Unfortunately, there are still families who are in the survival phase, although the numbers are small. Disaster victims will form attitudes awaiting the arrival of disasters, as reflected in community resilience [11]. The majority of families in the growing stronger phase is evidence that families in the North Lombok District are, consciously or not, waiting for a disaster to come. The meaning of waiting is a form of precaution. Watch out for disasters that can come suddenly.

More than half of families living in disaster prone areas, namely North Lombok District, have low coping rates. Ironically, high coping is only owned by less than one-tenth of the study sample. The extraordinary impact of the disaster is coupled with limited assistance, inadequate health facilities, physical and psychological impact. Meeting the needs of victims is far from enough and likely to cause setbacks and worsen psychological conditions [12]. The number of stressors and the effects caused by natural disasters cause flood victims to be flooded with stressors. These lead the victims of the disaster to become frustrated. The frustrating effect decreases the effectiveness of coping mechanisms, because the psychological victim experiences a form of fatigue.

The majority of families living in disaster prone areas, namely Lombok District, have a low level of preparedness.

Ironically, a high level of preparedness was not found in the families participating in this survey. According to research conducted in Bangladesh, disaster preparedness is influenced by many factors, one of which is understanding the symptoms of disaster risk [13]. If disaster victims do not understand the symptoms of disaster risk then there will be no action taken. This relates to the current level of knowledge and information about disasters. The likelihood of disaster preparedness in North Lombok is not high because the people expect the government to be an agent which shows indications of disasters and helps them to be prepared.

The Association Variable of Family Resilience

The location of the village or family residence was found to influence the family resilience phase. Families living on the coast were found to be in a higher family resilience phase. The results of research conducted in Bangladesh on disaster victims and still at risk of experiencing more disasters, found that the location or place of residence greatly affects community resilience [14]. It seems that families living on the coast are more deeply aware of the horrors that arise when a tsunami warning is announced, because they live in what might be the first time a tsunami will cause them to be swept away. Experience as an effect of this residence helps the formation of family resilience.

The sex of the head of the family was found to influence the phase of family resilience. A family led by a man has a tendency to increase in the family resilience phase. Decision-making in times of crisis, such as disasters, requires a great deal of logic and rules over feelings. Although the effects of disasters affect the decision-making

process, gender specifically shows a different response to it [15]. There is still a division of roles between the sexes, which is conservative in Indonesia, especially in rural areas. Local communities still consider men as leaders and women as household managers. It seems that this culture influences the head of a woman's household to encourage increased family resilience.

Family income is found to affect the family resilience phase. Families who have a higher monthly income will be in a phase of higher family resilience as well. Income affects family resilience through the mechanism of materially growing family resilience. Fulfillment of complete resources is very important in surviving natural disasters [15]. Fulfillment of completeness can be done with enough money. Technically, the more income then the family also has more money, by setting aside accounts receivable debt that the family may have. Regression models show that income increases family resilience.

The worship of Islam is found to influence the phase of family resilience. Routine families and istiqomah in carrying out Islamic religious worship, such as compulsory prayer five times daily, tilawatil Al-Quran, and dhikr, tend to have a high family resilience. Increased resilience independently or by individual strengthening mechanisms without professional psychological intervention is possible [16]. Especially with the help of spirituality, which encourages individuals to think clearly and encourages psychic reinforcement significantly [17]. Disaster victims' families in the Lombok sub-district are Muslim and religious culture is very heavily practiced so that spirituality provides exposure with high frequency.

The Association Variable to the Level of Coping

The age of the head of the family was found has association to the level of family coping. Families led by an older person tend to have higher coping. Exposure to large stressors in young people is reported to be more prone to disrupt mental health. This is allegedly caused by young age still not fully being able to provide care, but more likely to need to be treated [18]. A more mature family head is thought to be able to take care of the family and foster improvement in mental health so that family coping can increase. The sex of the head of the family was found to affect the level of family coping. A family led by a man has a tendency to increase the level of coping. Culture forms the norm that is applied to the community, including the family. Culture is sometimes invisible, but it actually has an influence on the mindset and norms adopted by the family [19], [20]. Families at the study site still apply the male gender as a leader. So that, culturally, men are better trained to be leaders than women.

Education is found to affect the level of family coping. Families led by a person with a tertiary education have a tendency to increase coping rates. Higher formal education helps the family head to digest information better. Higher education also helps in the analysis of decision-making [21]. Family coping is effective if the head of the family is able to direct the family to behave toward problems that occur. Earnings obtained affect the level of family coping. Families who have a higher income have a tendency to increase in coping as well. Sufficient income means that the family also has sufficient resources, because resources can be bought with money. Families with enough money add choices in determining steps to deal with problems [22]. The choice of a clear solution can be achieved, which will strengthen the family to form adaptive coping.

Islamic worship is found to affect the level of family coping. A family that is routine and istiqomah in practicing Islamic religion has a tendency to increase coping. Worship

increases the level of spirituality. Increased spirituality provides tranquility so as to eliminate doubt. Decision-making can be done if the family has no doubts [23]. In order for coping to form, the family must make a decision regarding the solution that must be done. There will be many solutions to a stressor, as will be the steps taken about a solution. Thus, calm in making decisions is needed. Worship can provide peace to the family.

The Association Variable of Disaster Preparedness

Education is found to affect the level of family preparedness. Families led by educated heads tend to have high levels of disaster preparedness. A high level of education gives families more access to related forms of activity, which can support preparedness. One example is that investment knowledge is not obtained if the family does not have enough education [24]. Investments can help families to get more resources so that families are able to prepare adequately.

Earnings obtained affect the level of family preparedness. Families who have a higher income tend to have a higher level of preparedness. Family vulnerability to disaster is declined if the household income rises. A study in Bangladesh reports that affluent families recover much quicker compared to impoverished families. The study implies that a family with many resources in a form of wealth was able to recover quickly [25]. This is somehow expected, because disaster preparedness means that the family has to provide resources such as food, evacuation needs, even medicine. Let alone the necessity of house renovation due to disaster destructive effect. Family without enough wealth tends to wait for the government or any help so that they can then start to prepare.

Islamic worship is found to affect the level of family preparedness. Routine and istiqomah families who carry out worship have a tendency to a higher level of preparedness. Worship encourages the temporal lobe to work so that positive thoughts can form in the family [21], [26]. Positive thinking about disaster is preparing to face it. Thus worship that promotes positive thoughts has a strong influence on preparedness activities.

The limitation of the study is not taking control of the sampling process, since snowball sampling is employed, there is a potential of the sample included to be restricted only in the favorable or unfavorable characteristics. The study doesn't take account of the previous disaster education that the family had received. This is just a depiction of disaster preparedness, especially on the level of knowledge.

CONCLUSION

The family resilience in coastal area in helping others phase with the family coping and disaster preparedness in low level category. Income factor has the highest association with family resilience, educational background was the strongest correlation with coping and for the disaster preparedness among respondents showed that worship culture have higher correlation than other factor.

REFERENCES

- [1] BMKG RI, "BMKG (Badan Meteorologi, Klimatologi, dan Geofisika)," Laporan Gempabumi, 2018. .
- [2] F. Ramdani, P. Setiani, and D. A. Setiawati, "Analysis of sequence earthquake of Lombok Island, Indonesia," Prog. Disaster Sci., vol. 4, p. 100046, 2019.
- [3] S. Sherchan, R. Samuel, K. Marahatta, N. Anwar,

- M. H. Van Ommeren, and R. Ofrin, "Post-disaster mental health and psychosocial support: Experience from the 2015 Nepal earthquake," *WHO South-East Asia J. public Heal.*, vol. 6, no. 1, pp. 22–29, 2017.
- [4] R. Hoffmann and R. Muttarak, "Learn from the Past , Prepare for the Future : Impacts of Education and Experience on Disaster Preparedness in the Philippines and Thailand," *World Dev.*, vol. xx, 2017.
- [5] M. Wang, C. Liao, S. Yang, W. Zhao, M. Liu, and P. Shi, "Are People Willing to Buy Natural Disaster Insurance in China? Risk Awareness, Insurance Acceptance, and Willingness to Pay," *Risk Anal.*, vol. 32, no. 10, pp. 1717–1740, Oct. 2012.
- [6] M. Åkebo, "Disaster Governance in War-Torn Societies: Tsunami Recovery in Urbanising Aceh and Sri Lanka," in *Disaster Governance in Urbanising Asia*, Singapore: Springer Science & Business Media, 2016, pp. 85–107.
- [7] M. Mundakir, "Dampak Psikososial Akibat Bencana Lumpur Lapindo," *J. Ners*, vol. 6, no. 1, pp. 42–49, Apr. 2017.
- [8] J. M. Patterson, "Integrating family resilience and family stress theory," *J. marriage Fam.*, vol. 64, no. 2, pp. 349–360, 2013.
- [9] C. Riley et al., "Preparing for Disaster: a Cross-Sectional Study of Social Connection and Gun Violence," *J. Urban Heal.*, vol. 94, no. 5, pp. 619–628, Oct. 2017.
- [10] S. Folkman, *Ways of coping questionnaire, sampler set, manual, test booklet, scoring key*. Palo Alto: CA : Consulting Psychologists Press, 1988.
- [11] G. Gumelar, Z. Akbar, R. D. Suryaratri, H. Erchanis, and L. D. Wahyuni, "The Effect of Family Resilience towards Household Disaster Preparedness in Coastal Coast District of Sumur, Banten," in *IOP Conference Series: Earth and Environmental Science*, 2020, vol. 448, no. 1.
- [12] T. Taufik and R. Ibrahim, "Making Sense of Disaster: Affinity to God as a Coping Strategy of Muslim Refugees in Central Sulawesi," *J. Loss Trauma*, vol. 25, no. 1, pp. 61–73, Jan. 2020.
- [13] S. Chakma and A. Hokugo, "Evacuation behavior: Why do some people never evacuate to a cyclone shelter during an emergency? a case study of coastal Bangladesh," *J. Disaster Res.*, vol. 15, no. 4, pp. 481–489, Jun. 2020.
- [14] M. S. Uddin, C. E. Haque, D. Walker, and M. U. I. Choudhury, "Community resilience to cyclone and storm surge disasters: Evidence from coastal communities of Bangladesh," *J. Environ. Manage.*, vol. 264, Jun. 2020.
- [15] P. D. Udmale et al., "How did the 2012 drought affect rural livelihoods in vulnerable areas? Empirical evidence from India," *Int. J. Disaster Risk Reduct.*, vol. 13, pp. 454–469, Sep. 2015.
- [16] A. P. Rajkumar, T. S. Premkumar, and P. Tharyan, "Coping with the Asian tsunami: Perspectives from Tamil Nadu, India on the determinants of resilience in the face of adversity," *Soc. Sci. Med.*, vol. 67, no. 5, pp. 844–853, Sep. 2008.
- [17] D. Gillies, L. Maiocchi, A. P. Bhandari, F. Taylor, C. Gray, and L. O'Brien, "Psychological therapies for children and adolescents exposed to trauma," *Cochrane Database Syst. Rev.*, vol. 2016, no. 10, 2016.
- [18] Y. Tian, J. Chen, and X. Wu, "Parental attachment, coping, and psychological adjustment among adolescents following an earthquake: a longitudinal study," *Anxiety, Stress Coping*, 2020.
- [19] E. Sloand et al., "Experiences of violence and abuse among internally displaced adolescent girls following a natural disaster," *J. Adv. Nurs.*, vol. 73, no. 12, pp. 3200–3208, 2017.
- [20] H. Digregorio, J. S. Graber, J. Saylor, and M. Ness, "Assessment of interprofessional collaboration before and after a simulated disaster drill experience," *Nurse Educ. Today*, vol. 79, pp. 194–197, 2019.
- [21] I. Timshel, E. Montgomery, and N. T. Dalgaard, "A systematic review of risk and protective factors associated with family related violence in refugee families," *Child Abus. Negl.*, vol. 70, pp. 315–330, 2017.
- [22] P. Mellgard, "The European Migrant Crisis Is A Nightmare. Climate Change Will Make It Worse. | Huffington Post," *Huffingtonpost*, pp. 1–7, 2015.
- [23] M. Rahnama, H. Shahdadi, S. Bagheri, M. P. Moghadam, and A. Absalan, "The relationship between anxiety and coping strategies in family caregivers of patients with Trauma," *J. Clin. Diagnostic Res.*, vol. 11, no. 4, pp. IC06–IC09, 2017.
- [24] S. Mattsson, E. M. G. Olsson, B. Johansson, and M. Carlsson, "Health-Related Internet Use in People With Cancer: Results From a Cross-Sectional Study in Two Outpatient Clinics in Sweden," *J. Med. Internet Res.*, vol. 19, no. 5, 2017.
- [25] M. A. Sattar and K. K. W. Cheung, "Tropical cyclone risk perception and risk reduction analysis for coastal Bangladesh: Household and expert perspectives," *Int. J. Disaster Risk Reduct.*, vol. 41, p. 101283, Dec. 2019.
- [26] A. Atreya et al., "Adoption of flood preparedness actions: A household level study in rural communities in Tabasco, Mexico," *Int. J. Disaster Risk Reduct.*, 2017.