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Exploring problems and needs in disaster preparedness : a qualitative study

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ABSTRACT

Introduction: Disasters are sudden, unplanned events that cause damage and loss to people. The way people understand or interpret disasters that occur is very diverse, so they respond and act on differently in anticipating future disasters that may occur in their environment. There is also diversity in problems and needs based on community perception. The purpose of this research is to explore the problems and needs related to disaster preparedness in the community.

Methods: An ethnographic study was conducted from September 2021 until July 2022 at Central Sulawesi. Twenty-five participants who met the inclusion criteria were involved through purposive sampling. The inclusion criterion was communities who directly affected by the Palu disaster on September 28, 2018. Researchers used a semi-structured interview guide as a data collection tool. Recording devices were used during the interviews. Interview data were recorded verbatim and the data analysis process was based on Gerrish and Lacey. Checking members and bold descriptions was done to maintain the validity of the data.

Results: Three main themes were found from emerging data, 1) Health support needs, 2) Knowledge support needs, and 3) Disaster support system needs., the researchers asked both community members and parties concerning problems and needs in regard to preparedness related to disasters.

Conclusions: Information support related to disasters, technology support especially in terms of early warning systems, as well as socialization and first aid training for health are needed for the community to support the sustainability of disaster preparedness in the community.

Keywords: community, disaster, need, preparedness, problem

Introduction

Indonesia is located on the equator and is the largest archipelago country located between the continents of Asia and Australia. Given its high exposure to various natural and climate hazards as well as considerable social vulnerability, Indonesia is considered to be one of the most disaster-prone countries (UNU-EHS, 2014). Interaction between residents increases, uncontrolled increase in urbanization and social and environmental impacts which are not considered due to economic development, has led to disasters and high climate-related vulnerability and risk in Indonesia (Djalante et al., 2017). Disasters can also be described as the combined result of exposure to a hazard, existing conditions of vulnerability, and inadequate capacity or actions to mitigate or deal with the potential negative consequences. Loss of life, injury, disease and other negative impacts on the physical, mental and social aspects of humans, including property damage, damage to assets, loss of services, social and economic disruption, and environmental degradation, are the impacts of disasters. Normal life patterns can be disrupted, physical and emotional pain and a sense of great helplessness and hopelessness are also the effects

of disaster. Disasters also have an impact on the socioeconomic structure of a region and the environment often require outside assistance and intervention. Disasters affect society in many ways. The impact on healthcare infrastructure is also multi-factorial.

Previous studies show that disasters can have an impact on society. In general, awareness, vigilance and preparedness have grown and developed through regular training, learning from the experiences of several developed countries that are prone to disasters such as Japan, the United States, Germany, Korea South, and several countries in Europe (Roskusumah, 2013). Communities that are able to cope with the impact of disasters on their own, can survive and bounce back are called safe communities. Safe community is not only the ability to cope with disasters but also the ability to deal with potential disturbances as a whole. Safe communities are formed by people who understand the nature of the disaster threats they face. This understanding can be obtained through counseling and training (Ismunandar et al., 2021). Increased knowledge to be aware of disaster preparedness can achieved with socialization with the aim of educating. That matter in line with the activities carried out by BNPB, that socialization regarding disaster awareness is very important to do to reduce the impact when a disaster occurs (Pahleviannur, 2019).

The earthquake and tsunami that rocked Palu and Donggala Central Sulawesi on Friday 28 September, 2018, at around 17.02 WIB was not the first in the history of disasters in the area. On Saturday, the National Disaster Management Agency (BNPB) released that Palu and Donggala had experienced earthquakes and tsunamis several times. History records that on December 1, 1927, an earthquake and tsunami occurred in Palu Bay. Local government officials did not fully understand the flow and procedures for responding to disasters quickly, as was evident during the disaster that hit Palu City and several other areas of Central Sulawesi. The government and society showed unpreparedness in facing the disaster. This can be seen from the monitoring results of the Partnership Team for Governance Reform at the Karajalemba Joint Post (Civil Society Coalition for Humanity) for the period 10-19 October, 2018. Assistance came from ministries/agencies and non-governmental organizations who came repeatedly and concentrated in the office courtyard of Palu City Government during the initial monitoring period. From the testimonies of the victims of the disaster, they explained that the pattern of aid distribution seemed unprofessional, because up to three days after the disaster they had not received aid (Samad et al., 2018). Cultural approaches to disasters and disaster resilience need to consider the community and cultural aspects, which are interconnected to the social structure of the society and the previous characteristics of the specific social groups (Lucini, 2014). The cultural difference behind this study is that researchers want to explore from the point of view of people living in disaster-prone areas about the disasters around them, including problems and needs related to disaster preparedness. How people see problems and needs related to disaster preparedness can be very different and this research explores the problems and needs related to disaster preparedness from the community's point of view.

Materials and Methods

This study uses a qualitative research method, specifically Focused Ethnography. The research area in this study is in Palu district, especially Lere Village, under the working area of the Kamonji Health Care Center. Inclusion criterion for main key informants is community members who were directly affected by the disaster that happened on 28th September, 2018. Total of participants in this study is 27, consisting of community members who lived in the area that directly affected by the disaster, community leaders, religious leaders, healthcare providers including a nurse, midwife, and representative of the health department, rescuer teams, both government and non-government. and a parliament member. A tape recorder was used to record the results of the interviews which were then transcribed verbatim. The data obtained were then analyzed to get a theme in accordance with the research objectives. This study will follow the analysis data process of ethnographic study according Gerrish and Lacey (2010) which comprises seven steps of data analysis. An example of the data analysis process is shown in Table 1.

The researcher validated the data by checking members as validation of the research results, to ensure reliability. The results of the research were compared with the results of similar studies to test the transferability of the research results. To guarantee the ethical consideration for this study, research ethics approval was obtained from Institutional Review Board (IRB) Khon Kaen University, no HE632304 on 16 June 2021. The research applied ethical principles in data collection, maintaining the confidentiality of participants' identities, benefits, fairness, and no harm carried out by researchers in the data collection process.

Table 1. Example of data analysis

Quotes	Coding	Sub themes	Themes	Categories
"*Ma'am, we have to live in refugee camps until now, because our I lost my house, ma'am; it's hot in the refugee camp, children who get sick easily, husbands also lost the boats to earn a living. There's no help now, ma'am, since this year's fasting month.*" (P7, 27 years old, housewife)	Loss house	Loss of assets	Economic loss	Community understanding related with impact of disaster
"*I just focused on running and seeing my two children, so many people were being pushed around by my body, there I lost my two children. After 3 days in the refugee camp I met my son number 1. He was found on the roof of the shop, when he met me, he was crying while hugging me, he was sorry he couldn't take care of his sister; his sister was taken with water.*" (P10, 30 years old, fish seller).	Loss child	Loss of someone close	Loss of human life	Community understanding related with impact of disaster
"*I have to admit, from the **many agencies** involved, we **lack coordination**. Preparedness is a separate division in BPBD, before the incident there were practically very few activities, now after the incident, we plan to socialize the Disaster Prepared Bag, but of course it must be coordinated with other agencies so that it is in line. Our programs often clash.*" (G4, 37 years old, Provincial Disaster Management Board).	Lack coordination	Organizational factor	Disaster support system need	Organizational problem related with disaster preparedness
"*The **elder's message**, always pay attention to it is sea water, when it is high and low. If **suddenly, the sea water recedes** as if it was sucked into the middle, run quickly, go to a high place. That's a sign of a tsunami.*" (P5, 41 years old, fisherman).	Elder's message	Knowledge from ancestor	Local knowledge factor	Factors that affect community preparedness in dealing with disasters

Whenever a participant feels uncomfortable, they can withdraw from the study, and there are no consequences.

Characteristics of participants

The main key informants in this study are a community directly affected by disasters. General informants involved in this study are community members who lived in the area directly affected by disaster, community leaders, religious leaders, healthcare providers including a nurse, midwife, and representative of the health department, rescuer teams, both government and non-government. and a parliament member. To choose key informants, the researcher had inclusion criteria, described as a set of predefined characteristics used to identify subjects who will be included in a research study (Salkind, 2010). Inclusion criteria for main key informants are community members who were directly affected by the disaster that happened on 28th September 2018. Table 2 shows the demographic characteristics of the participants.

Results

Search results

The results of community disaster preparedness problems and needs are categorized into three themes, namely: 1) Knowledge support needs, 2) Disaster support system needs, and 3) Health support needs. The researchers asked both community members and parties about problems and needs related to preparedness for disasters. Communities that experience large-scale disasters can have further trauma when outside organizations responding to the event fail to take into account the local culture, expertise, and capacity. Many experts call for greater understanding differences in society to encourage collaboration. Organizations from outside that try to address the problems and needs of the community, but ignore the cultural values that exist in society, will cause new problems later.

Theme 1: Health support needs

Health support needs are categorized by: 1) Education about first aid, and 2) Improved rapid response system. One of the impacts of disasters is the impact on public health, coupled with the loss of access, so that the perceived impact will be even greater.

Table 2. Demographic data of participants

Demographic Characteristics	Frequency	Percentage (%)
Age		
26 – 35	5	33.3
36 – 45	14	53.3
46 – 55	6	13.4
Level of Education		
Elementary School	6	24
Junior High School	5	20
Senior High School	7	28
Bachelor Degree	6	24
Master Degree	1	4
Occupation		
Housewife	5	20
Fisherman	4	16
Do not have permanent	1	4
job	3	12
Fish seller	1	4
Cleaning Service	1	4
Flower seller	8	32
Government	2	8
Non-Government		
Religion		
Islam	23	92
Christian	2	8

consequences that can endanger the health and lives of people are very important. After a disaster, a large number of people will need proper healthcare. Disasters demand a variety of needs because they differ greatly according to time, place, and extent. In critical situations, great efforts must be made to ensure that everyone receives proper care and lives are preserved. A well-organized disaster preparedness plan and effective community participation are essential to reduce the impact of natural disasters. Disaster health management is a systematic process, administrative, organizational, and operational decision-making skills and capacities, which deal with planning challenges to improve and reduce the health consequences of natural disasters.

"I was also in pain, my wife could only cry. Finally I tore my shirt, I told my wife to tie my wound. My wife and I both have hypertension, usually every night we take medicine from the puskesmas. After 3 nights in the upper village, new help arrived, ma'am, my head was about to explode, my body was hot and cold. Not only was I sick, many on the pitch were sick, but we both didn't know what to do. There was a wound on his head, legs, left alone, until the blood was dry." (P6, 35 years old, fisherman).

"For 3 days, we saved ourselves in Kawatuna, we just gathered in the field. Then, we heard that those in the Great Mosque, and at the city hall. Finally, on the third day, we walked to the Great Mosque, where we got there. Masya Allah, there was a lot of food, medicine. Even though we were only 7 kilometers away, the help did not reach us. I can't imagine that if there were refugees who were farther away from us, they might starve to death." (P7, 26 years old, housewife).

Theme 2: Knowledge support needs

On the theme of the need for knowledge support, it can be done through: 1) Routine of training, and 2) Socialization about disaster on a regular basis. Loss of life, property, jobs and damage to physical infrastructure and the environment are a real impact of
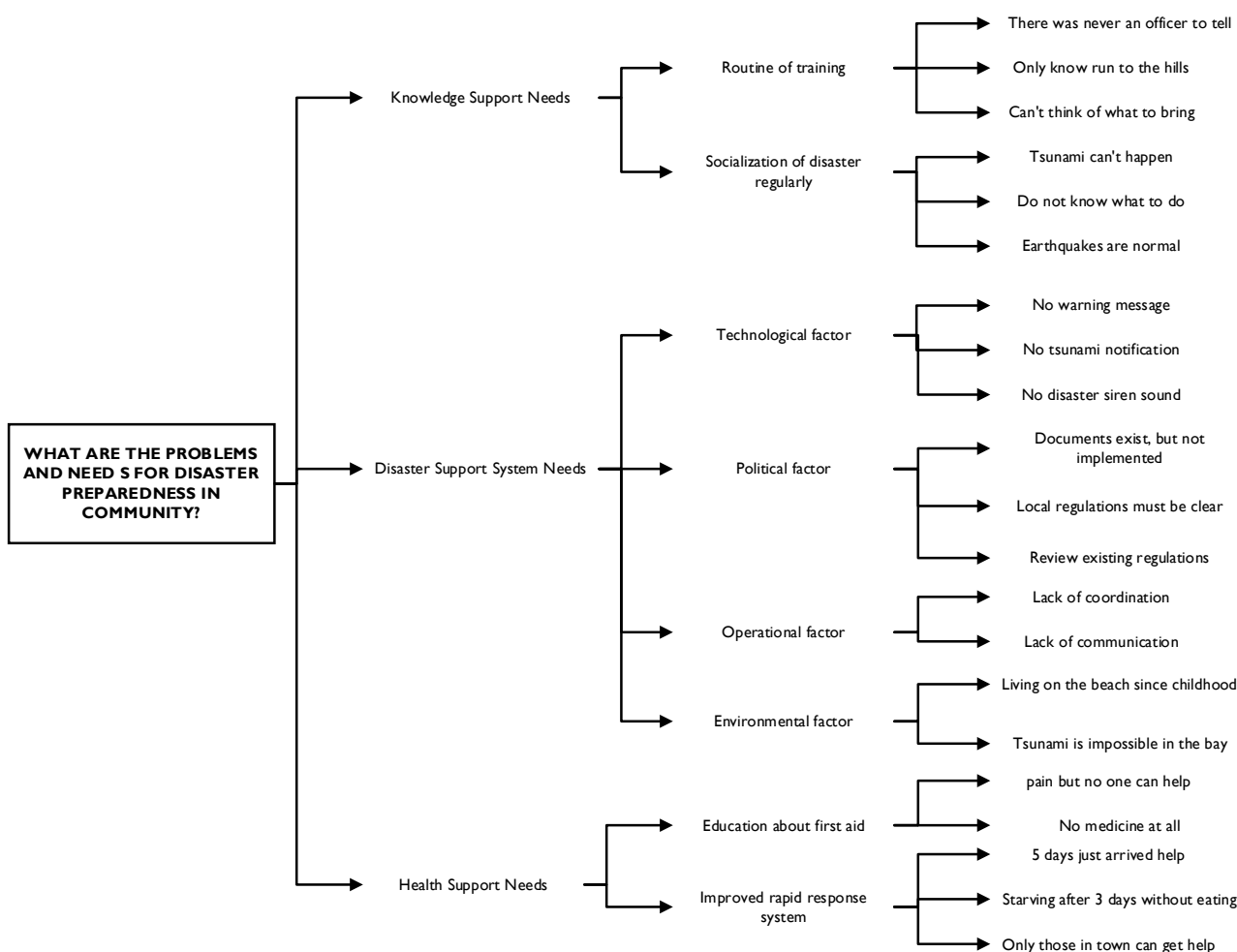

Figure 1. Problem and Needs for disaster preparedness in community

the disaster. During the last century, and increasing sharply over the last decade, the number of reported disasters has continued to increase. There are perceived gaps in coordination and information sharing in the context of disaster management, while knowledge management can improve disaster management processes. Identification of key disaster knowledge factors will be a driving force for successful disaster management. The level of community preparedness in dealing with disasters can be affected due to a lack of knowledge about disasters.

"*Before the big disaster, as far as I remember, we were only gathered in the field once, there was an ambulance. There were people from the regional disaster department, he said, so we were trained there if for example there was a disaster what to do, how to help other people. But yes, only once as I recall, after that nothing at all. Yes, if this is the case, we live in a disaster area, what we want is training so that we are ready, in case there is another disaster.*" (P16, 35 years old, fisherman).

"*Ma'am, I never thought that we would face a tsunami. At the age of 50, since I was little, there was no tsunami, nor have I heard from my parents' stories. Parents said we live in the bay, so there's no way a tsunami would come. So, I just believe what my parents say, how come suddenly after a big earthquake followed by a tsunami, ma'am.*" (P2, 45 years old, fish seller)

Theme 3: Disaster support system needs

For problems and needs related to the disaster support system, there are four sub-themes found, namely: 1) Technological factors, 2) Political factors, 3) Operational factors, 4) Environmental factors. Several factors contributed to the current disaster response effort, which also reflects the lack of disaster preparedness. The features of most disaster preparedness arrangements are embedded in complex and rapidly changing decision-making environments. Systematic weaknesses in how decisions are made within the organizational hierarchies of many agencies involved in disaster preparedness are also reflected in this system. Delays and ineffective strategies in collecting, processing, and analyzing data can also play a role. Information technology, especially decision support systems, can be used to reduce the time needed to make important decisions about task assignments and resource allocation.

"*Earthquakes have happened here many times, ma'am, not just this once. In the past, if there was an earthquake like that, I received an SMS notification, how big was the earthquake, there was a potential for a tsunami or not. Yesterday, from the morning of the earthquake, from 10 am if I'm not mistaken, there was also no SMS, a warning there will be a tsunami, there is no ma'am, there is no warning. Maybe everyone is busy with festival events.*" (P15, 32 years old, fish seller).

"*The Palu City Government has a document called a contingency document. What made me sad, because at that time I was already serving in parliament, I got the contingency document in Jakarta, not in Palu. It was my question at that time, how could important documents of our city be in the capital. The document is complete, explaining the conditions and risks that the city of Palu can face and what possible scenarios to overcome them. Currently the document has returned to Palu.*" (G5, 37 years old, Municipality Parliament Member).

Discussions

Preparedness is generally seen as consisting of activities aimed at increasing response activities and coping capabilities. Planning effectively during and in the immediate aftermath of a disaster but also for successfully navigating the challenges associated with short- and long-term recovery, is an emphasis on preparedness that emphasizes recovery efforts (Sutton, 1999). Delivering information about hazards, risks and actions to the general public is an important public education related to disaster preparedness. One of the hopes of disaster preparedness at the household level is that households will adopt protective measures and keep essential supplies for survival of up to three days, which will make surviving afterward more comfortable until formal assistance is available. Much of the research on how to promote individual preparedness has tended to focus on perceived risk and influence communication (Touhy, Stephens and Johnston, 2014).

Disaster knowledge factors are defined as facts that increase knowledge about managing disasters successfully. Therefore, the disaster knowledge factor can directly or indirectly affect the process and outcome of disaster management. The identified factors are classified into several categories based on their characteristics: Technological, Social, Environmental, Legal, Economical, Operational/Management, Institutions and Politics. These factors are common to all types of disasters and across three phases; mitigation/ preparedness, assistance/ recovery and reconstruction/ rehabilitation (Pathirage et al., 2014).

Training is the systematic acquisition of knowledge and skills with the aim of developing the necessary competencies for effective performance in the work environment. Training can also be defined as the steps involved to prepare and reduce (Nazli, Sipon and Radzi, 2014).

As stated by the participants, their need for disaster training will greatly assist the community in preparing for future disasters, given that participants are aware that they live in disaster-prone areas. A lack of understanding and awareness. communities and actors managing biological resources and the environment against disaster risk in their area are the main factors causing the large number of casualties, damage and losses caused by disasters, in general. In addition, an inseparable factor is inadequate structural mitigation support. This results in a lack of awareness, vigilance and preparedness in dealing with disasters. Awareness, alertness and preparedness can be grown and developed through routine training (Roskusumah, 2013).

Disasters that occur can have a catastrophic impact on the community. Communities that are able to cope with the impact of disasters on their own, can survive and bounce back are called safe communities. Safe community is not only the ability to cope with disasters but also the ability to deal with potential disturbances as a whole. Safe communities are formed by people who understand the nature of the disaster threats they face. This understanding can be obtained through counseling and training (Ismunandar et al., 2021).

In many areas facing the dangers of earthquakes, tsunamis and volcanic eruptions, detailed data and information regarding the hazards faced and their intensity are still lacking. The latest science and technology is used as an assessment. Such information is needed to develop science-based risk reduction measures for highly disaster-prone areas. There is a need to involve universities in the development of disaster research, science and technology. Indonesia's disaster management system has five main pillars or subsystems, namely legislation, planning, institutions, budget, and capacity. The system was built to address existing problems and challenges and is described in the following programs: 1) regulatory and institutional capacity improvement; 2) integrated disaster management planning; 3) research, education and training; and 4) community and stakeholder capacity building and participation in disaster risk reduction (National Agency of Disaster Management, 2009).

In prior study, after the 2004 tsunami, Indonesia built a tsunami early warning system (Indonesian Tsunami Early Warning System – Ina-TEWS) under the coordination of the Ministry Research and Technology, and operated by Meteorology Climatology and Geophysics Council (BMKG). Germany contributed to construction and development of Ina-TEWS which includes monitoring systems, processing and analysis, deployment, development capacity, as well as increased awareness and community preparedness. One of the examples is that the rapid assessment team together conducted an evaluation tsunami early warning system in the earthquake and tsunami event in Aceh 11 April, 2012. In the report, it was stated that although BMKG had issued a tsunami warning, the siren not activated by local government so that 10 minutes after the warning, the siren was activated by BMKG remotely; however, some sirens cannot be activated. Based on media coverage and statements by BMKG, the tsunami early warning system did not succeed in detecting the 2018 tsunami in Palu, resulting in many casualties. In addition, verification of the incident in Palu could not be done because there were no functioning telephone lines in Palu shortly after the earthquake occurred. Despite the failure of the warning system, the community is also considered not to have had a self-evacuation reflex in the event of an earthquake (Kurniasih, Marin and Setyawan, 2020).

Tsunamis are predictable and people in their path are warned to move to a safer location; however, it can be difficult to predict earthquakes. The lack of a tsunami early warning system in the Indian Ocean was demonstrated during the Sumatra earthquake and subsequent tsunami in 2004 (Pathirage et al., 2014).

From the results of the study, it was found that the lack of coordination between institutions involved in disasters was also considered a problem. Regular coordination between related institutions, as well as clarity of disaster documents, are also felt to be very helpful in dealing with future disasters. Research in the hazard and disaster field focuses explicitly on governance topics, although there is considerable research related to disaster management, law, and risk reduction policies and programs. This review begins by placing disaster governance within the broader framework of environmental, risk and earth system governance and by defining disaster governance. Governance arrangements, describing the characteristics of systems, and providing examples of governance institutions and processes at various scales,

are influenced by social, economic, as well as political forces, and are further discussed (Fuentes, 2017).

Other consequences associated with disasters encompasses deaths of many people, high costs over time, great economic and political impact, social and psychological disorders, damage to infrastructure, damage to houses, loss of property, and generally social disturbance of life in society. Among all that, the consequences that can endanger public health and life are very important. After the disaster, the impact is significant as a number of people will need proper healthcare. The risk of an outbreak is often greater in an emergency. Disasters reduce the physical health of survivors with injuries, and intensify chronic diseases (Pourhosseini, Ardalan and Mehrolhassani, 2015).

Nurses, as the largest group of committed health workers, often working in difficult situations with limited resources, play an important role when disaster strikes, serve as first responders, triage officers and care providers, care and service coordinators, information or education providers, and counselors. However, health systems and services in disaster situations only work when the nurse has the fundamental disaster competence or the ability to respond quickly and effectively. Multiple available definitions of disaster or emergency are all useful in reminding us that events are out of the ordinary or require resources beyond what is readily needed, so the response became known as the 'disaster' response.' As with jobs prepared for a global nurse audience, individual countries nursing regulations, employing agencies and institutions must interpret the world's expectations within the legal, cultural and ethical frameworks in which they function (International Council of Nurses, 2019).

Public health approach to disaster risk management should focus on reducing community vulnerability through prevention and mitigation and improvement measures coping capacity and readiness of the health sector and community and reduced access to health services (Disease Control Priorities Project (DCPP), 2007). It requires the concerted efforts of multiple systems and sectoral parties to prevent and reduce risk, prepare for emergencies, ensure effective response and recovery, and collectively contribute to the resilience of communities and countries to minimize health consequences and improve health outcomes, well-being and public safety (World Health Organization, 2019). First aid is not a substitute for all emergency services. However, to help reduce serious injury and increase the chances of survival, first aid is an important first step to provide effective and fast action. Salnil saves lives,

taking urgent action and employing the right technique makes a difference. For the Red Cross Red Crescent, a key pillar for building safer and more resilient societies is first aid, which in turn is the best place to increase the impact of disaster preparedness and reduce risks to health. To achieve this, the International Federation of Red Cross and Red Crescent Societies (IFRC) believes that first aid must be accessible to all, including the most vulnerable, and an integral part of a broader development approach that values and prioritizes prevention (IFRC, 2016).

Good preparation supported with the capacity to respond, at the national to local level, through a clear emergency response plan approach, must be owned, so that the health sector is able to respond to various emergencies in public health problems. Public health emergencies can also be complex, combining more than one hazard. Countries and people are often faced with these dangers, both simultaneously and as a result of such as armed conflicts after natural disasters, seasonal epidemics in prolonged crises, etc. For example, during the COVID-19 pandemic, several countries also had to deal with concurrent emergencies that required an immediate response: earthquakes in Croatia, floods in Indonesia, Cyclone Yaa in Bangladesh, explosions in Beirut, and typhoons in the Caribbean islands, not to mention the outbreak of seasonal infectious diseases, are just a few examples (World Health Organization, 2019).

One of the most important links in the chain preparedness in emergencies and disasters is the health system with all its institutions at the primary level and secondary health. Over the historical timeline, we have recorded thousands of disasters. Some of them are local, while other people transcend all boundaries and their influence is not only global in the geographical sense but the consequences have been felt by many generations (Dobricanin, Djokic and Dobricanin, 2018).

Conclusions

Cross-sectoral support and cooperation is needed so that community preparedness can be fulfilled. Even though people are used to the environment in which they live, it is necessary to increase public awareness of the dangers, potential disasters and risks that may occur in their environment. Good coordination between organizations involved in disaster management will support the achievement of sustainable disaster management, which includes disaster preparedness. Of course, financial factors also play a very important role, because the budget for disaster management, including

preparedness, is still sourced from the central and local governments. Local governments are very likely to receive grants from foreign parties, but in accordance with existing laws and regulations in Indonesia.

The impact of disasters is quite broad, especially the disaster that occurred in Palu not only triggered by one disaster, but multiple disasters, making the impact even more severe. One of these impacts is on the existing healthcare system. Cut off of all access and lack of trained personnel for first aid and emergency caused the number of victims to increase. Assistance from non-government organizations, both local and international, was constrained by transportation, which was quite difficult at the time. All incoming aid including non-government organization arrangements are under the command of the Regional Disaster Management Agency.

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References

Disease Control Priorities Project (DCPP) (2007) 'Natural disasters, coping with the health impact: disease control priorities project', Disease Control Priorities Project, (July), pp. 1–4.

Djalante, R. et al. (2017) 'Introduction: Disaster Risk Reduction in Indonesia: Progress, Challenges, and Issues', pp. 1–17. doi: 10.1007/978-3-319-54466-3_1.

Dobricanin, V., Djokic, N. and Dobricanin, S. (2018) 'The role of health systems in emergency response planning', Serb. J. Exp. Clin. Res., 0(0). doi: 10.2478/sjecr-2018-0011.

Fuentes, M. M. (2017) 'Economic Losses, Poverty & DISASTERS', pp. 1–14.

Gerrish, K. and Lacey, A. (eds) (2010) The Research Process in Nursing, 6th Edition. Wiley-Blackwell.

IFRC, I. F. of R. C. and R. C. S. (2016) Resilience : saving lives today ,.

International Council of Nurses (2019) 'Core Competencies in Disaster Nursing Version 2.0', pp. 1–16. Available at: https://www.icn.ch/sites/default/files/inline-files/ICN_Disaster-Comp-Report_WEB.pdf.

Ismunandar, I. et al. (2021) 'Pengetahuan dan Sikap Masyarakat Dalam Kesiapsiagaan Menghadapi Bencana Gempa Bumi dan Tsunami di Huntara Kota Palu dan Sigi The Knowledge and Attitude of Community in Preparedness for Earthquake and Tsunami Disasters at the Palu and Sigi City Shelters Is', Lentora Nursing Journal, 2(1), pp. 12–19.

Kurniasih, A., Marin, J. and Setyawan, R. (2020) 'Belajar dari Simeulue: Memahami Sistem Peringatan Dini Tsunami di Indonesia', Jurnal Geosains dan Teknologi, 3(1), p. 21. doi: 10.14710/jgt.3.1.2020.21-30.

Lucini, B. (2014) 'Multicultural Approaches to Disaster and Cultural Resilience. How to Consider them to Improve Disaster Management and Prevention: The Italian case of two Earthquakes', Procedia Econ. Finance, 18, pp. 151–156. doi: 10.1016/s2212-5671(14)00925-3.

'National Agency of Disaster Management' (2009) Indonesia National Disaster Management Plan 2010-2014., (24). Available at: http://jurnal.irigasi.info/index.php/jurnal_irigasi/article/download/206/277.

Nazli, N. N. N. N., Sipon, S. and Radzi, H. M. (2014) 'Analysis of training needs in disaster preparedness', Procedia Soc. Behav. Sci., 140, pp. 576–580. doi: 10.1016/j.sbspro.2014.04.473.

Pahleviannur, M. R. (2019) 'Edukasi Sadar Bencana Melalui Sosialisasi Kebencanaan Sebagai Upaya Peningkatan Pengetahuan Siswa Terhadap Mitigasi Bencana', J. Pendidik. Ilmu Sos., 29(1), pp. 49–55. doi: 10.23917/jpis.v29i1.8203.

Pathirage, C. et al. (2014) 'Knowledge Factors And Associated Challenges For Successful Disaster Knowledge Sharing', (January 2014), pp. 1–30.

Pourhosseini, S. S., Ardalan, A. and Mehrolhassani, M. H. (2015) 'Key aspects of providing healthcare services in disaster response stage', Iran. J. Public Health, 44(1), pp. 111–118. Available at: https://www.ncbi.nlm.nih.gov/pubmed/26060782.

Roskusumah, T. (2013) 'Komunikasi Mitigasi Bencana oleh Badan Geologi KESDM di Gunung Api Merapi Prov. D. I. Yogyakarta', J. Kaji. Komun., 1(1), p. 59. doi: 10.24198/jkk.v1i1.6031.

Salkind, N. J. (2010) Encyclopedia of Research Design Volume 1, Sage. doi: 10.4135/9781412983907.n1240.

Samad, M. A. et al. (2018) 'Disaster Risk Management in Palu City (case study of natural disasters September 28 2018)', Disaster Management, Risk Reduction, Community Preparedness, 1 no 1, pp. 1–11. http://dx.doi.org/10.31227/osf.io/tk8dw

Sutton, R. (1999) The Policy Process: An Overview - GSDRC, GSDRC Knowledge Services. Available at: https://gsdrc.org/document-library/the-policy-process-an-overview/ (Accessed: 7 August 2023).

Touhy, R., Stephens, C. and Johnston, D. (2014) 'Qualitative research can improve understanding about disaster preparedness for independent older adults in the community', Disaster Prevention and Management, Vol. 23 No. 3, pp. 296-308. https://doi.org/10.1108/DPM-01-2013-0006.

UNU-EHS (2014) 'World risk report 2014', Bonn, United Nations University – Institute for Environment and Human Security (UNU-EHS).

World Health Organization (2019) Health Emergency and Disaster Risk Management Framework, W Health Organization. Available at: https://www.who.int/hac/techguidance/preparedness/health-emergency-and-disaster-risk-management-framework-eng.pdf?ua=1.