

Smart Health Village in Improving Disaster Preparedness

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ABSTRACT

Background: Disaster-prone areas are areas that have the potential for natural disasters such as earthquakes, mountain eruptions, landslides caused by activity or movement from the base of the earth. Understanding the potential for natural disasters in each region as one of the anticipatory steps to minimize the number of victims of natural disasters. Precise and accurate information is needed for disaster management. The slope of the area is quite steep, and road access to villages and tourist attractions is vulnerable to landslides. The current disaster incident information reporting system still applies the conventional model. The community also experiences difficulties in receiving information and submitting reports regarding village conditions.

Purpose: This research aims to analyze the effectiveness of smart health villages in improving disaster preparedness.

Method: The research design used a pre-experiment with a pre-test and post-test design approach with a sample size of 64 volunteers who were taken using purposive sampling. The independent variable in this study is Smart Health Village and the dependent variable is the voluntary task force's ability to preparedness disaster. The research instrument used a questionnaire for each variable. Data analysis in this study is the Wilcoxon Signed Rank Test. The implementation of this activity consists of the design stage, application creation, system design, socialization and training, and trial.

Results: The research results showed that the voluntary task force's preparedness was in a good category as much as 88% and as enough as 12% with p value = 0.000. This application system smart health village based on the web allows both the community (users), admin (task force), and verifiers (village officials) to access anywhere and at any time, thus increasing the capability and quality of human resources in disaster preparedness and disaster-prone areas.

Conclusion: Based on the results it can be concluded that smart health village can improve ability in preparedness of disaster in disaster-prone areas thus reducing impact of anxiety and and panic due to disaster.

Keywords: ability, disaster, preparedness, smart- health village

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BACKGROUND

Implementing disaster management is one of the achievements of national development carried out by the government and regional governments. Pandansari Village is one of the villages in Malang Regency that has a high level of disaster vulnerability. The Malang Regency Regional Disaster Management Agency usually called with BPBD as the person responsible for implementing disaster management immediately formulated and established a disaster management policy in Pandansari Village. BPBD Malang Regency in carrying out its functions and duties is guided by the Head Regulation (PERKA) of the National Disaster Management Agency (BNPB) No. 1 of 2012 related to disaster resilient villages. Therefore, the authors are interested in conducting research related to the implementation of disaster management in Pandansari Village (Chang et al., 2012).

Pandansari Village routinely faces landslides, floods, and tornadoes every year, including the appearance of cracks in residents' houses due to shifting soil. The land contour in Pandansari village tends to be hilly with sandy soil composition. Sandy soil causes its problems, namely landslides that occur both during the rainy and dry seasons. Landslides will cut off road access from Pandansari village towards Poncokusumo. This will have an impact on the economy and public health. When a landslide occurs, road access will be closed so that farmers cannot send their produce to the city and it is difficult to find health care facilities. Apart from landslides, Pandansari village was also one of the areas affected by the eruption of Mount Bromo and Semeru.

Volcanic eruptions will cause a buildup of volcanic ash and increase soil fertility. Soil fertility has an impact on people's livelihoods. The community's source of income mainly comes from agriculture, namely apples and sugar cane. A total of 537 families have a livelihood as apple farmers, and 153 families have a livelihood as sugar cane farmers. Of the 951 Ha of Pandansari village, 592 Ha are used as fields or moorland, and 4 Ha are used as rice fields. The majority of Pandansari village residents earn their living as farm laborers in various types of agriculture. Even though the livelihoods of the residents of Pandansari village vary, as many as 80% of the people in Pandansari village are still included in the lower economic group, where as many as 1,181 families are still registered as poor. All activities in Pandansari village are under the supervision of the Pandansari Village Head.

Community empowerment is carried out with the aim of increasing the knowledge and abilities of the community, so that they can identify the problems they face, and their potential, plan and carry out solutions by utilizing the potential that exists in the local area. There is community empowerment carried out through increasing human resource capacity so it is hoped that it can create a Disaster Resilient Village.

Implementing disaster management is one of the achievements of national development carried out by the government and regional governments. Pandansari Village is one of the villages in Malang Regency that has a high level of disaster vulnerability. The Malang Regency Regional Disaster Management Agency (BPBD) as the person responsible for implementing disaster management immediately formulated and established a disaster management policy in Pandansari Village. BPBD Malang Regency in carrying out its functions and duties is guided by the Head Regulation (PERKA) of the National Disaster Management Agency (BNPB) No. 1 of 2012 related to disaster resilient villages (DESTANA). Therefore, the authors are interested in conducting research related to the implementation of disaster management in Pandansari Village. This research uses descriptive research methods with a qualitative approach. The first research focus is the implementation of disaster management in building disaster-resilient communities.

This study focuses on material related to risk management in tourist areas affected by landslides. The research area is in Pandansari Village, Poncokusumo District, Malang Regency, where this location is the main corridor for Malang Regency to access two tourism activities, Bromo Crater tourism and the Mount Semeru climbing tourist route. These tourism activities require supporting access, namely roads. Road conditions in this village are relatively bad. The Pandansari Village area has quite steep slopes. This slope condition causes the main road to the village and tourist attractions to be vulnerable to landslides. at the research location. Mitigation that is suitable to be developed in this area is community-based mitigation. The Pandansari Village community has a custom of upholding obedience to village officials, which will facilitate the process of forming a disaster resilient community.

Pandansari Village government services still apply a conventional system, which requires residents to get health services by coming to the Poncokusumo Community Health Center, where access is difficult and takes quite a long time. The community also has difficulty receiving information and submitting reports regarding village conditions.

METHOD

The research design used in this study an analytic pre-experiment research design. The design of this study was used to analyze effectiveness of smart health village to improve preparedness of disaster management where the smart health village before and after intervention as independent variable and ability preparedness of disaster management as dependent variable. Intervention into group using module smart-health village was given in 8 weeks (4 weeks of mentoring coaching and 4 weeks of independent learning). Every week volunteer evaluated to knowledge about preparedness of disaster.

This study was conducted among volunteer in Poncokusumo, Malang Regency, East Java, Indonesia. Population in this research are volunteer in Pandansari Village, Poncokusumo District, Malang Regency, East Java, Indonesia in July- August 2023 of intervention program and evaluated in September- October 2023 and used accidental sampling. Data for this study were conducted using questionnaire preparedness index (Zhai and Lee 2023a). Parameters from preparedness index are knowledge and attitudes (45%), emergency respon plans (35%), resource mobility disaster (15%) and warning system (5%) which use Guttman Scale so,respondent choose the answer “yes” score 1 and “no” score 0. Then preparedness index can category into “very well prepared” score 80- 100, “pretty well prepared” score 65- 79, “somewhat well prepared” score 55-64, “not all prepared” score less than 40. Indicator from knowledge and attitue are (1) understanding of natural disasters, (2) understanding of the causes of landslides, (3) understanding of types of landslides, (4) understanding of the impact of landslides, physical vulnerability of house buildings, understanding of disaster preparedness, attitudes and concern for landslide risks. Data analyze used Wilcoxon Signed Rank Test.

This study received ethical approval from the Ethics Committee the Health Polytechnic of Malang, Indonesia with certificate numer 2043- KEPK/ 2023. After receiving explanations and research procedure instruction all respondent voluntarily provided informed consent to participate in the research. The research procedure adhered to the principles outlined In the Declaration of Helsinki for research involcing human participants.

RESULTS

Pandansari Village is a village located in Poncokusumo District, Malang Regency. Geographically, Pandansari village is located on the slopes of Mount Semeru and Mount Bromo, which are a group of active mountains in the province of East Java. The population of Pandansari village is 7,000 people, with details of 3,644 men and 3,356 women. The majority of formal education pursued by residents in Pandansari Village is elementary school as many as 3,752 people, 676 people with junior high school education, 152 people with high school education, 51 people with bachelor's degrees, and the remaining 762 people have never received formal education.

Pandansari Village routinely disaster because the land is disaster-prone, landslides, floods and tornadoes every year, including the appearance of cracks in residents' houses due to shifting soil. The land contour in Pandansari village tends to be hilly with a sandy soil composition. Sandy soil causes its own problems, namely landslides that occur both during the rainy and dry seasons. Landslides will cut off road access from Pandansari village towards Poncokusumo. This will have an impact on the economy and public health. When a landslide occurs, road access will be closed so that farmers cannot send their produce to the city and it is difficult to find health care facilities. Apart from landslides, Pandansari village was also one of the areas affected by the eruption of Mount Bromo and Semeru. Because of Pandansari Village as a disaster-prone so it have voluntary preparedness disaster from agency disaster management in Malang Regency.

This chapter will describe the results of sampling in September until October 2023 regarding the analyze smart health village into preparedness disaster in Pandansari Village, District of Poncokusumo, Malang Regency.

Table 1. Characteristic of Respondent

Description	Frequency	Percentage (%)
Gender		
Male	42	66
Female	22	34
Age		
19- 35 years old	5	8
36- 45 years old	42	66
45- 59 years old	17	26
Occupation		
Civil servant	3	5
Entrepreneur	6	9
Farmer	55	86

Length of voluntary

Less than 1 years	6	9
More than 1 years	58	91

From the result of table 1, it is found that frequency distribution of general characteristic volunteer disaster preparedness as much as male 66%, in the range of age 46- 45 years old as 66%, with length of voluntary more than one years 91%.

Table 2. Effectiveness Smart Health Village to Improving Preparedness of Disaster

Preparedness of Disaster	Pre	Post	p- value
Excellent	3 (5)	8 (12)	
Good	25 (39)	56 (88)	
Bad	25 (39)	0	
Worst	11 (17)	0	0,001
Mean ± SD	63.69 ± 11.5	91.11 ± 19,69	

Based on the output table above, based on decision above it can be concluded that H1 is accepted and H0 is rejected because p- value 0,001 < 0,000. Thus it can be interpreted that smart health village effective to improving ability of voluntary preparedness of disaster.

DISCUSSION

Identification of Ability Preparedness Disaster of Voluntary before Smart Health Village

From the result of identification of ability preparedness disaster of voluntary before smart health village in the good and bad category with a total of 64 volunteer are 39% from each category. While mean of preparedness of disaster are 63.69 ± 11.5.

Limited public knowledge in disaster preparedness is an indicator of the low capacity of human resources in a region. In accordance with Law Number 24 of 2007 concerning Disaster Management, preparedness is a series of actions, preparations and activities carried out by individuals and community groups with the aim of anticipating or facing any threat of disaster that disrupts human survival in a planned manner(Butt, 2014; Grady et al., 2016; Koesuma et al., 2016; Lee & Low, 2006; Saputra & Supangkat, 2014; Suciani et al., 2018). Organizing efforts are carried out effectively and efficiently as an effort to anticipate or reduce the impact of disaster risk by increasing capacity through knowledge and disaster response attitudes (Aiken, 2004; Birkmann et al., 2010; Chan & Sondorp, 2007; Kennedy et al., 2005; Siciliano & Wukich, 2017).

Increasing community capacity through education to build community-based

awareness is very important, because community involvement in analyzing the risks, dangers and vulnerabilities in their surroundings can increase awareness which influences community attitudes and behavior.

Identification of Ability Preparedness Disaster of Voluntary After Smart Health Village

From the result of identification of ability preparedness disaster of voluntary after smart health village in the good category with a total of 64 volunteer are 88%. While mean of preparedness of disaster are 91.11 ± 19.69 .

Efforts to improve services in smart village-based awareness and preparedness in creating resilient villages (Alrazeeni, 2015; "Health Aspects of Disaster Preparedness and Response Panel Session 2: Seismic Risks Including Tsunamis," 2006; Hu, 2018; Phelps et al., 2011).

The results of data analysis and data interpretation showed that most of the respondents were from the disaster task force with experience and knowledge about the dangers of disasters that are prone to occur.

Effectiveness of Smart Health Village to Improving Preparedness of Disaster

From the result of the Wilcoxon Signed Rank Test, and test result of the analysis of effectiveness smart health village that H1 is accepted and H0 is rejected because $p\text{-value } 0,001 < 0,000$. Thus it can be interpreted that smart health village effective to improving ability of voluntary preparedness of disaster. Apart from that, Destana is a community resilience movement, so that it is not only the National Disaster Management Agency that carries out duties and responsibilities in increasing resilience for villages, so there needs to be a synergy of programs carried out to build village community-based disaster resilience, one of which is through the development of Smart Health Villages. Where the smart health village is an application program that can be developed according to community needs with the aim of increasing resilience (toughness) against the threat of disasters that are vulnerable to occurring, especially in disaster-prone areas, as implemented in Pandansari Village, Poncokusumo District, Malang Regency (Chakrabhan et al., 2005; Chang et al., 2012; Chapman et al., 2016; Li et al., 2015; MacRae & Hodgkin, 2011; Taubenböck et al., 2009).

Volunteers play a crucial role in disaster preparedness, response, and recovery, including landslides. Some key roles of volunteers in landslide events include: (1) Community engagement: Volunteers can educate and engage with the local community, providing information about the risks, the importance of preparedness, and how to respond during a landslide event. They can organize workshops, distribute educational materials, and conduct awareness campaigns. (2) Early warning systems: Volunteers can assist in monitoring and maintaining early warning systems for landslides, such as rainfall measurement equipment or geotechnical monitoring devices. Smart health village is an innovative concept that utilizes web-based applications to improve health-related disaster preparedness. So the hope is that with this application the community can be more prepared and responsive in facing disasters.

CONCLUSION

From the research results, it can be concluded that the majority of respondents before being given a smart health village had sufficient capabilities in disaster preparedness. Meanwhile, almost all respondents who had been given knowledge in the smart health village application increased their individual capacity to good and very good. Apart from that, there is an influence in providing smart health villages in improving disaster preparedness with a p-value of 0.001 in the task force in the Pandansari area, Poncokusumo sub-district, Malang regency. So it is hoped that this effort can continue in order to increase the resilience and ability of community members, especially in increasing disaster preparedness in disaster-prone areas, especially natural disasters.

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CONFLICTS OF INTEREST

The authors declare that there is not any conflict of interest in this study.

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