

## RESEARCH ARTICLE

## Mosque is the only visible shelter at the most dangerous time: A qualitative study of the victims' experience in the Mount Semeru eruption

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### Abstract

**Objective:** To assess the evacuation behaviour of victims during acute natural disaster.

**Method:** The qualitative, phenomenological study was conducted in Lumajang Regency, Indonesia, from December 5 to 12, 2021, and comprised disaster victims who had just been evacuated from the Mount Semeru eruption disaster site. Data was collected using a semi-structured interviews and observations. Data was analysed using Colaizzi's qualitative method.

**Results:** There were 18 subjects aged 19-60 years. They were interviewed in two groups, with the first group having 11 (61.1%) subjects and the other 7 (38.9%). On the basis of the data collected, 4 themes emerged. The first theme was emphasis on 'evacuation together'. The second theme was 'helping others in need'. The third theme was 'local wisdom passed down through generations'. The fourth theme was 'mosque being the only bright site' which made it the destination of choice for evacuation.

**Conclusion:** Disaster victims remember well the buildings they frequent. This is a good solution for determining shelter points during a disaster. There needs to be a regulation and preparation at the evacuation referral point so that victims may survive during acute disasters.

**Keywords:** Disaster, Eruption, Evacuation, Religious belief, Mass psychology. (JPMA 73: S-54 [Suppl. 2]; 2023)

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### Introduction

Mount (Mt) Semeru erupted suddenly on December 4, 2021, when the residents of Summersari Hamlet were going about their daily activities. The Lumajang Regency BPBD (Indonesian Disaster Management Regional Board) Command Post reported 54 deaths and 6 people were declared missing. Material losses included 1,047 houses damaged and the destruction of a large bridge. This disaster forced 9,417 people to evacuate the area<sup>1</sup>.

This eruption was not preceded by danger signs and there was no early warning from BMKG (Indonesian Meteorology, Climatology, and Geophysics Board) and BPBD. As a result, the evacuation of victims was random and unplanned. According to a victim who was evacuating with his family using a motorbike, the road could not be passed by motorbikes due to piles of volcanic ash on the route.<sup>2</sup> Many victims of the Mt Semeru eruption died while evacuating. Several victims died due to failed evacuation, and there were even victims who died due to the wrong evacuation route.<sup>1</sup> The Lumajang Regency BPBD reported that there were victims who died in hot cloud burning conditions while taking shelter in the kitchen.<sup>1</sup>

Even though Summersari Hamlet, Supiturang Village, Pronojiwo District, is in the disaster red zone, 7.9 km from the volcano centre, the community does not have adequate capacity for the evacuation process. BPBD once provided education to residents related to disaster preparedness using disaster simulations. According to the theory, disaster risk is inversely related to capacity. If the capacity of the community is lacking, the risk of disaster will be higher. Evacuation behaviour is related to the capacity of the community. Evacuation behaviour is the behaviour shown by disaster victims during the evacuation process.<sup>3,4</sup>

Research on evacuation behaviour using artificial intelligence (AI) simulations found that victims who experience a hazard will evacuate themselves based on strategies that appear at the time. Victims will consider higher benefits and less casualties.<sup>3</sup> Additionally, emotional functioning in an emergency affects considerations for evacuation because emotions are driven by the knowledge possessed by the victim, while the influence of the emergency environment has been known to be influential.<sup>5</sup> The strategy of a victim to evacuate and save oneself is influenced by considerations of higher benefits and fewer casualties, which are decided by emotions based on self-knowledge and the influence of the surrounding environment. The available research is mostly about the mass evacuation behaviour using a computer model.<sup>6</sup>

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Many victims vulnerable to disaster choose not to evacuate due to not wanting to go to an evacuation site; not feeling safe enough; or not feeling obligated.<sup>4</sup> Research conducted on communities at the foot of Mt Kelud and Sinabung showed that, in order to mobilise a community, a local leader is crucial. To encourage community members to participate and empower themselves, such a leader uses knowledge of the local culture, or local wisdom, and a grasp of the community's character. The sharing of information and the development of a disaster mitigation strategy by the government and the community also lead to a common commitment to promote community engagement and empowerment.<sup>7</sup>

The community of Summersari Hamlet is a religious community. Their daily activities are always associated with divinity and the balance of nature. These values are thought to have an effect on the evacuation behaviour of disaster victims. Survivors reported that they took refuge in the mosque located in the middle of the hamlet (Figure). Even though, when the eruption occurred, it was pitch dark, the victims could reach the mosque<sup>1</sup>. The current study was planned to dig deeper into the phenomenon to assess the evacuation behaviour of the victims of acute natural disasters.

## Methods

The qualitative, phenomenological study was conducted in Lumajang Regency, Indonesia, from December 5 to 12, 2021, and comprised disaster victims who had just been evacuated from the Mount Semeru eruption disaster site.

The sample was raised using snowball sampling technique since the nature of the sample was hard to measure. Those included were individuals who lived in the red zone area, had experienced direct evacuation from the eruption and were willing to participate voluntarily. The rest were excluded.

Data was collected initially by approaching the village head of Candipuro to get permission and to seek assistance in meeting the potential participants. The village head led the researchers to the first shelter where interviews were conducted with several participants at the same time. Data-collection at that particular shelter continued till data saturation. Semi-structured interviews were used, lasting about 15 minutes with each participant.

Questions related to the experiences of disaster victims while escaping from hot clouds, the process that helped them take shelter, the priorities during evacuation, their feelings during the process, the intention to try to save other victims, and their intended evacuation destination.

A second cluster of similar interviews was held a few days later at a different shelter within the affected area. Data were analysed using the 7-step Colaizzi's qualitative data analysis method.<sup>8,9</sup>

The approval from the "Ngudia Husada" College of Health Sciences ethics review committee was acquired after the study because of the dynamic nature of the action research.<sup>10</sup>

## Results

There were 18 subjects aged 19-60 years. They first group had 11(61.1%) subjects and the other 7(38.9%) (Table). On the basis of the data collected, 4 themes emerged; 'evacuation together', 'helping others in need', 'local wisdom passed down through generations' and 'mosque being the only bright site' which made it the destination of choice for evacuation.

The first theme was 'evacuation together'. The participants said they tried to evacuate together with their closest family or neighbours. They invited family members to take shelter at their homes and only evacuated when the situation was safer. The head of the family tried to find the missing family members.

Q7: *"I was looking for my son who was at a neighbour's house before running to the mosque. My wife was still in the fields. I am afraid my wife will die ...."*

P10: *"I ran downhill, I ran super-fast. I dragged my friend along"*

The second theme was 'helping others in need'. Some participants said that they managed to evacuate because they were helped by their neighbours.

P5: *"I ran away with my wife and child on a motorbike. The road down to the main road was covered with sand. I could not continue the journey with the motorbike. Luckily, there was Mr K, who took us in his pick-up van. I left my motorbike, I only care for my family safety."*

P4: *"I could run to the mosque after being helped by Mr M. The road was dark and I had no flashlight. If Mr M had not brought a flashlight, nobody would have been able to see anything in the dark."*

The third theme was 'local wisdom passed down the generations'. The Summersari community has a belief that has been passed down through generations, according which, in the event of a volcano erupting, the residents are advised to run towards the middle of the hamlet. Running north will expose people to the volcanic ash even though north is the direction to the nearest village (Penanggal Village); running west will take them towards the

**Table:** The study cohort.

No	Code	Name	Age (years)	Status	Profession	Refugee place	Village origin
<b>Interview on December 5, 2021</b>							
1	P1	Victim Y (Jeans)	38	His father and mother have not been found	Candipuro village hall	Sumbersari	
2	P2	Victim K (Black copy of blue shirt)	47	Victim B .s sister	sand miner	Candipuro village hall	Sumbersari
3	P3	M . victim	43	Victim's wife K	Farm workers	Candipuro village hall	Sumbersari
4	P4	Puj Victims	26	Child Victim K	sand miner	Candipuro village hall	Sumbersari
5	P5	Victim S (Third Clothes)	46	Victim's sister B	Farm workers	Candipuro village hall	Sumbersari
6	P6	Victim W	40	Victim's wife S	Housewife	Candipuro village hall	Sumbersari
7	P7	Victim B (Blue Jacket)	51		Farm workers	Candipuro village hall	Sumbersari
8	P8	Sum Victim (green negligee)	49	Kor B's wife	Farm workers	Candipuro village hall	Sumbersari
9	P9	Sa victim (chess suit)	46		Housewife	Candipuro village hall	Sumbersari
10	P10	My Victim	45	Victim's cousin B	sand miner	Candipuro village hall	Sumbersari
11	P11	Victim Wa	21	My Victim's Child	Does not work	Candipuro village hall	Sumbersari
<b>Interview on December 9, 2021</b>							
12	P12	Victim P (Semi's Mother)	40	Brother Sit, P, L Sut victim's wife	Farmer Labor	Elementary School Date 1	Sumbersari
13	P13	Victim P (Gina's Mother)	60	Brother Sit, P, L	Housewife	Elementary School Date 1	Sumbersari
14	P14	Victim L (Mr. Sutrisno)	50		Farm workers	Elementary School Date 1	Sumbersari
15	P15	Kor Sit	38	Brother Sit, P, L	Farm workers	Elementary School Date 1	Sumbersari
16	P16	Al victim	37		sand miner	Elementary School Date 1	Sumbersari
17	P17	Victim Yun	33	Kor Al .s wife	Farm workers	Elementary School Date 1	Sumbersari
18	P18	M child	19	Child Victim Al	Student	Elementary School Date 1	Sumbersari



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**Figure:** "Sumbersari" Mosque - The mosque used for shelter.

mountains; running east will lead them to the rice fields; and running south will take them to the river in which direction the lava flows. In contrast, running towards the middle of the town will take the residents to the mosque that has been there since long. Even though the mosque is 1km away from most of the houses, the residents still tried reach there for shelter.

P12: *"I have a small prayer room next to my house, but I still ran to the mosque, I followed my old man's word. My late grandmother, said if there is a disaster or a lava flood, don't run anywhere but to the mosque. You cannot run north nor south. Just run to the middle of the hamlet to the mosque."*

P13: *"Yes, you cannot go to the south because river blocked you. If you go to the north, that is the source of the lava. My neighbour who ran to the north hit by the lava ... The distance from the mosque to my house is about 1km."*

The final theme was 'mosque is the only bright site'. The participants said that when the clouds descended and darkened the entire village, only one place could be seen; the mosque in the middle of the hamlet. The participants tried to evacuate their homes as the houses would collapse under the weight of the accumulating volcanic ash. The surroundings were so dark that even flashlights and cellphone lights could not properly light the way. The

participants said that the mosque was shining bright, and was visible from a distance, so they evacuated to the mosque. According to one participant, an estimated 300-500 people took refuge in the mosque. Many participants said that their steps felt like they were being led to the mosque and they felt they knew the direction of the mosque even though they did not go there on a daily basis.

P15: *"When the wedhus gembel (local term of calling the hot clouds) came down, I did not see anything ... I did not see anything using my cellphone and flashlight. I just walked towards the mosque. It looked bright."*

Q6: *"... Only the mosque was visible. Everything else was dark. Everyone rushed to the mosque. There were many people there, like, say, 300 people."*

Q8: *"You know, I always collecting hay in the morning with my son. I memorized there were stones close to the road to the mosque. I memorized it because I felt it by my foot since I never wear sandals. I ran to the direction of the mosque and I knew I was there because I felt the stones leading to the mosque. The flashlight did not help people see much around them, but the mosque was visible even to the naked eye."*

## Discussion

The study aimed at capturing the experiences of the victims of the Mt Semeru eruption disaster in Summersari Hamlet. The study participants expressed sadness because some of their family members had not been found. They were generally in a defensive mode and maintained personal space.

The Summersari community did not want to evacuate without their family members. During the evacuation, people assisted one another. The community was looking for family members who did not leave together. While in the mosque shelter, some groups were able to locate family members. Neighbours assisted each other in the evacuation process.

The desire to gather with the family before the evacuation was intense because individuals tend to go home in the hope that there would be some family members left and they could evacuate together.<sup>11</sup> Factors that increase the effectiveness of evacuation planning are hazard perception, sources of evacuation order, and acceptance of government evacuation procedure. The late evacuation response time can be attributed to their neighbours' evacuation advice.<sup>12</sup> People who know that the government has an established evacuation procedure are generally more inclined to evacuate in a timely manner than those who are unaware.

The survival rate of catastrophe victims is largely influenced by the ancestors' belief in evacuating during a calamity. Many of the victims in the current study claimed to recall their forefathers or mothers delivering the lesson and repeating it over and over about what to do in case a tragedy strikes. The people of Tenggerese, a tribe in the Bromo-Tengger-Semeru maintain range, is known to preserve the local wisdom.<sup>13</sup>

Modernisation, reliance on technology and social media are both advantageous and disadvantageous. Local knowledge is a long, logical instinct passed down through the generations. The fading of local wisdom can be caused by an interrupted relay in an age group. Young people in Indonesia are becoming less aware of local wisdom, because generally it is not in the written form. Local knowledge, in the form of ability to cope with tragedies, has been shown to keep civilisations alive.<sup>14</sup> Local wisdom is the community's original knowledge derived from noble values in order to regulate the order of life, and to ensure peace and prosperity. Local wisdom is also synonymous with wisdom. The community was shaped by local wisdom to be wise in responding to repeated disasters.

The community considered the mosque to be a safe haven. The mosque appeared to be bright, and the road leading to it appeared to be clear. The survival, according to the victims, was possible only in the mosque and nowhere else. This belief indicated trust in the Muslim faith. In life-threatening crisis situations, religious people encourage disaster victims to make the best decisions they can. The traditional belief and religious belief could encourage victims to minimise the effect of disaster by linking it to policies and authorities.<sup>6</sup>

Religions believe that disasters are acts of God, and that people should prepare for the next disaster. Using the interpretation of Holy Quran's verses related to natural disasters, communication-based rise-mitigation interventions should be considered to help educate people to be more prepared for the next disaster.<sup>15</sup> With religious beliefs, decision-making becomes quicker because of the belief that decisions based on religion are the best.

The current study has its limitations. The sample size could not be calculated due to the nature of the disaster. The recruitment process in the study was done with the help of the person in charge of the shelter. This could have influenced the power of the study.

## Conclusion

If the high risk of hazards and high vulnerability of the citizens is not balanced with proper capacity-building, the risk of disaster will have an impact on the people. Disaster

victims remembered well the path to the location they frequently visited. This may facilitate the decision regarding the positioning of shelter points in disaster-prone areas. There needs to be a regulation and preparation of the evacuation referral point agreed by the local people and widely known among the community so that the victims may survive during acute disasters.

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