EXAMINING THE PSYCHOSOCIAL IMPACT OF MOUNT SEMERU ERUPTION ON CHILDREN: A DESCRIPTIVE ANALYSIS

[1]Ira Rahmawati , [1]Lantin Sulistyorini, [1]Peni Perdani Juliningrum, [1]Eka Afdi Septiyono, [1]Nuning Dwi Merina, [2]Lutfian Lutfian, [3]Istna Abidah Mardiyah, [4]Ayunda Puteri Rizanti
[1]Department of Pediatric Nursing, Faculty of Nursing, University of Jember
[2]Master of Advance Nursing, Faculty of Medical, Nursing, and Health Sciences, Monash University
[3]Registered Nurse, University of Airlangga Hospital
[4]Medical Services Department, Aesculap Medical Center

Corresponding Author: Ira Rahmawati; Department of Pediatric Nursing, Faculty of Nursing, University of Jember; ira.rahmawati@unej.ac.id; 081249158680

ABSTRACT

Background: Children affected by disasters are victim who risk for mental health disorders. The disaster is a very traumatic experience for them that can affect their psychology, which will impact their emotions, conduct, activities, and relationships with their social environment. This study aimed to identify the mental health status of children's experienced Semeru Mount eruption. **Methods:** This study used a descriptive design. Thirty-seven participants were recruited using the purposive sampling technique, and the Strengths and Difficulties Questionnaire (SDQ) collected the children's mental health status indicators. In addition, sociodemographic data were collected comprising age and sex. The chi-square was used for data analysis. **Results:** This study showed that children aged 4-11 years old which is most of them are above 5 years old 54.1% and female 59.5%, had most children's mental health problems were 59.5% had peer problems, and 16.2% had conduct problems. While in refugee camps, children were separated from their friends. Children tend to be aloof and were not interested in socializing with their new friends while in refugee camps. Mental health problems found in children affected by the eruption of Mount Semeru were conduct problems and peer problems. **Conclusions:** We suggest that the parents play an active role in the rehabilitation process of their children through mentoring children in increasing physical activity with peers, such as doing play therapy.

Keywords: Children, Mental Health, Disaster Victim, Pediatric Nursing

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Introduction

Indonesia is an archipelagic country located in a geographical, hydrological, and demographic position prone to disasters (Angreini & Supratman, 2021). Also, it is well-known as the ring of fire and is highly prone to disasters since it is located above the tectonic plate (Martono et al., 2019). One of the natural disasters in Indonesia in early December 2021 was the eruption of Mount Semeru. On Sunday, December 5, 2021, at around 15.10 WIB, the Mount Semeru Observation Post on Mount Sawur stated that there was a hot cloud fall with the direction of the glide towards Besuk Kerobokan, and visually the mountain was covered in fog and volcanic ash with the

smell of sulfur. This condition resulted in 2,004 people being displaced, and the Regent of Lumajang determined the emergency response to the disaster due to the Semeru eruption for 30 days. Based on data from the Disaster

Management Operations Control Center collected from December 5, 2021 until December 6, 2021, it was reported that as many as 5,025 people were affected by the eruption of Mount Semeru, 22 people died, 29 people were still missing, and 41 people suffered burns. In 2010 when Mount Merapi erupted in Sleman, 312 people in the refugee camps experienced anxiety disorders, and 75 of them were under 19 years old. Simatupang also shows that as many as 61.5% of adolescents experience post-traumatic stress from the Mount Sinabung eruption (Nasution & Sembiring, 2022).

Natural disasters can cause loss and sadness to the victims, especially children. It is not uncommon for victims of natural disasters to experience severe trauma due to disasters (Rahman, 2018). These psychological problems appear not only at certain ages or groups of people but also often occur in children whose physical and psychological resilience is still very vulnerable (Hickman et al., 2021). According to Wardiyah, children are at high risk of experiencing psychosocial problems when a disaster occurs (Daulay et al., 2021). This is because the traumatic experience of mountain eruptions can cause various physical disorders social and psychological developments that impact mental, emotional, social, personality, and poor self- esteem (Pagotto et al., 2015). These psychological problems arise shortly after a disaster occurs, months or even years after the disaster has passed (La Greca et al., 2013). For children, disasters are very traumatic experiences that can affect their psychology, so many lose their joy in refugee camps (Rahman, 2018). Butchmuller (2018) stated that almost all children in refugee camps showed signs of post-traumatic stress and found a broad scope of mental health domains that were affected (Buchmüller et al., 2018).

Psychological problems related to natural disasters at the age of children will last long after the disaster incident (Hilmi et al., 2019). This condition will develop into severe psychological problems if it is not detected early by identifying children's stress level victims of natural disasters. It is not easy to restore disaster victims' psychological and mental health. It takes a long time and a method to deal with their mental health problems. The mental trauma experienced by children is greater than the physical impact. They lost their parents and lost their education, friends, siblings, joy, and the environment where they played. Rahmadian et al. (2016) showed that 19,9% children experienced Post Traumatic Stress Disorder (PTSD) which is a stressful condition that is felt after the occurrence of trauma such as a natural disaster 12. It is believed that emotional problems experienced by children might develop to the PTSD condition.

Identification of children’s mental health during disaster is necessary as continuous eruptions could cause stressors in children and affect their mental health (Daulay et al., 2021). However, the research of

identification related to the children's mental health is very limited in Indonesian, because the majority of officers just focus on the children's physical condition. Thus, more specific identification was needed to be an early detection of mental health problems in children during a disaster to be given further treatment in accordance with the mental health aspects that are experiencing whether emotional, conduct, behavior, or peer problems. Therefore, this study aimed to identify mental health problems in children affected by the eruption of Mount Semeru.

Methods

Study design

This study used a descriptive research design based on quantitative approach. Through this method, children affected by the eruption of Mount Semeru were focused on to be identified their mental health status, including: emotional, conduct, hyperactivity, and peer problems. The data were collected at 21st December 2021 after children and parents stayed 16 days in one of the refuge locations in Lumajang, Indonesia.

Population and sample

The study population were parents who have children aged 4-11 years old which is situated in one of the refuge locations in Lumajang, Indonesia. There were a total 41 children's that were in the refugee. The total sample in this study was 37 children aged 4-11 years who were obtained using a total sampling technique, according to the inclusion and exclusion criteria that the researcher has determined. The inclusion criteria were as follows: Children aged 4-11 years, parent do not have a mental illness, being a female parent, children living in refuge locations. Meanwhile, the exclusion criteria in this study were children with a history of emotional and behavioral disorders before the disaster. Before the data were collected, the parents were informed and the inform consent was

obtained. Researchers distributed the inform consent to the parents, and asking the parent to sign it. There were 5 children who didn't match to the inclusion criteria:

3 parents refused to let their children participate in this study, one child had emotional disorder. Hence, there were mere 37 children included in this study.

Data collected

After obtaining the ethics committee's approval, researchers printed the questionnaire and went to the refugee locations. Researchers asked for data on children aged 4-11 years who were in the research location from the refugee officers in Lumajang, Indonesia. Prior to participating in the study all children were screened according to inclusion and exclusion criteria. After that, all the parents of the child were given an explanation regarding the purpose and benefit of the research to be carried out. Researcher gave informed consent to the parents who wanted to participate in this study. Demographic questionnaires in the form of gender and age were filled in first, then the researchers interviewed the respondents' parents using the Strengths and Difficulties Questionnaire (SDQ) which was used to screen children's mental health status based on 4 aspects and to determine whether children who experienced psychological

problems needed a referral to the hospital or not.

Instrument

This study uses the SDQ. The questionnaire in this study was modified based on field conditions in the community. The questionnaire consists of 20 questions with the interpretation that if the SDQ score is more than 14 or more, it indicates the need to consult or be referred to a doctor or mental health professional.

Each negative question item is given three points of assessment, namely never = 0, sometimes = 1, and often = 2, while positive questions are given the opposite value. The SDQ questionnaire used in this study assessed four psychological subscales 1) emotional symptoms, 2) conduct problems, 3) hyperactivity, 4) peer problems. The SDQ used in this study was developed and tested for reliability and validity by Istiqomah (2017) and showed that the Cronbach Alpha as 0,624 and r table as 0,759 13. The construct validity test using PAF shows that the SDQ-TR has six-factor structures. In addition, Sianturi's (2018) states that the SDQ questionnaire is declared valid with a CVI (Content Validity Index) of 1.

Data analysis

All of data assessment in this study were analyzed using SPSS version 23.0 to employ for statistical analysis. the Shapiro-Wilk test was used to assess the compatibility of the data normality. The demographics data (age and gender) were analyzed using distribution and frequency and the 4 SDQ subscales, and interpretations of the SDQ were analyzed using frequency and percentage. In addition, the researcher used the Chi-square correlation test to analyze the relationship between age and gender category and the SDQ subscale. A $p< 0,05$ was considered as significant in the analyses.

Ethical Clearance

This research has received ethical approval from the ethical committee of the medical research. All respondents have explained this research's purpose, steps, and benefits. Prior to the research, respondents, and informants from their parents signed an informed consent form.

Results

Table 1. The distribution of respondents based on age and gender (n=37)

Child Characteristics	n (%)
Age	
Under 5 years old	17 (45.9%)
Above 5 years old	20 (54.1%)
Gender	
Male	15 (40.5%)
Female	22 (59.5%)

Based on table 1. The age categories of participants were categorized into two groups, 17 (45.9%) children aged under five years and 20 (54.1%) children aged above five years. Characteristics of respondents based on gender showed that 59.5% of the children who participated in this study were female, and 40.5% were male.

Table 2. The distribution of respondents based on SDQ indicator

Subscale	N (%)	B (%)	A (%)
Emotional	34 (91.9)	3 (8.1)	0 (0)

Conduct	24 (64.9)	7 (18.9)	6 (16.2)
Hyperactivity	35 (94.5)	2 (5.4)	0 (0)
Peer problem	11 (29.7)	4 (10.8)	22 (59.5)

Based on the data in table 2, the highest proportion of children's mental-emotional problems is peer problems as many as 22 children (59.5%) and conduct problems as many as six children (16.2%). In addition, seven children (18.9) were in the borderline category on the conduct problem subscale.

Based on Table 3. It shows that the participants' characteristics of the age factor do not have a significant relationship to the psychological status of the emotional, conduct, and hyperactivity subscales with p>0.05. However, there is a significant value on the peer subscale with a p-value of <0.05. Twenty-two children (59.5%), especially aged above five years (37.8%), had problems with their peers. In addition, table 3 shows no relationship between gender and the four psychological subscales of children with p> 0.05.

Table 4. Status of Referral Needs to be based on SDQ (n=37)

Referral Needs	**n (%)**
Normal	33 (89.2)
Need to be referred to a doctor or mental health professional	4 (10.8)

Table 4. Shows that as many as four children (10.8%) need to be referred to a doctor or mental health professional, while 33 children (89.2%) do not have psychological health problems that require referral to a professional

Discussion

Emotional Problem

The study reveals that almost all aspects of the SDQ questionnaire fall into the borderline category, with 59.5% of children showing abnormal peer problems

and 16.2% exhibiting conduct issues. This indicates significant mental and emotional health challenges among children affected by the Mount Semeru Eruption disaster. Sumarno (2017) notes that disaster-exposed children often face prolonged stress, depression, and behavioral disorders, impacting their social connections (Sumarno, 2017).

In this study, the age of children was categorized into two groups: children aged under five years old (45.9%) and children aged above five years old (54.1%). This is by the age grouping based on the Substance Abuse and Mental Health Services Administration (SAMHSA). Post-disaster trauma contributes to a decline in children's mental states, causing physiological, emotional, and behavioral changes. Younger children, under five years old, may exhibit reactions like bedwetting, anxiety, and excessive fear 16.

While the majority (91.9%) of children appear normal, some are at risk of developing emotional symptoms. The eruption indirectly influences emotional problems, with symptoms such as difficulty sleeping, unreasonable fears, and emotional numbness. Left unaddressed, these conditions can lead to stress and depression (Sumarno, 2017).

Various factors, including family environment, school, residence, community, and social media, influence emotional problems in children (Hulukati,

2015). The study suggests a robust support system in the affected environment, possibly contributing to observed emotional stability. However, continuous monitoring is crucial to address potential long-term effects.

The study also shows that gender does not affect the psychological aspects of children due to the eruption of Mount Semeru. This is in line with Goenjian et al., (2000), study showing that gender was not significantly associated with anxiety after 4.5 years of the earthquake in Armenia . Rahmat & Alawiyah (2020), explain that gender affects a person's response to the traumatic event he or she suffers; many men experience traumatic events, but more women develop trauma as a terrifying response.

As one of the world's disaster-prone areas and at risk of multiple hazards, Indonesia should be able to prepare and manage preparedness (Rustinsyah et al., 2021). Collaborative efforts among stakeholders are crucial to implement comprehensive mental health services (Martono et al., 2019). The Indonesian government's initiatives include applying integrated mental health services, providing necessary infrastructure, and promoting community engagement and early detection (Tristiana et al., 2018).

Conduct Problem

In Conduct problems, 16.2% of children exhibited abnormal behavior during disasters, including aggressive behavior, anger control issues, frequent lying, and despair (de Jong et al., 2015;McDermott & Cobham, 2014). Physiological changes such as appetite loss and digestive disorders were common. Children aged above five experienced additional challenges like crying, attachment issues, headaches, vision and hearing problems, sleep disturbances, nightmares, and potential long-term effects such as phobic behavior, social isolation, and excessive anger .

In the post-disaster period, children may engage in disciplinary violations, using harsh language, intentional harm, cheating, and stealing (Rizkiah et al., 2020). Play therapy, as suggested by Rizkiah, is an effective solution for addressing behavioral problems in children, allowing them to release tension, cope with emotions, and promote relaxation (Rizkiah et al., 2020).

Parents' post-disaster experiences impact children's mental health, with potential Post-Traumatic Stress symptoms affecting parental support. This can lead to inadequate emotional responsiveness and poor parenting behaviors, making it challenging for children to process and adjust to traumatic events, resulting in heightened distress (Juth et al., 2015).

Hyperactivity Problem

Children affected by the eruption of Mount Semeru in this study did not show hyperactivity problems such as restlessness, being too active, being unable to stay still for a long time, constantly moving restlessly, being easily distracted, and being unable to concentrate. However, some children are in the borderline category, so they are at risk of experiencing hyperactive problems as a manifestation of stress and anxiety in children who experienced Mount Semeru eruptions.

However, children need treatment planning to prevent them from experiencing more severe hyperactivity problems in the future. Activities aiming to support affected children and families should be well coordinated, ideally with a single point of contract (e.g., schools), to identify those exposed, screen for risk and psychiatric disorders, and triage them to relevant services. Because the material needs of the community may overshadow the psychological needs of children (Danese et al., 2020).

Peer Problem

This study reveals that peer problems, experienced by 59.5% of children affected by the Mount Semeru eruption, stem from the impact of the disaster, leading to social separation. These problems manifest as aloofness, a preference for solitary play, and intimidation or threats from other children. Oe et al. (2018), emphasize that such peer relationship issues may result from the psychological disorders induced by disasters. To mitigate these problems, anti-stigmatizing interventions should focus on influencing emotions and fostering social acceptance among affected children. Stronger emotional reactions are found to predict discrimination more than stereotypes (Astuti et al., 2019). Problems with peers can lead to self-isolation behaviors, hindering adaptation to friends in subsequent developmental stages (Wang et al., 2013).

Oe et al. (2018) suggest that prolonged stays in refugee camps increase the risk of peer interference as children tend to focus on themselves. Caregivers can play a crucial role by encouraging physical activities among children, such as group play and exercise, to reduce peer-related challenges. Positive parenting practices, as discussed by Sugiarti et al. (2022), contribute to character development, influencing psychosocial growth through expanded socialization. This study establishes a significant relationship between a child's age and peer problems. Findings align with Bedriye (2014), research, indicating that school-age children, particularly those who experienced disasters, exhibit avoidance behavior, increased aggression, reluctance to attend school, and a disinterest in playing with friends. Age, as indicated by Purnamasari affects a child's understanding of disasters due to their cognitive developmental stage (Purnamasari, 2016). Psychological factors play a pivotal role in mental health crises, with stress levels identified as a primary contributor (Purnamasari, 2016;Kharima et al., 2022). Priyantini et al. (2021), indicates that variables such as age, location, marital status, occupation, education, income, knowledge, anxiety levels, and coping mechanisms are closely linked to mental health crises.

Children affected by disasters, experiencing heightened distrust and anxiety, require direct assistance to express their feelings and avoid psychological disorders (Rahman, 2018). However, post-disaster return-to-school strategies and mental health interventions remain inadequately described (Purnamasari, 2016). The psychological impact on children during disasters is attributed to their direct exposure to and experience of the eruption's impacts, compounded by

their age-related psychological immaturity (Thoyibah et al., 2019). In conclusion, addressing peer problems, considering age-related implications, and recognizing the influence of psychological factors are crucial components in providing effective interventions for children affected by the Mount Semeru eruption.

Limitation

This research was conducted through interviews with the respondents' parents. It is very likely that they are still experiencing psychological disorders such as stress which may affect perceptions when filling out questionnaires caused by losing their livelihood, place of residence, and even those closest to them. In addition, data collection was only carried out once using a questionnaire instrument, thus it would be better if the measurements were repeated again or by asking for help from psychologists or psychiatrists who have expertise in mental health diagnosis when conducting interviews with parents. In addition, researchers also only use one evacuation site, it would be better if the next researcher took several refugee camps with a larger number of samples.

Conclusion

The natural disaster of the eruption of Mount Semeru in Lumajang Regency impacts the mental health of children who have fled in refugee camps. Mental health problems found in this study are conduct problems and peer problems. In addition, four children needed a mental health professional referral for further treatment.

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Table 3. Age factor analysis on the mental health status of participants emotional and conduct problems based on SDQ (n=37)

Psychological status	Age		n (%)	*p-value*	*Gender*		*n (%)*	*p-value*
	Under five years	Above five years			M	F		
Emotional				0.175				0.791
Normal	14 (37.8)	20 (54.1)	34 (91.9)		14 (37.8)	20 (54.1)	34 (91.9)	
Borderline	3 (8.1)	0 (0)	3 (8.1)		1 (2.7)	2 (5.4)	3 (8.1)	
Total	17 (45.9)	20 (54.1)	37 (100)		15 (20.5)	22 (59.5)	37 (100)	
Behaviour				0.97				0.463
Normal	11 (29.7)	13 (35.1)	24 (64.9)		8 (21.6)	16 (43.2)	24 (64.9)	
Borderline	3 (8.1)	4 (10.8)	7 (18.9)		4 (10.8)	3 (8.1)	7 (18.9)	
Abnormal	3 (8.1)	3 (8.1)	6 (16.2)		3 (8.1)	3 (8.1)	6 (16.2)	
Total	17 (45.9)	20 (54.1)	37 (100)		15 (40.5)	22 (59.5)	37 (100)	
Hyperactivity				1.000				0.779
Normal	16 (43.2)	19 (51.4)	35 (94.6)		14 (37.8)	21 (56.8)	35 (94.6)	
Borderline	1 (2.7)	1 (2.7)	2 (5.4)		1 (2.7)	1 (2.7)	2 (5.4)	
Total	17 (45.9)	20 (54.1)	37 (100)		15 (40.5)	22 (59.5)	37 (100)	
Peer Problem								0.483
Normal	9 (24.3)	2 (5.4)	11 (29.7)	0.007[a]	6 (16.2)	5 (13.5)	11(29.7)	
Borderline	0 (0.0)	4 (10.8)	4 (10.8)		1 (2.7)	3 (8.1)	4 (10.8)	
Abnormal	8 (21.6)	14 (37.8)	22 (59.5)		8 (21.6)	14 (37.8)	22 (59.5)	
Total	17 (45.9)	20 (54.1)	37 (100)		15 (40.5)	22 (59.5)	37 (100)	