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Children's psychosocial state after the 2018 Lombok earthquake

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Abstract

Background: The current earthquake disaster in Lombok, Indonesia, in July 2018 has caused 564 deaths, and 445.343 were evacuated to refugee camps, including children. Disasters have the potential in resulting short-and long-term effects on the psychological functioning, emotional adjustment, health, and developmental trajectory of children. Nurses play a significant role when a disaster occurs. One of the nurses' roles is to give a traumatic healing intervention to the victims

Objective: This study sought to assess children's psychosocial state after the 2018 Lombok earthquake.

Methods: A total of 189 children from five regencies in Lombok were selected to participate in the study using accidental sampling. Data were collected using the Strengths and Difficulties Questionnaire (SDQ). Descriptive statistics and cross-tabulation were used for data analysis.

Results: The participants consisted of 98 girls (51.9%) and 91 boys (48.1%), with the majority (n = 142 [75.1%]) being from school-aged children. The SDQ results showed that most of the children were at the abnormal stage for difficulties (n = 103 [54.5%]), and most of them were at a normal stage for strength (n = 97 [51.3%]). The cross-tabulation analysis revealed that gender might influence the SDQ score for the strength (p = 0.034), but not for difficulties (p = 0.482). However, age did not have a correlation with SDQ score, either for strength (p = 0.475) or difficulties (p = 0.836), respectively.

Conclusion: The study found that children in Lombok generally displayed positive behavior and emotional progress after the earthquake. However, some children remained in distress and thus required more observation from parents or other social welfare agencies. This research may help nurses decide on their nursing care for children who experience disasters.

Keywords

life skills; school adolescents; sexual behavior; substance use; nursing; Indonesia

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Background

A multitude of factors may expose people to vulnerable situations. Among them are floods, earthquakes, and tropical cyclones, which constitute the three most devastating natural disasters, accounting for 90% of the world's immediate losses (Kouadio et al., 2012; Kousky, 2016). In addition, recent decades have seen the increased occurrence and impact of natural disasters, causing massive damage to the economy and human beings, including severe injuries and millions of deaths (Tang et al., 2014).

In 2011, 332 natural disasters were recorded worldwide, with substantial human and economic impacts, killing 30,773 people and affecting 244.7 million others (Guha-Sapir et al., 2012). In the past decades, five countries—China, the United States, the Philippines, India, and Indonesia have been most frequently hit by natural disasters (Guha-Sapir et al., 2012). In 2011, 7 of the ten countries with the highest disaster mortality rates were categorized as high-income or upper-middle economies (Guha-Sapir et al., 2012). Most developing countries may also suffer from severe impacts because of poor building practices and insufficient infrastructure despite not being prone to natural disasters.

Indonesia is geographically situated in the "Ring of Fire" and is thus prone to many disasters. Each year the country experiences floods, earthquakes, volcano eruptions, drought, forest fires, tropical cyclones, and landslides (Cameron & Shah, 2015; Husna et al., 2020). In the past ten years, Indonesia was hit by many catastrophic disasters such as the

tsunamis in West Sumatra in 2010 and Tasikmalaya in 2009, the earthquakes and tsunami in Mentawai in 2010, the floods in Wassior West Papua, the Mount Merapi explosion in Yogyakarta in 2010, the floods and tsunami in Palu in 2018, and the earthquake in Lombok in 2018.

Lombok is an island in West Nusa Tenggara Province in Indonesia. The island consists of four districts: West Lombok, North Lombok, Central Lombok, and East Lombok. It has a total area of 4.725 square kilometers and is roughly circular (Horwath HTL, 2017). On 5 August 2018, a magnitude seven earthquake struck Lombok with a depth of 32 kilometers after a series of earthquakes in early July 2018 with a strength of 6.4 SR. This earthquake killed 390 people and injured 1,447 others, not to mention the 67,875 destroyed houses, 468 damaged schools, and 2,793 displaced residents (Dwidiyanti et al., 2018; Suryatningsih, 2018). In addition, it left people in a grave situation, having lost their homes or family members (Dwidiyanti et al., 2018). Such disasters have caused massive repercussions to Indonesia in terms of financial and human damages such as injuries, death, and trauma (Nuari, 2017; Utami et al., 2016). Specifically, many children lost their parents and other family members as well as their homes, stopped going to school, and even sustained injuries (Tim Pusat Studi Gempa Nasional, 2019).

Every year, disasters affect millions of children worldwide, whether natural, such as earthquakes, hurricanes, tornadoes, fires, floods, or manmade, such as war, terrorism, or industrial accidents (Alisic et al., 2014; Masten & Narayan, 2012). Children are particularly fragile to the effects of disasters and other traumatic events because they lack the experience, skills, and resources to help them independently fulfill their developmental, social, emotional, mental, and behavioral health needs (Alisic et al., 2014). Kousky (2016) found that children are the most common victims of disasters. They are also more vulnerable to these events, with different needs that require special treatment after disasters occur (Kousky, 2016). Furthermore, both short- and long-term effects of disasters on children may include some problems in psychological function, emotional adjustment, health, and developmental status. Thus, understanding children's psychological reactions to disasters have become a key concern for public mental health (La Greca et al., 2013).

As the largest workforce in disasters, nurses play a significant role among medical teams in many earthquake cases (Yang et al., 2010). One of the pivotal nurses' roles is giving a traumatic healing intervention to the victims (Dwidiyanti et al., 2018; Istiqomah, 2017). However, to be able to deliver the care effectively, nurses should be able to understand the children's mental health first. Nevertheless, the Strength and Difficulties Questionnaire (SDQ) is well known worldwide, while in Indonesia, it is still rare to be used, particularly in nursing when it comes to disaster.

The recent earthquake in Lombok also affected children, directly or indirectly, with a high risk of developing behavioral and emotional problems. Hence, it is essential to recognize Indonesia as part of the "Ring of Fire" and the severe effects of natural disasters on children. However, while the earthquake in Lombok has been regarded as one of the worst in Indonesia, there has been no study in the nursing field which can examine its effect on Indonesian children. Thus, this paper aims to evaluate children's psychosocial state after the Lombok earthquake, which can eventually shape a better understanding for nurses, especially in community health nurses that provide nursing care.

Methods

Study Design

This study employed a descriptive quantitative design among children in five regions throughout West Lombok.

Participants

One hundred eighty-nine participants participated in this research. The inclusion criteria of the participants were (a) children aged 4–11 and (b) the ability to speak Bahasa. The participant was determined using the accidental sampling method. The sample size was calculated using the Lemeshow formula for unknown populations, with a maximal estimation proportion of 0.5, alpha of 10% (0.1), and significance level of 0.05 (Lemeshow et al., 1990). Thus, the minimal sample size was 107 participants, including a 10% prediction for dropped out participants.

Instruments

The Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997; Keliat & Marliana, 2018) was used to evaluate the psychosocial state of the children who were affected by the 2018 Lombok earthquake. The SDQ is a short behavioral screening instrument for children and adolescents (3–17 years old) that focuses on their strengths and hardships (Goodman, 1997). The questionnaire consists of 25 questions under five subscales: prosocial, hyperactive, emotional problems, behavioral problems, and peer relationships (Keliat & Marliana, 2018). Each item is scored based on a three-point response format: not true (1), somehow true (2), and true (3). The SDQ questionnaire used in this research was already written in Bahasa and could be accessed freely. The SDQ was chosen as a diagnostic tool because it has been successfully implemented in many Asian countries as one of the most reliable indicators of pediatric mental disturbance (Lee & Bhang, 2018; Lieber, 2017; McDermott et al., 2005). One local study showed that the SDQ has good reliability, with a Cronbach's alpha of 0.773 (Oktaviana & Wimbarti, 2014).

Data Collection

Data were collected in August 2018 by the researchers and volunteer investigators. The volunteer investigators were informed about the inclusion and exclusion criteria and the questionnaire's scoring procedure in a briefing. The volunteers were divided into five teams consisting of five to six per team composed of lecturers, mental health nurses, and students. The teams were then assigned to five regions throughout Lombok. Each investigator collected data using the questionnaire on the children.

Data Analysis

The data were analyzed using SPSS 24, and descriptive statistics were used to present the mean, standard deviation, frequency, and percentage. In addition, a cross-tabulation was used to identify the association between age, gender, and SDQ.

Ethical Consideration

The study was ethically approved by the Ethics Commission of Universitas Indonesia (no. SK-02/UN2.F12.D1.2.1/ETIK. FIK.2020). Prior to data collection, informed consent was signed by the parents or caregivers of the children. Then, the children were interviewed in the presence of their respective parents or caregivers, from which the SDQ questionnaire data were collected.

Results

Characteristics of the Participants

A hundred response rate of the participants was identified in this study, which 189 children from the five regions were affected by the 2018 Lombok earthquake. The participants consisted of 98 girls (51.9%) and 91 boys (48.1%), with a mean age of 8.2 years. Most participants were school-age children (75.1%) (**Table 1**).

Table 1 Age and gender characteristics of the participants

Characteristics	*n* (%)	Mean ± SD
Age		8.2 ± 2.164
Preschool Age	47 (24.9%)	
School-Age	142 (75.1%)	
Gender		
Boys	91 (48.1%)	
Girls	98 (51.9%)	

SDQ Scores of the Participants

Table 2 shows that most participants had an SDQ general score of more than 24 (51.9%), which indicated that some of the children's mental health stages are at risk. For example, for the difficulties score, there were 103 children (54.5%) in the abnormal category and 86 (45.5%) in the normal category. Nonetheless, for the strengths score, more children were in the normal stage (51.3%) than in the abnormal stage (48.7%).

Table 2 Strength-and-difficulty analysis based on SDQ scores

SDQ Score	*n*	%	Valid Percent	Cumulative Percent
General Score				
< 24	91	48.1	48.1	48.1
≥ 24	98	51.9	51.9	100
Difficulties				
Normal	86	45.5	45.5	45.5
Abnormal	103	54.5	54.5	100
Strengths				
Normal	97	51.3	51.3	100
Abnormal	92	48.7	48.7	48.7

Associations of Age, Gender, and SDQ

Table 3 shows that girls were less strong (55 respondents) than boys (37 respondents). In addition, 78 school-aged children found it difficult to adjust to their current situation after the earthquake. Nonetheless, there were 75 school-aged children in the normal stage for their strength.

Table 3 Age, gender, and SDQ scores

Characteristics	SDQ Score					
	Difficulties			Strengths		
	Normal (*n*)	Abnormal (*n*)	*p*-value	Normal (*n*)	Abnormal (*n*)	*p*-value
Gender						
Boys	39	52	0.482	54	37	**0.034**
Girls	47	51		43	55	
Total	86	103		97	92	
Age						
Preschool Age	22	25	0.836	22	25	0.475
School-Age	64	78		75	67	
Total	86	103		97	92	

Discussion

To the best of our knowledge, although Indonesia experiences many natural disasters, no research has been conducted on children's post-disaster adaptation and an early assessment of their mental health. Our study is the first to address the children's mental health after the natural disaster, especially the post-Lombok earthquake. Besides, a big help is needed for those children on their physical condition and physiological state considering the massive catastrophe caused by this earthquake. Nurses, particularly community health nurses, play a pivotal role in this circumstance.

There are several important findings of our research. First, this study found a very interesting phenomenon in gender roles in the disaster. In the difficulties domain, the research found no significant differences in how boys and girls faced difficult situations after the earthquake. This finding was similar to studies conducted by McDermott et al. (2005), Kar (2009), McLaughlin et al. (2009), who also found no statistical differences according to gender.

Our study finding also found that more boys faced difficulties compared to girls, which is quite similar to research conducted by Moriwaki and Kamio (2014) that there was a higher level of difficulties in boys than girls. However, in this study, boys tend to have more strength than girls (54 and 43, respectively). This may be due to the fact that boys tend to engage in post-disaster recovery activities directly. That involvement may indirectly increase their self-esteem and feeling of control (Bokszczanin, 2007). In addition, Lombok, just like other Indonesian regions, is a patriarchal society that believes males should not show their weaknesses and be

responsible more in many given situations. Thus, the researchers assumed this social structure might influence the social coping strategy after the earthquake. Nonetheless, our research has not investigated the relationship between social structure and coping strategy in society after the disaster.

The researchers also observed the pivotal role of gender in determining children's ability to adapt to post-disaster circumstances. This study found that girls struggle more than boys. There were 55 girls in the abnormal category for strength and only 37 for boys. On further analysis, the researchers found that gender may have a relationship with this phenomenon, with a p-value of 0.034. This current finding is in line with previous studies that found that girls may experience more emotional struggle than boys (Elklit, 2002; Moriwaki & Kamio, 2014; Oe et al., 2018).

Despite many controversies surrounding this issue, studies have shown that females are more vulnerable to post-disaster settings than males. For example, Ayub et al. (2012) found that girls are more likely to experience emotional problems than boys, which has also been supported by other studies finding a decisive effect of gender on how children react to disasters (Bonanno et al., 2010; Dell'Osso et al., 2011; Hagan et al., 2005). Males are known to take more risks and engage in more fearful or dangerous situations, while females are more sensitive to stressful situations or loss and are more instinctive (Dell'Osso et al., 2011). Several factors may explain this condition; for instance, females experience greater objective exposure, prior trauma, or even post-disaster stressors than males (Bonanno et al., 2010), which may influence how they interpret the post-disaster situation. Another example involves differences in how males and females perceive an earthquake's duration or impacts. However, a research gap persists regarding how gender plays a crucial role in children's post-disaster mental health. According to our on-site observation, girls are more likely to remember the details of these incidents than boys. Some expressed being afraid to stay away from their parents or other family members. This is consistent with a previous study that found that girls express their feelings and emotions more than boys (Hagan et al., 2005).

The second explanatory factor in our study is age. This study found that children of school age (7-12 years old) were more unstable than preschool-aged children. There were 78 children in the abnormal level for the difficulties category and 67 children in the abnormal level for the strength category. This finding was similar to previous studies that found no significant relationships between age and SDQ score (Acharya et al., 2018; Feo et al., 2014; Kar, 2009). However, the descriptive distribution showed that school-age children struggle more than preschool children.

Several studies have found that younger children (preschool age) may be more positive in responding to disaster aftermaths despite being in an early stage of their cognitive development (Bonanno et al., 2010; Felix et al., 2011; Kun et al., 2013; Liu et al., 2011). This is in contrast with older children (school age) who can already recognize and recall any important events during disasters. But, again, the developmental factor may underpin these circumstances. As children get older, they become more aware of what happens and thus interpret the situation better than younger children. Another explanation is that older children may start to assume certain roles in helping their families, placing more responsibility on them and adding more stress (Felix et al., 2011; Gabrielli et al., 2014).

Other factors, such as social-cultural factors, may influence children's psychosocial state, which future studies need to investigate. Social support such as parents and family, friends and peers, teachers and schools, and other community resources could play significant roles in the association with the mental health of children (Comer et al., 2014; Pfefferbaum et al., 2014; Sriskandarajah et al., 2015). Sriskandarajah et al. (2015) described multiple trauma experienced by children in Sri Lanka and found that their ability to adjust to mass trauma and internalize behavior problems may be affected by parental care methods. Parental care may be a strong protective factor for children and may mitigate the adverse effects of trauma caused by war and natural disasters (Sriskandarajah et al., 2015).

Limitations of the Study

The researchers acknowledge some limitations in this study. First, the sample size was not as large as expected because of difficulties accessing certain regions due to the earthquake damage. There should be a higher number of respondents considering the scale of this earthquake, but moving from one place to another proved to be a challenge; thus, the respondents were only from areas that the researchers could access. Another limitation was that this study provided only a general description of some behavioral problems initially detected among children that might develop after disasters. This necessitates a deeper analysis of certain factors that may support or delay children's development of positive psychosocial adaptation to post-disaster circumstances. Finally, because the children responded to a self-report questionnaire, there might be issues in the truthfulness of their statements, as they were in the presence of their parents.

Recommendation for Future Studies

It is important for nurses to work based on cultural understanding to make it easier to implement nursing care. Cultural values may influence the way people adjust to disasters in their region/country. Asian countries possess several cultural factors regarding parenting and family. First, in some Asian countries, parental care tends to be overprotective and control children. Second, Asian families most likely live near their extended families (Gabrielli et al., 2014; Sriskandarajah et al., 2015). A study argued that it is culturally acceptable for extended families to reside together in certain areas (Gabrielli et al., 2014). It also found that one refugee camp may consist of several families still bound to other families in the camp (Gabrielli et al., 2014). In a refugee camp in West Lombok, the researchers found that most refugees were from the same family. Thus, it is assumed that family may shape children's ability to cope with post-disaster situations.

Inevitably, disasters affect children through many pathways. They may cause direct physical harm, such as the destruction of schools and healthcare facilities, which can disrupt children's learning processes and their access to health services. Children and their families may also encounter illnesses, injuries, or even death. Children who directly witness the death of a family member or experience injuries during disasters are at risk of experiencing adverse outcomes (Comer

et al., 2014). Nurses need to recognize and understand the children's mental health before giving them any treatments. This will also help nurses determine what group may need more attention and intensive care than others.

Implications of the Study

Despite the limitations, this study has a significant impact on practical implications. First, this research is the first study in Indonesia that examined the children's strengths and difficulties after the earthquake, which may provide baseline data about the strengths and difficulties in children after disasters and knowledge for healthcare workers, especially psychiatric and pediatric nurses, to provide nursing interventions. Second, this study described the associations between gender, age, and SDQ. Although in the statistical analysis, only the strengths variable was correlated with gender. This may serve as a basis for further study to consider the role of gender in understanding children's mental health status. Last, considering the study's findings, the nurse's post-disaster roles are crucial for helping children overcome and identify any post-traumatic syndrome they may develop after the catastrophe.

Conclusion

The research results describe children's ability to cope with post-disaster events in terms of strengths and difficulties. It found that children in Lombok generally adopted a positive outlook and experienced emotional progress after the earthquake. However, some children were in alarming situations and thus required more observation from parents or other social service agents. This study also attempted to conduct a general analysis of the demographic factors that may influence these situations. Age and gender are believed to shape children's ability to adapt to disaster aftermaths. It may also help nurses determine their nursing care after acknowledging and understanding the mental health status of children. However, further studies to identify other influencing factors of children's ability are necessary.

Declaration of Conflicting Interest

All authors declare no conflict of interest in this study.

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Authors' Contributions

All authors contributed equally in conceptualization and methodology, data analysis, interpretation, drafted the manuscript and agreed with the final version of the article.

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Data Availability

The datasets generated during and/or analyzed during the current study are not publicly available due to subject confidential information but are available from the corresponding author on reasonable request.

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