Int J Adv Life Sci Res. Volume 5(4) 11-18
https://doi.org/10.31632/ijalsr.2022.v05i04.003

International Journal of Advancement in Life Sciences Research

Online ISSN: 2581-4877

Journal homepage http://ijalsr.org

Review Article

Establishing Nutritional Management after Natural Disaster for Children Under-five Years in Indonesia: A Systematic Review

Rizky Dzariyani Laili*, Arie Dwi Alristina, Dewinta Hayudanti, Rossa Kurnia Ethasari

Department of Nutrition, Sekolah Tinggi Ilmu Kesehatan Hang Tuah Surabaya, Indonesia

**Correspondence E-mail :rizkylaili@gmai.com*

Abstract

Background: Indonesia has the potential for natural disasters, such as volcanic eruptions, earthquakes, floods, landslides, tsunamis and others. The impact of displacement for children under-five is the risk of infectious diseases, nutritional deficits, growth and psychosocial disorders. Food aid for adult refugees is relatively less problematic than for children because adults can consume various types of food. Otherwise, children under-five have been unable to consume all various foods provided at the shelter. If this problem is not addressed, children will suffer from malnutrition and may become malnourished further. This study focuses on nutrition management after-disaster for children under-five. **Methods:** The type of study was cross-sectional. This research was carried out by systematic review study, which was a literature study that published about Indonesia databases using Science Direct and Proquest. The inclusion criteria were studies that focused on food and nutrition management for children in the shelter. **Results:** The study shows that the nutrition management for children under-five in the shelter has not been addressed optimally, so it is urgent to specifically and integrated nutrition management. Nutrition programs in the shelter include nutrition services, nutrition counseling, nutritionist, and food supply. **Conclusion:** The role of nutritionists during emergency disasters can contribute to optimal nutrition services in shelter. They can help by arranging menus and attention to nutrition and food hygiene to be provided to children. SOP's for addressing nutrition health are required, as well allocation funds to provide nutritious food for children under-five.

Keywords: *nutrition, disaster, shelter, food management*

Introduction

Disasters are extraordinary events that occur beyond human control, without knowing the time and the impact of losses that will be caused. The impact of disasters can be in the form of environmental damage and mass deaths. The magnitude of the impact caused by the disaster makes it important for the attention of the entire community to be prepared for disasters (Chaudhary & Piracha, 2021).

Indonesia is an area that is vulnerable disasters, both natural and human-made. Factors that cause disasters to occur include geographical, climatic, geological conditions, as well as socio-cultural and political diversity. In Indonesia, there are more than 5,000 rivers, large and small, so that there is the potential for flooding, flash floods and landslides during the rainy season. In addition, the territory of Indonesia is in the path of the most active earthquake in the world because it is surrounded by the Pacific Ring of Fire and is above three continental plate collisions. This condition makes Indonesia an area vulnerable to volcanic eruptions, earthquakes, and tsunamis.

Received on : 9th July 2022; Revised version received on :4th August 2022; Accepted: 31st August 2022

According to data given by the National Disaster Management Agency, there were 224 disasters in Indonesia between February 2017 and February 2018. There were 36 earthquakes, 68 tornadoes, 26 fires, 59 floods, 34 landslides, and one volcanic eruption among Indonesia's 224 disasters. Natural disasters produce emergency situations in a variety of fields, including health and nutrition. In nutrition field, Rahmawati *et al* (2014) studied about household food security after earthquake disaster. The population's food security was low. Only 41% of people were food secure; the rest were food insecure, low food secure, or very low food secure (9 percent, 43 percent, 7 percent, consecutively).

Disasters not only cause death and injury and damage to various health facilities, but also have an impact on public health problems, such as the emergence of various post-earthquake diseases, poor clean water and environmental sanitation facilities, psychological trauma and access to reproductive health services for women and their partners (Widayatun & Fatoni, 2016).Disasters can strike people of all ages. Because adult refugees were more able to absorb the various sorts of food supplied, a large amount of food supply was given to them. Food support for newborns and toddlers is tough because infants and toddlers are unable to consume all types of food available in refugee camps. In the community, a variety of dietary problems and implications had developed, particularly among children and women (Nouri*et al*, 2021).

The need for health and food services will increase in post-disaster conditions. For this reason, disaster management related to nutrition is very necessary and needs to be considered, especially the nutritional needs of infants, toddlers, children, pregnant women, and the elderly who are vulnerable to post-disaster disease (Tumenggung, 2017).

The toddler group is the most vulnerable age group and requires special nutritional treatment. Improper feeding of these groups can increase the risk of illness and death, especially in disaster conditions. The mortality data for children under five years is 2-3 times higher in the refugee camps in the 0-6 month age group (WHO, 2001).

The government, community and non-governmental organizations have experience in dealing with food and nutrition crises caused by disasters, although they are not accustomed to acting quickly and appropriately in crisis situations (Amagai *et al*, 2014). Bureaucratic obstacles are often a classic reason that almost always appears every time a disaster occurs. Many of the complaints of disaster victims to get assistance written in print media or broadcast in electronic media indicate that the problem has not been handled properly. The basic impact is the emergence of health and nutrition problems in community groups affected by disasters due to damage to health service facilities, interrupted food distribution lines, damaged clean water facilities and poor environmental sanitation.

This condition can have an impact on changes in the nutritional status of disaster victims, especially vulnerable groups, namely infants, toddlers, pregnant women, breastfeeding mothers and the elderly (Balhara *et al*, 2017). In an effort to handle nutrition in a disaster situation, a series of activities carried out post-disaster is providing food so that refugees are not hungry and can maintain their nutritional status, while the handling of nutrition activities in the advanced emergency response stage is to overcome nutritional problems through nutritional interventions that are needed.

Methods

The method used is a literature review, which is a literature search, both international and national, which is carried out using a database, Science Direct and Proquest. At the beginning of each journal article search, several articles were obtained that met the criteria with the keywords management post-disaster nutrition.

Results and Discussion

Marshall (2021) stated that adequate child nutrition is crucial for a child's growth, child malnutrition is common in crisis situations. However, there is little research on the link between starvation and disasters. Overall, research shows that crises have detrimental effects on nutritional status, diet

intake, anthropometric failure, and long-term child development. Crisis-related interventions, on the other hand, had a beneficial impact on nutrition-related knowledge and habits. More research is needed to determine the long-term viability of the interventions and the effectiveness of existing guidelines.

Post-disaster nutrition management activities are basically monitoring and evaluation as part of surveillance, to find out the need assessment and carrying out nutrition development activities as a follow-up or response to information obtained in an integrated manner with public health service activities to improve and maintain the nutritional and health status of disaster victims.

Food shortages, nutritional deficiencies, and increased malnutrition are common after major catastrophes, especially among vulnerable populations of people. Acute food shortages and volatility are prevalent in the early phases of catastrophes, and sufferers are completely reliant on food supplies. To sustain people's health, the following three major points should be considered:1) proper water consumption, 2) adequate meal intake, and 3) water and food safety. The first priority in the aftermath of a disaster is to ensure that energy and protein requirements are met. The projected average daily calorie and protein requirements per person per day in this period are 2100 Kcal and 50 g, respectively, based on the most recent world food program (WFP) recommendations.

Achieving adequate energy/protein consumption, some parameters such as population sex and age distribution, activity level, environmental temperatures, and pre-existing malnutrition should be considered. Nadjarzadeh *et al* (2020) revealed due to difficulties in preparing and cooking meals in the days following the disaster, precooked foods are the best alternative. If the substructures are not harmed, hot meals may be distributed after one week. However, disaster managers may take a long time to be able to offer warm meals to disaster survivors. In this circumstance, ready-to-eat items, particularly canned legumes (lentil, beans, and peas), can be combined with bread, biscuits, and dates. To avoid deficiency disorders, it is critical to guarantee that the rationed food provides safe levels of micronutrient intake after 2-3 weeks.1) Rapid Nutrition Assessment (RNA), 2) quantitative and qualitative monitoring of food baskets, and 3) execution of nutrition-specific treatments are the major specialized functions of nutrition response in disasters.

Nutritional management is important in emergency situations, this is caused by several things, namely; (1) limitations in refugee camps (food, health services, shelter, sanitation, clean water) (2) food assistance (nutrition) is one form of assistance to rescue victims (maintain nutritional status) (3) to optimize nutrition assistance, it is necessary to handle proper nutrition so that nutritional surveillance is needed.

Provision of emergency food is prepared by officers in the event of an emergency determined by the local regent in accordance with the provisions that have been set. When the community is declared displaced, it is impossible for the community to provide their food. The provision of services and handling of nutrition that does not meet the nutritional needs of toddlers can have a bad impact on the nutritional status of toddlers.

Nutrition management activities in disaster situations need to be coordinated to be effective and efficient, including the following:

a. Calculation of ration needs;
b. Preparation of menu,100 kcal, 50g protein and 4g fat;
c. Preparation of menus for vulnerable groups;
d. Assistance in food administration from preparation to distribution;
e. Supervision of food aid logistics, including infant formula milk assistance;
f. Implementation of nutritional surveillance to monitor the nutritional status of refugees, especially toddlers and pregnant women;
g. Implementation of follow-up or response according to the results of nutritional surveillance;
h. Implementation of nutrition counseling, especially breastfeeding counseling and complementary feeding counseling;

i. Micronutrient supplementation (vitamin A capsules for toddlers and iron tablets for pregnant women)

Nutritional management in Toddlers:

1. Integrate nutrition interventions with public health promotion activities
2. Understand and follow social, economic, and physical norms in building preparedness for handling toddler nutrition
3. Prepare food ingredients, especially those designed for toddlers
4. Ensure food variety and collaborate with food supply chains
5. Consult with women and girls for food selection
6. Nutrition services

Infants and children were recognized as the categories most in need of considerable benefit in phase 0 at emergency shelters, followed by the elderly and finally nursing mothers. The elderly were the most commonly identified category in stages 2 and 3, followed by diabetes patients and then hypertension patients. Doctors and public health nurses provided a lot of the information that dietitians utilized to identify vulnerable people who needed extra help (Tsuboyama *et al*, 2021).

Provision of emergency food is prepared by officers in the event of an emergency determined by the local Regent in accordance with the provisions that have been set. When the community is declared displaced, it is impossible for the community to provide their own food. The provision of services and handling of nutrition that does not meet the nutritional needs of toddlers can have a bad impact on the nutritional status of toddlers. Pradhan *et al* (2016) revealed in all of the studies that were included, food supplementation during disaster was an important aspect of the nutritional therapies. Reduced prevalence of wasting was the most consistent nutritional result across all five included investigations, followed by reduced prevalence of underweight in four, stunting in three, and anemia in one.

Nutrition services, nutrition counseling, the provision of specific staff or human resources in the field of nutrition, and food supply are all activities that can help with nutrition in an emergency (Tumenggung *et al*, 2017). Research conducted by Kusumaningrum, Siagian & Beazley (2022) on handling nutrition for toddlers in refugee states that the presentation of food menus for toddlers can be said to be minimal, because public kitchens do not prepare special menus for toddlers so that toddlers only consume food that is also consumed by adults.

7. Collection of anthropometric data for toddlers

The collection of anthropometric data for toddlers is still carried out every month because the Posyandu is still running in the refugee camps. Anthropometric measurements were carried out by Posyandu cadres which were then reported to the village midwife. With the anthropometric data of toddlers, the nutritional status of toddlers can still be monitored so that if someone experiences a poor nutritional status, they can be treated immediately (Tanjung & Wahyuni, 2021).

In a study conducted by Nasrul *et al* (2019) on children under five in the Buluri Village, Ulujadi Subdistrict, Palu City, there was an increase in nutritional problems such as an increase in the number of malnutrition from before the disaster. The trigger for an increase in post-disaster nutritional problems in refugee camps is due to the lack of food ingredients that have guaranteed nutritional value, an unsanitary living environment after the disaster that can cause disease, as well as parenting patterns and lack of parental income which results in a poor economy after the disaster.

8. Nutrition counseling

Nutrition education provided by nutrition workers in disaster emergencies has a significant meaning. Counseling is an effort to change human behavior, both individuals and communities so

that they can create mental attitudes and the ability to solve the problems they face in order to improve and maintain good nutrition.

According to Zulaekah's research, Nutrition education or counseling is a method of educating people in order to change their eating habits and nutritional status. People will be more aware of the importance of food and nutrition as a result of this endeavor, and will behave and act in accordance with nutritional guidelines.

9. Specialist or Human Resources

The role of health workers or nutritionists during disaster emergencies can contribute to optimal nutrition services in refugee camps. According to Azkha's research (5), in the emergency response stage, the role of health workers can help in public kitchens by arranging menus and paying attention to nutrition and food hygiene to be given to people suffering from disasters. Do not let food that is not proper or stale and does not contain various germs, so that those who eat it do not become sick. For this reason, it is necessary to have a nutritionist and be assisted by the local community. This soup kitchen can be held in government offices or in the vicinity of a disaster, especially in refugee camps.

Tumenggung *et al* (2017) stated that one of the impacts of disasters on the decline in the quality of life of the population can be seen from the various public health problems that occur. Disasters followed by evacuation have the potential to cause health problems. Insufficient food supply is the beginning of a process of declining health status which in the long term will directly affect the level of fulfillment of the nutritional needs of disaster victims.

Nutritional Management of children aged 0-23 months

Infants and children aged 0-23 months or under two years are the most vulnerable group and therefore require special nutritional treatment (Sunguya *et al*, 2013). Inappropriate feeding and malnutrition in these groups can increase the risk of higher morbidity and mortality in disaster situations. Handling of nutrition for children aged 0-23 months follows the Principles of Providing Infant and Child Food (PPICF) as follows:

a. Breastfeeding for infants/Baduta is very important, it is still given in disaster situations
b. Baby is still breastfed
c. Toddlers still breastfed
d. PPICF in disaster situations must be carried out correctly and on time
e. The PPICF implementing institution is a local government assisted by the Local Health Service which has trained personnel to administer PPICF in disaster situations.
f. If the local Health Office does not yet have or has limited staff for implementing PPICF in a disaster situation, it can ask for assistance from other health offices.
g. PPICF must be integrated into health services, mothers and orphans
h. The implementation of PPICF begins with a quick assessment to identify the condition of the mother, baby and child, including infants and orphans
i. Food rations must cover the need for appropriate and safe food to meet the nutritional adequacy of infants and children
j. Formula milk, other dairy products, bottles and teats are not included in the ration procurement.
k. Giving blue vitamin A capsules (100,000 IU) for children aged 6-11 months, and red vitamin A capsules (200,000 IU) for children 12-59 months. "If a disaster occurs in less than 30 days after the administration of vitamin A capsules (February and August), the toddler is no longer recommended to receive vitamin A capsules.

l. Public kitchens should provide food for children aged 6-23 months

m. Bottled drinking water is always made available at the refugee camps.

The management of assistance for Formula Milk or Breast Milk Substitutes provides information to donors and the mass media that assistance in the form of formula milk, bottles and pacifiers for disaster victims is not needed, assistance in the form of formula milk or breast milk substitutes must obtain permission from the head of the local Health Office, distribution and use of formula milk (substitutes) must be closely monitored by health workers, health centers and local health offices, always pay attention to the expiration limit of formula milk packaging to avoid poisoning and contamination.

Nutritional Management of Toddlers 24-59 Months

a. Avoid using milk and other foods that are prepared using water, unhygienic storage, because of the risk of diarrhea, infection and poisoning.

b. The diversity of the food menu and the feeding schedule are adjusted to the ability of the implementing staff. The daily menu list is pasted which is easy to see by the food processing operator.

c. Administration of vitamin A capsules

d. The main food given should come from family foods that are high in energy, vitamins and minerals. The staple food that can be given is rice. Sweet potato, cassava, corn, side dishes, vegetables and fruit. Food assistance that can be provided is in the form of staple foods, nuts and vegetable oil.

Research conducted by Kusumaningrum, Siagian & Beazley (2022) regarding the handling of nutrition for toddlers in refugee camps, it is stated that the presentation of food menus for toddlers can be said to be minimal, because public kitchens do not prepare special menus for toddlers so that toddlers only consume food that is also consumed by adults. Consumption of food that is not diverse and limited, such as the lack of consumption of fresh fish, fruit, meat and so on which are sources of nutrients for the growth and development of toddlers.

In disaster situations, nutrition education offered by nutrition workers has a substantial impact. Counseling is an attempt to alter human behavior, both individually and collectively, in order to foster positive mental attitudes and the ability to handle problems in order to enhance and sustain good nutrition. People will be more aware of the importance of food and nutrition as a result of this endeavor, and will behave and act in accordance with nutritional guidelines.

According to Azkha's research, in the emergency response stage, the role of health workers can help in public kitchens by arranging menus and paying attention to nutrition and food hygiene to be given to people suffering from disasters. Do not let food that is not proper or stale and contains various germs, so that those who eat it become sick. For this reason, it is necessary to have a nutritionist and assisted by the local community. This soup kitchen can be held in government offices or in the vicinity of a disaster, especially in refugee camps.

Some of the obstacles faced include the difficulty of collecting data on infants and toddlers because the refugee camps are scattered in many points (Ghazanchaei *et al*, 2021); the difficulty of distributing aid to remote areas, apart from the location being difficult to reach, also due to limited distribution officers, lack of transportation equipment and damaged infrastructure due to the disaster that occurred. Another obstacle is the inadequate availability of food for toddlers in terms of type, quantity and quality as well as the limited number of special personnel who handle nutrition for toddlers during a disaster. In addition, the absence of a special budget allocated for the nutritional needs of toddlers is an important note.

Ginting *et al* (2019) states that Food security includes three elements: 1) food availability, 2) food access, and 3) food usage. Furthermore, in a disaster situation, the most susceptible population,

particularly children under the age of five, who are in the cognitive development stage, will be the most affected by poor health and nutrition due to distastes. Indonesia is located between three Earth plates that are constantly moving, the Indo-Australian plate, the Eurasian plate, and the Pacific plate, making the Indonesian region extremely vulnerable to volcanic eruptions.

Cooperation and coordination between these stakeholders can facilitate the implementation of the aid distribution mechanism (Batalipu & Yani, 2019). Good coordination and cooperation with cross-sectors can facilitate the process of distributing food or logistics so that assistance provided by the government and private parties can be received quickly and on time by the disaster-affected community.

Future policies/actions taken by stakeholders to overcome the obstacles experienced in meeting the availability of food and the factors that influence it are as follows: (1) If there is a food shortage, coordinating with cross-sectoral districts and sub-districts. For large numbers, you can coordinate or ask the provincial level. (2) Propose a Regent Regulation concerning guidelines for handling under-five nutrition in flood disaster emergencies. (3) Propose standard operating procedures (SOP) for handling nutrition under five for disaster emergencies. (4) Propose a budget for the procurement of food ingredients for the handling of disaster emergency nutrition.

Conclusion

The handling of toddler nutrition in disaster emergencies has not been handled specifically and there is no special food available for toddlers. The amount and type of food available is not appropriate and cannot meet the nutritional needs of toddlers. Limited funds, human resources and distribution methods can affect the availability of food for toddlers. For this reason, it is necessary to handle the nutrition of children under five in post-disaster conditions specifically by providing different foods according to age groups. It is necessary to draw up SOPs for handling under-five nutrition in post-disaster conditions, in this case, which is the authority of the Health Service as the technical implementer.

References

Amagai, T., Ichimaru, S., Tai, M., Ejiri, Y., & Muto, A. (2014). Nutrition in the Great East Japan earthquake disaster. *Nutrition in Clinical Practice*, *29*(5), 585-594.https://doi.org/10.1177/0884533614543833

Balhara, K. S., Silvestri, D. M., Tyler Winders, W., Selvam, A., Kivlehan, S. M., Becker, T. K., ... & Global Emergency Medicine Literature Review Group (GEMLR). (2017). Impact of nutrition interventions on pediatric mortality and nutrition outcomes in humanitarian emergencies: a systematic review. *Tropical Medicine & International Health*, *22*(12), 1464-1492.https://doi.org/10.1111/tmi.12986

Batalipu, N. R., & Yani, A. (2019). Manajemen Penanggulangan Gizi Pasca Bencana.https://doi.org/10.31227/osf.io/cb7q6

Chaudhary MT, Piracha A. Natural Disasters—Origins, Impacts, Management. Encyclopedia. 2021 Oct 30;1(4):1101-31. **https://doi.org/10.3390/encyclopedia1040084**

Ghazanchaei, E., Khorasani-Zavareh, D., Aghazadeh-Attari, J., & Mohebbi, I. (2021). Establishing the status of patients with non-communicable diseases in disaster: A systematic review. *Disaster Medicine and Public Health Preparedness*, 1-8.https://doi.org/10.1017/dmp.2020.364

Ginting, S., Kitreerawutiwong, N., & Mekrungrongwong, S. (2019). Food Security and Management of Nutritional Program for Children under Five Years on Post Volcano Eruptions in Indonesia. *Journal of Nursing and Health Sciences*, *13*(1), 11-22.

Kusumaningrum S, Siagian C, Beazley H. Children during the COVID-19 pandemic: children and young people's vulnerability and wellbeing in Indonesia. Children's Geographies. 2022 Jul 4;20(4):437-47. https://doi.org/10.1080/14733285.2021.1900544

Marshall, A. I., Lasco, G., Phaiyarom, M., Pangkariya, N., Leuangvilay, P., Sinam, P., ... & Zhang, Y. (2021). Evidence on Child Nutrition Recommendations and Challenges in Crisis Settings: A Scoping

Review. *International journal of environmental research and public health*, *18*(12), 6637.https://doi.org/10.3390/ijerph18126637

Nadjarzadeh, A., Sadeghi Ghotbabadi, F., & Moghtaderi, F. (2020). Nutritional Needs during Disaster. *Journal of Disaster and Emergency Research*, *2*(2), 58-60.

Nouri, M., Ostadtaghizadeh, A., Hosseinzadeh-Attar, M. J., Fallah-aliabadi, S., Bagheri, S., AlJasem, M., & Avazaghaei, H. (2021). A Systematic Review of the Nutritional Consequences of the Earthquake in East Azerbaijan Earthquake 2012. *Journal of Nutrition, Fasting and Health*, *9*(3), 186-195.https://doi.org/10.22038/JNFH.2021.56661.1329

Pradhan, P. M. S., Dhital, R., & Subhani, H. (2016). Nutrition interventions for children aged less than 5 years following natural disasters: a systematic review. *BMJ open*, *6*(9), e011238.http://dx.doi.org/10.1136/bmjopen-2016-011238

Rahmawati, W., Erliana, U. D., Habibie, I. Y., & Harti, L. B. (2014). Ketahanan pangan keluarga balita pasca letusan gunung Bromo, Kabupaten Probolinggo, Indonesia. *Indonesian Journal of Human Nutrition*, *1*(1), 35-49.

Sunguya, B. F., Poudel, K. C., Mlunde, L. B., Shakya, P., Urassa, D. P., Jimba, M., & Yasuoka, J. (2013). Effectiveness of nutrition training of health workers toward improving caregivers' feeding practices for children aged six months to two years: a systematic review. *Nutrition journal*, *12*(1), 1-14.https://doi.org/10.1186/1475-2891-12-66

Tanjung, N. U., & Wahyuni, S. (2021). Pengukuran Antropometri Balita dan Perempuan Usia Subur Pasca Bencana Erupsi Gunung Sinabung di Desa Pertenguhen Kecamatan Simpang Empat Kabupaten Karo. *Shihatuna: Jurnal Pengabdian Kesehatan Masyarakat*, *1*(1), 17-20. http://dx.doi.org/10.30829/shihatuna.v1i1.9229

Tsuboyama-Kasaoka, N., Ueda, S., & Ishikawa-Takata, K. (2021). Food and nutrition assistance activities at emergency shelters and survivors' homes after the Great East Japan earthquake, and longitudinal changes in vulnerable groups needing special assistance. *International Journal of Disaster Risk Reduction*, *66*, 102598.https://doi.org/10.1016/j.ijdrr.2021.102598

Tumenggung, I. (2017). Masalah Gizi Dan penyakit Menular Pasca Bencana. *Health and Nutritions Journal*, *3*(1), 1-9.

Widayatun, W., & Fatoni, Z. (2016). Permasalahan kesehatan dalam kondisi bencana: Peran Petugas kesehatan dan partisipasi Masyarakat. *Jurnal Kependudukan Indonesia*, *8*(1), 37-52.