

Nutritional Problems and Interventions Occurring in Earthquake

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Abstract

Earthquakes are among the natural disasters that occur frequently in many countries. Natural disasters have a negative impact on people's physical and mental health. As with other disasters, the first priority for earthquakes is nutrition. It is critical that clean water and safe food are delivered to earthquake victims as soon as possible after the earthquake. At the same time, people's energy, protein, and vitamin needs should be met with the food that is delivered. Infants, pregnant women, and the elderly are among the priority groups for post-earthquake food supply. It is also of great importance that there are people belonging to special nutrition groups among the earthquake victims. Experts must participate in meeting water and food needs to avoid various problems. Prepared contingency plans should address nutritional needs more comprehensively by considering priority and special groups, and nutritional interventions should be identified in advance. In this study, the nutritional problems that occurred after the earthquakes in the world and in our country were identified and nutritional intervention studies were examined.

Keywords: Earthquake, Nutritional Needs, Health, Safe Food

Depremlerde Ortaya Çıkan Beslenme Sorunları ve Müdahaleleri

Özet

Deprem, Dünya'nın birçok ülkesinde sıklıkla karşılaşılan doğal afetlerden biridir. Doğal afetler insanların fiziksel ve ruhsal sağlığını olumsuz bir şekilde etkilemektedir. Yaşanan diğer afetlerde olduğu gibi depremde de beslenme ihtiyacı ilk sırada yer almaktadır. Depremden ardından depremlere kısa bir süre içerisinde temiz su ve güvenli gıdanın ulaşması hayati önem taşımaktadır. Aynı zamanda ulaştırılan gıda ile bireylerin enerji, protein ve vitamin ihtiyacı da karşılanıyor olmalıdır. Bebekler, hamileler ve yaşlılar deprem sonrasında gıda desteğinin sağlanmasında öncelikli grupta yer almaktadırlar. Ayrıca depremler arasında özel beslenme gruplarında bulunan bireylerin olması da büyük bir önem arz etmektedir. Su ve gıda ihtiyacının giderilmesinde konunun uzmanlarının görev alması yaşanacak çeşitli problemlerin önlenmesi açısından oldukça önemlidir. Hazırlanan acil durum eylem planlarında beslenme ihtiyacının öncelikli ve özel gruplar düşünülerek daha kapsamlı bir şekilde ele alınması ve beslenme müdahalelerinin önceden belirlenmesi gerekmektedir. Bu çalışmada dünyada ve ülkemizde yaşanan depremler sonrasında ortaya çıkan beslenme sorunları ortaya konulmuş ve beslenme müdahalesi konusunda yapılan çalışmalar incelenmiştir.

Anahtar kelimeler: Deprem, Beslenme İhtiyacı, Sağlık, Güvenli Gıda

1. INTRODUCTION

Natural disasters, which cause deaths, injuries, destruction of habitats and failure to meet basic needs such as food and water, have a significant impact on human life. Particularly, sudden events such as earthquakes, fires, avalanches, floods, etc., disrupt people's normal routines and daily activities. According to statistical studies, earthquakes rank first among natural disasters in terms of their impact and risks [1]. Damage to food resources and food systems after natural disasters and the negative consequences of these damages on people's livelihoods are a significant threat to food security. The consequences of natural disasters can last for a long time. The impairment of infrastructure affecting people's livelihoods, including livestock, agricultural activities, lands, and transportation routes, weakens food security [2].

Individuals are directly injured or lose their lives as a result of natural disasters. Moreover, survivors facing challenges such as severe stress, lack of sleep, difficulties in accessing medical assistance and medication, and malnutrition are at risk of diseases such as hypertension and diabetes. Hence, there is a tendency for fatal or non-fatal cardiovascular diseases to emerge after disasters [3].

The emergence of nutrition-related issues after disasters is influenced not only by short-term food shortages, but also by imbalanced and inadequate nutrition in the long run. Efforts are made to supply the food and water needs through various relief organizations reaching the affected areas. However, the establishment of temporary shelters post-disaster may not always ensure adequate and balanced nutrition, particularly affecting children, the elderly, pregnant women, and individuals in special dietary groups [4,5]. The composition of meals in emergency shelters indicates malnutrition, with excess carbohydrates and low levels of protein, fibre, vitamins and minerals. Improving the quality of meals in temporary shelters has been shown to reduce the incidence of diseases and disaster-related deaths [6]. Studies reveal both positive and negative relationships between nutrition and cardiovascular diseases [7,8]. After the disaster, problems related to nutrition must be solved quickly and arrangements such as food storage for special diets must be made in advance.

2. NUTRITION-RELATED HEALTH PROBLEMS OCCURRING AFTER the EARTHQUAKE

Following devastating earthquakes that have occurred in many countries around the world and at different times, it can be challenging for individuals who have survived the rubble and lost their homes to access food. Additionally, this situation leads to deficiencies in food hygiene and directly causes health problems. After the 2010 earthquake in Haiti, one of the poorest countries in the world, numerous health problems such as cholera, malnutrition, poisoning, anxiety, and depression emerged [9]. Consuming ready-made foods with high energy value can be beneficial in preventing malnutrition [10].

After an earthquake, the storage conditions of food become more challenging, leading to an increase in food poisoning cases. Necessary precautions should be taken in the storage of perishable foods such as milk and dairy products. Consumption of spoilt and contaminated foods can lead to serious health problems. This situation results in a high number of food poisoning cases being admitted to hospitals [11]. Canned foods, especially those preferred immediately after disasters, should be constantly monitored. Canned foods whose packaging integrity is compromised, opened or damaged should never be used. Foods that require a cold chain must be maintained at specific temperatures during transportation and storage. To avoid cross-contamination, great attention should be paid to the hygiene of equipment and personnel. Cleaning procedures should be planned in detail. In this way, food safety can be ensured [12].

The contamination of water sources after an earthquake can lead to the spread of diarrheal diseases. This situation poses a serious public health issue, particularly in areas with inadequate hygiene conditions. Research indicates an increase in the frequency of diarrheal diseases after an earthquake, which can lead to potentially fatal situations [13]. In Nepal, following the 7.8 magnitude earthquake in 2015, damage to the water supply systems made it difficult to access clean drinking water, leading to an increase in malnutrition rates among children [14].

After natural disasters, children become more vulnerable to infectious diseases due to various factors. Factors such as infrastructure damage, changes in environmental conditions, contamination of water and food sources, difficulty in accessing clean water and food, inadequate waste control, disruption or restriction of access to health services, negatively impact the immune system of children. The risk of diseases that can be prevented by vaccination, particularly, increases. Children may have to live in crowded living conditions for extended periods, and inadequate personal hygiene also increases the risk of spreading infectious diseases. Additionally, factors such as lack of information after a disaster, inadequate animal and vector control, delayed burial procedures, and unhealthy preservation of bodies also contribute to the increase in infectious diseases. The disruption of established systems after a disaster, loss of the living environment, and hindrance of healthy development lead to children becoming more fragile and hopeless individuals in the future [15].

The extreme shock removed during natural disasters such as earthquakes adversely affects the growth and development of children. A study reported that children affected by the earthquake in India in 2001 were 5-9 cm shorter than their peers who were not affected by the earthquake [14]. Another study, which observed the nutritional status of children living in temporary shelters after the earthquake for 2 years, demonstrated the necessity of providing nutritional support as well as psychosocial support to ensure normal growth of children and to mitigate the long-term effects of the earthquake, in addition to providing psychosocial support [16]. Bhadra (2015) advocates the use of school-community-based strategies for the protection of children [17].

After the Wenchuan (China) earthquake in 2008, a study found that women in the earthquake-affected areas increased their consumption of ready-to-eat foods, stockpiled food, and experienced nutritional disorders. In a study conducted two years after the earthquake, it was found that the number of breastfed children decreased and 90% of children did not receive nutritional supplements despite being malnourished. The rate of anemia among children affected by the earthquake increased from 36.5% immediately after the earthquake to 67.5% after two years [18].

Following the earthquake in Japan in 2011, which caused a tsunami and a nuclear disaster with a magnitude of 9.0, it was found that the levels of sodium and vitamin deficiencies increased among individuals in temporary shelters [19]. Other studies conducted after the Japan earthquake reported a significant increase in the frequency of cardiovascular diseases in the past three years compared to other disaster areas [20,21].

3. NUTRITION IN EARTHQUAKE EMERGENCY PLANS

According to the Turkish Disaster Response Plan, which systematically plans intervention at national and local levels, the responsibility for nutrition services in disasters is assigned to the Türk Kızılay. The Ministry of Environment, Urbanization and Climate Change, the Ministry of Health, the Ministry of Agriculture and Forestry, and the Ministry of Interior provide support to the Türk Kızılay at the national level for nutrition services. The local organizations of these institutions, civil society organizations, the private sector, and municipalities are the units with which the Türk Kızılay collaborates at the local level [22].

The nutrition plan for disasters is designed according to the first 72 hours following the disaster, also known as the golden hours, and the period after 72 hours. Nutrition activities carried out in the 0-72 hour period in the disaster area are considered early-phase nutrition services [23]. It is important to provide easily accessible, non-perishable, easy-to-consume, and durable foods during the golden hours (0-72 hours). During this time, emergency nutrition kits are distributed to individuals, consisting of 1 packet of 0.25 ml water, 1 sweet biscuit, and 1 packet of 200 ml fruit juice. The aim of nutrition services in disasters is to provide foods with high nutritional value and energy to individuals. Nutrition services, initially carried out using serving vehicles, are continued with mobile ovens, mobile kitchens, and kitchen kits depending on the scale of the incident [24].

Nutrition services conducted after the golden hours encompass long-term nutrition services. Following early-phase nutrition services, distribution of hot meal sets and dry foods to disaster-affected families should be planned. Under long-term nutrition services, a food package should be prepared to meet the average 7-day nutritional needs of a family of 5 [25].

4. NUTRITIONAL PROBLEMS AND INTERVENTIONS AFTER THE EARTHQUAKE

Interventions after disasters are categorized as acute, mid-term, and long-term. In the acute period, meeting the basic needs of the disaster victims such as nutrition, shelter, reaching their relatives, accessing medical treatment if necessary, and ensuring their safety and well-being is considered one of the most important and prioritized psychosocial interventions. The interventions conducted immediately after the disaster belong to the acute period. Mid-term and long-term psychosocial services include psycho-education and empowerment programs, while long-term interventions involve specialized mental health professionals focusing on the individual and the event. The acute period is the period when the basic and safety needs are attempted to be met immediately after the disaster (between 1-3 weeks). In the acute period, besides meeting the basic needs (nutrition, shelter, etc.) of individuals exposed to traumatic events, the aim is to instill a sense of safety and hope. The importance of support in the acute period is highlighted during this period when these feelings are intensely experienced. The goal in this period is to provide appropriate, flexible, and basic assistance considering the symptoms. During acute period, it is possible to observe the difficulties of individuals affected by the disaster by carefully observing the environment and determine an appropriate intervention method based on these observations [26].

The Ministry of Interior Disaster and Emergency Management Presidency (AFAD) has published the Turkish Disaster Response Plan (TAMP), which explains the national and local level intervention system. TAMP has stated that effective intervention management consists of three stages: preparation, intervention, and pre-recovery. The intervention levels are divided into four groups based on the degree of impact. The levels, named S1-S4, determine the impact and specify the groups that will provide support based on the type and scale of the event. AFAD manages the entire process [10]. Within the scope of TAMP, nutrition services have been determined considering individuals with special nutritional needs such as infants, children, pregnant women, patients, etc., based on ensuring the adequate food intake level of earthquake victims. During the early hours of disasters, the Provincial and District Disaster and Emergency Management Centers are responsible for meeting the early and long-term nutritional needs [23].

Turkey, home to some of the world's most important fault lines, is experiencing severe earthquakes. Encountering nutrition problems during earthquakes has highlighted the need to create emergency action plans. Especially after the Marmara earthquake on August 17, 1999, studies have gained momentum. Following the earthquake in Van on 23 October 2011, Türk Kızılay and various organisations established 13 tent cities to meet the food and shelter needs of the people and provided social service support after the earthquake response process, which proved to be an improvement compared to the Marmara earthquake [10].

Various interventions have been made to address nutrition problems that arise after earthquakes in many parts of the world. 'Child Nutrition Week', which was activated after the 7.8 magnitude earthquake in Nepal, created an effective platform by delivering basic nutrition services packages to children and mothers in the earthquake-affected areas. Positive progress has been recorded between measurements made between two periods as a result of the measures and incentives taken. Pregnant women's iron and folic acid needs have been met with many nutritional supplements [10].

After the Great Japan Earthquake in 2011, researchers observed that earthquake survivors changed their dietary habits by consuming unhealthy, high-salt foods. Therefore, the Japanese government aimed to change and socialize these habits by creating cooking classes for earthquake survivors with the slogan "Eat Well, Live Well." It has been shown that these classes have improved the mental and physical health of the survivors [27].

During the 2017 Iran Earthquake, various nutrition interventions were implemented within the first 10 days, including rapid assessment of the nutrition status of children and breastfeeding mothers, providing specific nutrition support for diabetic and hypertensive patients, and supplying vitamin A, vitamin D, calcium, iron supplements, and multivitamins for children under 2 years of age. There was a serious shortage of nutrition experts in the region following the earthquake [28].

After the earthquake in Northern Pakistan in 2005, food supplementation was provided to prevent acute malnutrition in children under 5 years of age [29].

In a study conducted by Yolcu (2020), a comparison was carried out between the earthquakes in Chile (2019) and Elazığ (2020). Differences in disaster risk and crisis management application methods were observed in both earthquakes. It was found that Chile has made significant progress in earthquake preparedness, while Türkiye has been reported to have weaker interventions. Despite all legal regulations, it has been suggested that the societal and institutional approach to earthquake preparedness, intervention after the earthquake, and recovery efforts weaken earthquake culture and its achievements. It has been stated that this situation negatively affects the distribution of the country's economy and the budget allocated to regional investments, as observed in the aftermath of the Elazığ earthquake [30].

In the Kahramanmaraş earthquake that occurred in Türkiye on February 6, 2023, in addition to the inability to reach the region in time, an important problem related to nutrition was the inability to deliver food aid to villages and settlements that were far from the center because the roads were closed. Effective planning of logistical activities plays a crucial role in reaching the needed areas quickly. In addition, it is of great importance to manage the volunteers contributing to food aid on the ground from a single center and to identify the need for food and water by establishing a communication network to accurately and effectively deliver aid to hard-to-reach areas. It has also demonstrated the power of the internet and social media to ensure communication. In this way, it was reported where and what was needed in the earthquake area, and those who wanted to help organized and sent their aid [31].

Following earthquakes, a significant increase in malnutrition and various vitamin and micronutrient deficiencies is observed, especially in women and children. Vitamin content is insufficient, particularly due to excessive grain consumption in many diets. Multivitamin tablet supplements, along with main and side dishes, can play an important role in meeting the vitamin and mineral needs of earthquake victims to achieve optimal health quickly and effectively. Therefore, nutritional supplement programs need to be included in disaster

management plans. However, it is important not to overlook symptoms related to Crush syndrome when developing intervention plans [31].

5. CONCLUSION

The measures taken by states in response to earthquakes play a crucial role in saving many lives. Precautions before and after earthquakes should include considerations for food and nutrition, in addition to shelter and emergency response. The research underscores the importance of taking measures to prevent anemia, malnutrition, growth retardation in children, cardiovascular disease, and gastrointestinal problems resulting from nutritional deficiencies after earthquakes. Particular attention should be paid to people with special health needs before earthquakes, such as diabetics, pregnant women, and children, to mitigate the risks. Sound strategies must be developed to protect against potential disruptions in the food supply chain after earthquakes or other emergencies, and systems should be put in place in advance. To effectively manage earthquakes and similar emergencies, it is important to plan and implement processes such as storing non-perishable, easy-to-prepare food, prioritizing food hygiene and sanitation to prevent contamination of water and food, and coordinating the food supply chain. It is also necessary to determine the nutritional needs of specific groups and to train those responsible for post-earthquake nutrition accordingly. Comprehensive and realistic solutions outlined in emergency plans are of great importance for the well-being of people who survive disasters.

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