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# Managing Nutritional Needs and Health Status of Children in Communities Affected by Natural Disasters

**Susilo Wirawan[1]***
[1]*Poltekkes Kemenkes Yogyakarta, Indonesia
*Co e-mail: susilo.wirawan@poltekkesjogja.ac.id[1]

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**ABSTRACT**

*Natural disasters significantly impact food security, parenting practices, and children's nutritional status, particularly in the post-disaster phase, which is characterized by limited access to food and health services. This study aims to analyze the relationship between household food security and child nutritional management with the nutritional status of toddlers in disaster-affected communities. The study used a descriptive analytical design with a cross-sectional approach in 120 households with toddlers aged 0–59 months. Data were collected through structured interviews and anthropometric measurements, then analyzed using the chi-square test to assess the relationship between variables. The study results show that the majority of households are vulnerable to food insecurity and have adequate to inadequate child nutrition management. Household food security is significantly associated with toddler nutritional status based on indicators of weight for age (W/A), height for age (H/A), and weight for height (W/H). Toddlers from food insecure households are at higher risk of malnutrition, stunting, and wasting. Furthermore, inadequate management of children's nutritional needs is also significantly associated with all indicators of nutritional status disorders. This study concludes that post-disaster nutritional status of toddlers is a multidimensional outcome influenced simultaneously by structural and behavioral family factors. Therefore, post-disaster nutrition interventions need to integrate strengthening household food security with assistance in family- and community-based nutrition management to support sustainable child nutritional recovery.*

***Keywords:*** *Food Security, Nutrition Management, Toddler Nutritional Status, Post-Disaster, Affected Communities*


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## INTRODUCTION

Global climate change, armed conflict, and various natural disasters have caused significant disruptions to social, economic, and food security systems in various parts of the world. This phenomenon has direct implications for access to and availability of nutritious food, especially for vulnerable groups such as children. The latest global report confirms a significant increase in acute food insecurity and child malnutrition, with nearly 38 million children under five experiencing acute malnutrition in 26 nutrition crises by 2024. This condition is closely linked to the global food crisis due to conflict, climate, and economic factors, exacerbating the vulnerability of children in the contemporary era. The Global Report on Food Crises (GRFC) 2025 reports that more than 295 million people in 53 countries will experience acute hunger in 2024, an increase of 14 million from 2023, with 1.9 million in the catastrophic phase (IPC/CH Phase 5). Child malnutrition reaches extreme levels in Gaza, Mali, Sudan, and Yemen, showing a sixth consecutive upward trend (Research Centre, 2025).

Natural disasters such as earthquakes, floods, tsunamis, and volcanic eruptions have significant and long-term impacts on affected communities, particularly on vulnerable populations such as children. Children are among the most at risk during and after disasters due to their increased nutritional requirements, immature immune systems, and dependence on caregivers for food and health support (Pradhan, Dhital and Subhani, 2016). Disasters often disrupt food supply chains, sanitation systems, healthcare services, and livelihoods, resulting in increased food insecurity and a higher risk of malnutrition among children under five years of age.

Evidence from low- and middle-income countries indicates that natural disasters are associated with increased prevalence of stunting, wasting, and underweight among children (Agabiirwe et al., 2022). Floods, in particular, have been shown to exacerbate undernutrition due to prolonged displacement, contamination of water sources, and reduced access to nutritious food (Agabiirwe et al., 2022). Similarly, post-earthquake assessments have revealed declining household food security and worsening nutritional status among toddlers in affected areas (Rural and Remote Health, 2020; Hartini et al., 2024).

In addition to food insecurity, disasters frequently compromise infant and young child feeding practices (IYCF), including reduced breastfeeding support and inadequate complementary feeding (Pradhan, Dhital and Subhani, 2016). Emergency conditions may also increase the risk of infectious diseases such as diarrhea and respiratory infections, further aggravating malnutrition and negatively affecting child growth and development (Child Nutrition in Disaster, 2022).

Effective management of children's nutritional needs in disaster-affected communities requires integrated and multi-sectoral approaches. These include immediate food assistance, micronutrient supplementation, protection and promotion of breastfeeding, restoration of primary healthcare services, and continuous monitoring of growth and health indicators (Pradhan, Dhital and Subhani, 2016). Strengthening community resilience and disaster preparedness systems is also essential to mitigate long-term adverse health outcomes among children. Therefore, understanding and managing the nutritional needs and health status of children in disaster contexts is critical to preventing a cycle of malnutrition and vulnerability.

Early childhood malnutrition not only impacts short-term health but also has the potential to cause long-term consequences such as impaired linear growth, delayed cognitive development, and reduced productivity in adulthood. Strong epidemiological evidence suggests that early childhood malnutrition, such as during early childhood or exposure to famine, is associated with a higher risk of non-communicable chronic diseases (NCDs) in adulthood, including diabetes, stroke, and heart disease. This adds to the public health burden through increased multimorbidity and long-term medical costs (Zhao et al., 2025).

In emergency situations, disruptions to food systems and distribution are key factors that impair public access to nutritious food. Natural disasters or conflict can disrupt food production, disrupt distribution chains, and hinder the sustainability of food aid that meets the nutritional needs of children, particularly toddlers and breastfeeding mothers. Available emergency food aid often focuses on meeting short-term energy needs without considering the balanced nutritional value essential for child development. This situation increases the risk of macro- and micronutrient malnutrition among vulnerable groups in emergency situations (Adeoya et al., 2022).

Infant and young child feeding practices also face various challenges in disaster situations. Factors such as maternal stress, disruption of health services, lack of social support, and poor sanitation can hinder exclusive breastfeeding and the provision of appropriate complementary foods. Furthermore, the use of formula milk without adequate access to clean water and hygiene actually increases the risk of infection and worsens a child's nutritional status (Deniz Bilgin & Karabayır, 2024).

The nutritional vulnerability of children in post-disaster communities is further exacerbated by weak household food security and high reliance on low-nutrient processed food aid. Research confirms that toddlers are at high risk of malnutrition and severe malnutrition, including marasmus and kwashiorkor, during disaster response if specific nutritional interventions are not implemented, even if physical food aid is available. This is due to the inadequate nutritional quality of such aid, particularly for toddlers who cannot consume regular refugee food (Maisyaroh, 2023).

Family behavioral factors also play a role in determining children's nutritional status after a disaster. Nutrition literacy levels, knowledge of feeding practices, and families' ability to adapt food consumption patterns following disaster-related food system disruption significantly determine the long-term quality of children's nutritional intake. Appropriate nutrition education has proven to be a crucial strategy for increasing families' capacity to meet children's nutritional needs, particularly in crisis-affected areas (UNICEF, 2022).

However, child nutrition responses in emergency contexts still face various limitations at the health service and humanitarian assistance levels. Integration of nutrition interventions with other health services is often suboptimal, particularly during the post-disaster recovery phase. The capacity for continuous monitoring of children's nutritional status is often compromised due to health systems being overwhelmed by the workload during the emergency response phase (Octaria et al., 2026).

Furthermore, there is a clear gap between short-term nutrition interventions in emergency response and sustainable, long-term approaches. General food aid in evacuation centers is

inappropriate for toddlers because it lacks micronutrients, is difficult to digest, and fails to consider sanitation or holistic child health, leading to malnutrition even when physical supplies are adequate. In Indonesia, public kitchens rarely provide special complementary foods, resulting in children consuming adult foods that are not optimal for nutritional recovery (Sulistiawati & Taufiqqurrahman, 2020).

Contemporary studies also highlight the limitations of studies that integrate nutrition, family practices, health systems, and food distribution within a single systemic framework in post-disaster contexts. Many studies still focus on a single dimension, such as child nutritional status or household food security, without comprehensively linking these interrelated factors within a single management model (Adeoya et al., 2022).

Based on this description, there is a clear need for a model for managing children's nutritional needs that takes into account the local sociocultural context and the adaptive capacity of community health services to respond to disaster situations. Such a model is crucial to support public health policies and disaster management strategies that focus on long-term nutritional recovery. This provides a strong foundation for this research to develop a more holistic and evidence-based approach to child nutrition management in disaster-affected communities.

## METHODS

This study used a descriptive analytical design with a cross-sectional approach to analyse the relationship between household food security, Infant and Young Child Feeding (IYCF) practices, child nutrition management, and the nutritional status of toddlers in disaster-affected communities. This design allows for the measurement of all variables in a single observation period, making it suitable for identifying determinants of nutritional status in the post-disaster recovery phase without direct intervention. The study was conducted during the early to mid-recovery phase in disaster-affected areas that were purposively selected based on their level of vulnerability, the magnitude of the impact, and the availability of health services and food assistance.

The study population consisted of all households with infants aged 0–59 months in the affected areas. The sample was determined using a sample size formula for observational analytical studies with a 95% confidence level, then selected using proportional random sampling techniques according to the distribution of the infant population. Inclusion criteria included households that remained in the area during the post-disaster phase and were willing to be respondents.

The dependent variable was the nutritional status of children, measured using the anthropometric indicators of weight for age (WFA), height for age (HFA), and weight for height (WFH) based on WHO standards. Independent variables included household food security, IYCF practices, and child nutrition management, with confounding variables such as the child's age and gender, mother's education, parents' occupation, and access to health services.

The research instrument was a structured questionnaire developed based on food security indicators and child nutrition practices. Content validity was tested by experts in community nutrition and disaster health. Construct validity was tested using Pearson's correlation (calculated r > table r; $\alpha = 0.05$), while reliability was assessed using Cronbach's Alpha with a criterion of ≥0.70.

Anthropometric measurements were taken using digital scales and standardised length/height boards.

Data analysis was performed through editing, coding, and entry stages using statistical software. Univariate analysis presented frequency distributions, proportions, means, and standard deviations. Numerical data normality testing was performed using Shapiro–Wilk to determine data distribution. Bivariate analysis used the Chi-square or Fisher's exact test for categorical variables, and the unpaired t-test or Mann–Whitney test according to the results of the normality test for numerical variables. The significance level was set at $p < 0.05$ with a 95% confidence interval.

## RESULTS

### A. Respondent Characteristics

**Table 1. Distribution of Household and Toddler Characteristics (n = 120)**

| Characteristics | Category | n | % |
|---|---|---|---|
| **Child's age** | 0–23 months | 46 | 38.3 |
| | 24–59 months | 74 | 61.7 |
| **Gender** | Man | 63 | 52.5 |
| | Woman | 57 | 47.5 |
| **Mother's education** | Low | 49 | 40.8 |
| | Intermediate | 52 | 43.3 |
| | Tall | 19 | 15.9 |
| **Parents' job** | Not fixed | 68 | 56.7 |
| | Still | 52 | 43.3 |
| **Access to health services** | Limited | 71 | 59.2 |
| | Adequate | 49 | 40.8 |

Most toddlers are in the 24–59 month age group, with a relatively balanced gender balance. The high percentage of mothers with low to medium education and the predominance of precarious employment indicate post-disaster socioeconomic vulnerability, potentially impacting families' capacity to meet children's nutritional needs. Limited access to health services for more than half of respondents indicates structural barriers to ongoing nutritional status monitoring during the recovery phase. These findings align with the post-disaster context, which is often characterized by disruptions to health services and aid distribution.

### 1. Post-Disaster Household Food Security

**Table 2. Distribution of Household Food Security**

| Food Security Category | n | % |
|---|---|---|
| Food security | 28 | 23.3 |
| Food insecurity | 54 | 45.0 |
| Food insecurity | 38 | 31.7 |

The majority of households are vulnerable to food insecurity (76.7%). This situation reflects the disruption of post-disaster food production and distribution systems, which directly impacts access to nutritious food for toddlers. This situation has the potential to increase the risk of macro- and micronutrient deficits in vulnerable groups.

**2. Infant and Young Child Feeding (IYCF) Practices**

**Table 3. Distribution of IYCF Practices**

| IYCF Practice | n | % |
|---|---|---|
| Good | 37 | 30.8 |
| Enough | 44 | 36.7 |
| Not enough | 39 | 32.5 |

Only about a third of respondents practiced optimal feeding practices. The high proportion of inadequate practices indicates barriers to exclusive breastfeeding, feeding frequency, and the quality of complementary feeding during emergencies. Family stress, sanitation, and limited healthcare support likely contribute to these conditions.

**3. Managing Children's Nutritional Needs at the Family and Community Level**

**Table 4. Distribution of Children's Nutritional Needs Management**

| Nutrition Management | n | % |
|---|---|---|
| Good | 33 | 27.5 |
| Enough | 51 | 42.5 |
| Not enough | 36 | 30.0 |

The majority of families (72.5%) fall into the adequate to inadequate nutrition management category. This indicates that specific nutrition interventions and family education have not been optimally implemented during the recovery phase. Limited integration of nutrition programs with community health services can lead to a lack of systematic provision of children's nutritional needs.

**4. Nutritional Status of Toddlers Based on Anthropometric Indicators**

**Table 5. Nutritional Status Based on BB/U**

| Category | n | % |
|---|---|---|
| Good nutrition | 62 | 51.7 |
| Malnutrition | 41 | 34.2 |
| Malnutrition | 17 | 14.1 |

**Table 6. Nutritional Status Based on Height/Age**

| Category | n | % |
|---|---|---|
| Normal | 58 | 48.3 |
| Short (stunting) | 46 | 38.3 |

| | | |
|---|---|---|
| Very short | 16 | 13.4 |

**Table 7. Nutritional Status Based on Weight/Height**

| Category | n | % |
|---|---|---|
| Normal | 65 | 54.2 |
| Thin | 39 | 32.5 |
| Very thin | 16 | 13.3 |

The distribution of nutritional status shows that although more than half of toddlers are in the normal category, the prevalence of malnutrition, wasting, and stunting remains high. The proportion of stunting (51.7% if short and very short combined) indicates chronic problems related to dietary quality and medium-term food security post-disaster. Meanwhile, wasting reflects acute nutritional deficits likely related to limited food access and disruptions to health services during the emergency response phase. The use of weight-for-age (W/A), height-for-age (H/A), and weight-for-height (W/H) indicators allows for the simultaneous identification of acute and chronic nutritional problems in disaster-affected populations.

Overall, the descriptive results indicate a pattern of child nutritional vulnerability influenced by a combination of structural and behavioral family factors. High levels of food-insecure households, suboptimal IYCF practices, and limited nutritional management correlate with the persistently high proportion of toddlers with malnutrition, wasting, and stunting. This pattern confirms that in a post-disaster context, child nutritional status is a multidimensional outcome simultaneously influenced by food security, parenting practices, and community health service capacity.

**B. Bivariate Analysis**

**1. Household Food Security and Nutritional Status**

**Table 8. Relationship between Food Security and Nutritional Status (W/A)**

| Food security | Good Nutrition | Malnutrition | Total | p-value | PR (95% CI) |
|---|---|---|---|---|---|
| Food security | 21 | 7 | 28 | **0.003** | **2.91 (1.38–6.12)** |
| Vulnerable/Unresistant | 41 | 51 | 92 | | |

The relationship between food security and nutritional status (weight/age) is significant ($p<0.05$). Children living in food-secure households are nearly three times more likely to be malnourished than children living in vulnerable or food-insecure households. This shows epidemiologically that access to and availability of food are key factors determining adequate energy and protein intake in the post-disaster phase.

**Table 9. Relationship between Food Security and Nutritional Status (TB/U)**

| Food security | Normal | Stunting | Total | p-value | PR (95% CI) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Food security | 19 | 9 | 28 | **0.001** | **2.24 (1.28–3.91)** |
| Vulnerable/Unresistant | 39 | 53 | 92 | | |

Food security is significantly associated with stunting. The risk of stunting is more than doubled in food-insecure households. This indicates that medium-term dietary quality deficits contribute to impaired linear growth in children in disaster-affected communities.

**Table 10. Relationship between Food Security and Nutritional Status (BW/H)**

| Food security | Normal | Thin/Very Thin | Total | p-value | PR (95% CI) |
|---|---|---|---|---|---|
| Food security | 20 | 8 | 28 | **0.012** | **1.83 (1.03–3.24)** |
| Vulnerable/Unresistant | 45 | 47 | 92 | | |

There is a significant relationship between food security and wasting. Children from food-insecure households are almost twice as likely to experience acute malnutrition. Epidemiologically, post-disaster food supply instability can trigger an acute energy deficit, reflected in the weight/height indicator.

**B. Management of Nutritional Needs and Nutritional Status**

**Table 11. Relationship between Nutrition Management and Nutritional Status (W/A)**

| Nutrition Management | Good Nutrition | Malnutrition | Total | p-value | PR (95% CI) |
|---|---|---|---|---|---|
| Good/Enough | 52 | 32 | 84 | **0.001** | **2.64 (1.39–5.01)** |
| Not enough | 10 | 26 | 36 | | |

Inadequate nutritional management more than doubles the risk of malnutrition. This highlights the importance of family capacity in menu planning, utilizing food aid, and monitoring child growth during the recovery phase.

**Table 12. Relationship between Nutrition Management and Nutritional Status (TB/U)**

| Nutrition Management | Normal | Stunting | Total | p-value | PR (95% CI) |
|---|---|---|---|---|---|
| Good/Enough | 47 | 37 | 84 | **0.006** | **1.89 (1.12–3.20)** |
| Not enough | 11 | 25 | 36 | | |

A significant association exists between the quality of nutritional management and stunting. The nearly doubled risk confirms the role of family- and community-based nutrition interventions in preventing chronic growth disorders.

**Table 13. Relationship between Nutrition Management and Nutritional Status (BW/H)**

| Nutrition Management | Normal | Thin/Very Thin | Total | p-value | PR (95% CI) |
|---|---|---|---|---|---|
| Good/Enough | 54 | 30 | 84 | **0.002** | **2.27 (1.29–3.98)** |
| Not enough | 11 | 25 | 36 | | |

Suboptimal nutritional management is significantly associated with wasting. Epidemiologically, weak coordination of food aid utilization and growth monitoring increases the likelihood of acute malnutrition in children.

## DISCUSSION

### 1. The Relationship between Household Food Security and Toddler Nutritional Status (W/A)

The results in Table 8 show a significant relationship between household food security and toddler nutritional status based on the weight-for-age indicator (p=0.003). Toddlers from vulnerable or food-insecure households are almost three times more likely to experience malnutrition than toddlers from food-secure households. This finding indicates that food security is a direct determinant of children's adequate energy and protein intake in the post-disaster phase.

Theoretically, the UNICEF Conceptual Framework of Malnutrition positions household food security as the underlying cause influencing children's food intake and nutritional status. In a post-disaster context, disruptions in food production and distribution lead to a decline in the quantity and quality of family consumption, which is quickly reflected in weight-for-age, an indicator of overall nutritional status.

These findings align with contemporary research showing that post-disaster food insecurity is significantly associated with increased incidence of child malnutrition. A cross-country study by Basyigit et al., 2025, reported that households with limited food access after a disaster had a higher prevalence of underweight children. The Disaster Food Security Framework also emphasizes that post-disaster food security significantly determines the nutritional status of vulnerable groups, particularly toddlers (Clay, 2022).

The researchers' critical assumption is that this strong association does not solely reflect absolute food shortages, but also reflects the failure of the food aid system to ensure adequate child-specific nutrition. Available aid tends to be oriented toward meeting the family's overall caloric needs, rather than the protein and micronutrient needs of toddlers. Thus, the risk of malnutrition remains high despite the availability of adequate food aid.

### 2. The Relationship between Household Food Security and Toddler Nutritional Status (TB/U)

Table 9 shows a significant association between household food security and stunting incidence (p=0.001), with the risk of stunting more than doubled for toddlers from vulnerable or food-insecure households. This finding confirms that food security impacts not only acute nutritional status but also medium- to long-term linear growth.

Theoretically, the height/age indicator reflects exposure to chronic nutritional deficits and diet quality over a longer period. Poor food security leads to limited consumption of animal protein and essential micronutrients such as iron, zinc, and vitamin A, which play a vital role in bone and tissue growth.

These findings are consistent with findings (Adeoya et al., 2022) that post-disaster food insecurity contributes to the high prevalence of stunting in children in various crisis-affected

countries. Furthermore, a systematic review in Indonesia by (Laili et al., 2022) confirmed that post-disaster household food security is a key factor in stunting prevention.

The researchers' assumption critically assessed that the stunting found was not solely a direct impact of post-disaster conditions, but rather an accumulation of pre-disaster nutritional vulnerabilities that were left unaddressed and then exacerbated by the food crisis and disrupted health services. Thus, the disaster acted as a triggering factor that accelerated the manifestation of stunting in children already vulnerable.

**3. The Relationship between Household Food Security and Toddler Nutritional Status (BW/H)**

Table 10 found a significant relationship between food security and toddler nutritional status based on weight/height (p=0.012). Toddlers from food-insecure households had almost twice the risk of wasting compared to toddlers from food-secure households.

Epidemiologically, weight/height is a sensitive indicator of acute changes in energy intake and the incidence of infectious diseases. In post-disaster situations, fluctuations in food supply and limited dietary variety can lead to sudden energy deficits, which are reflected in wasting.

This finding is supported by research (Kasim et al., 2025) which reported that food instability and poor quality emergency food increased the incidence of wasting in toddlers in disaster areas. A post-earthquake study in Turkey also demonstrated a strong association between food insecurity and acute decline in children's nutritional status (Berk et al., 2025).

The researchers' assumptions critically interpret wasting in toddlers as reflecting weak nutritional protection mechanisms in the transition from emergency response to recovery. When aid distribution begins to decrease or become uncoordinated, food-insecure households are the first group to experience acute nutritional deficits, resulting in rapid weight loss in children.

**4. The Relationship between Nutritional Needs Management and Toddler Nutritional Status (W/A)**

Table 11 shows that inadequate nutritional management is significantly associated with an increased risk of malnutrition or severe malnutrition based on weight/age (p=0.001). Toddlers from families with inadequate nutritional management are more than twice as likely to experience malnutrition or severe malnutrition.

Theoretically, nutritional management encompasses a family's ability to plan menus, utilize food aid, and monitor child growth. In post-disaster situations, this capacity becomes crucial due to limited resources and high dependence on external assistance.

These results are in line with a systematic study (Laili et al., 2022) which confirmed that weak post-disaster family nutrition management contributes to the high rate of underweight toddlers.

The researchers' critical assumptions confirm that poor nutritional management is not solely due to food shortages, but also to low nutritional literacy and a lack of ongoing support from health workers. Without adequate educational support, families tend to be unable to optimize available food resources to meet the specific needs of toddlers.

**5. The Relationship between Nutritional Needs Management and Toddler Nutritional Status (TB/U)**

The results of Table 12 show a significant relationship between nutritional management and stunting (p=0.006). Toddlers from families with poor nutritional management have almost twice the risk of experiencing stunting.

Theoretically, good nutritional management plays a role in ensuring the continued adequacy of essential nutrients. Inconsistencies in the quality and frequency of feeding during the post-disaster recovery phase can hinder children's linear growth.

This finding is consistent with the study (Adeoya et al., 2022) which emphasized the importance of integrating family nutrition management and community health services in preventing post-disaster stunting.

The researchers' critical assumption is that inadequate nutrition management reflects weak integration between nutrition programs and community health services. Without regular growth monitoring and nutritional counseling, the potential for stunting goes undetected early and only becomes apparent when the condition has become chronic.

**6. The Relationship between Nutritional Needs Management and Toddler Nutritional Status (BW/H)**

Table 13 shows a significant relationship between nutritional management and wasting (p=0.002). Toddlers from families with poor nutritional management are more than twice as likely to experience acute malnutrition.

Theoretically, suboptimal nutritional management has a direct impact on inadequate daily energy and protein intake, especially when families are unable to adjust the type and amount of food to the toddler's needs.

These results are in line with research (Kasim et al., 2025) which confirms that weak coordination in the use of food aid and low levels of family nutrition education increase the risk of wasting in children after a disaster.

The researchers critically assess the assumption that wasting is an indicator of a family's failure to adapt to changes in the post-disaster food system. When families lack the knowledge and support to adapt their children's diets to available food sources, the risk of acute malnutrition becomes unavoidable.

## CONCLUSIONS

This study concludes that the nutritional status of toddlers in disaster-affected communities is a multidimensional outcome that is significantly influenced by household food security and the quality of child nutrition management. Food insecurity has been shown to be associated with an increased risk of underweight (W/A), stunting (H/A), and wasting (W/H), reflecting acute and chronic nutritional deficits in the post-disaster phase. However, food availability alone is not sufficient without the family's capacity to plan, utilise, and adjust nutritional intake according to the child's age and condition, so that parenting practices and nutritional literacy play a key mediating

role between food access and nutritional status. Conceptually, these findings confirm that disasters not only trigger short-term food crises but also accelerate existing nutritional vulnerabilities, especially when aid and health services systems are not optimally integrated. Therefore, post-disaster nutritional recovery requires a holistic and sustainable approach that integrates strengthening household food security, family-based nutrition management education and assistance, and continuous monitoring of child growth through public health services to support long-term child survival and quality development.

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