Original Article

# Investigating household food security whit the growth rate children 2 to 5 years earthquake Kermanshah

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## ABSTRACT

If food conditions are not safe and anxiety and food worries develop at the household level and develop among children, then food insecurity will make sense. Therefore, the purpose of this study is to investigate the relationship between household food security and the growth rate of children aged 2 to 5 years in the earthquake-stricken areas of Kermanshah. The present study is a survey-descriptive and retrospective method.Inclusion criteria were age range 2 to 5 years, children's household consent to participate in the study, permanent residence, previous child care at least 4 months before the earthquake near Sarpol-e-Zahab and Babajani Trinity Health Centers and physical health. The population is 263 children, 71 boys and 85 girls. To collect data from the anthropometric questionnaire of children before and after the earthquake, the 18-item Food Safety Questionnaire (USDA) was completed. To analyze the data, independent t-test, analysis of variance, chi-square test, ANOVA and regression test were used using Spss18 software.
The results showed that due to the significant level (P <0.05) in each of the three percentiles, there is a statistically significant relationship between the growth status of children after the earthquake and the food security of children. The present study shows that the safer the food security situation of the family, the children will have a complete and healthy nutrition and as a result they will have a sufficient growth rate and will be more healthy.

**Keywords:** food security, household economic situation, Kermanshah earthquake

## Introduction

An earthquake at a depth of 11 km with a magnitude of 7.3 on the Richter scale occurred in Iran (Azgegle, Kermanshah province) at 21:48:16 on the evening of Sunday, November 13, 2017. The Red Crescent relief camp in Sarpol-e Zahab announced that the health center of Sarpol-e Zahab was destroyed due to the earthquake [1]. There were 91 orphan children in the earthquake, 31 and 47 of which lost their mothers and fathers, respectively, and 13 children lost both parents.

Concerns in crises are amplified where there is the issue of food insecurity. Food security is one of the most important confounding variables that can have a great impact on the amount of energy intake and growth status of children. Paying attention to the health and nutritional status of children is one of the important issues of the World Health Organization, and the nutrition and growth conditions of children are the best indicators of the health of children [2]. Food insecurity will make sense when there is no food security conditions and anxiety and concern about food develops at the household level and among children [3]. According to the definition of food security, food insecurity can be referred to as limited access to adequate intake of acceptable food [4]. In a crisis, children need

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foods with higher nutritional values than adults. Assessment of the nutritional status and identification of the nutritional needs of children are among the most important primary steps in nutrition planning in crises [5].

In spite of many global efforts to improve the health of society, energy-protein malnutrition and micronutrient deficiencies remain the most important nutritional problems in most developing countries, including Iran, and account for an important contributor to the mortality of more than half of children in these countries [6, 7]. Anthropometric measurements (e.g., height and weight) are the internationally recommended method for the assessment of nutrition at the population level [8]. Among the indicators of growth, "weight" is a more sensitive criterion that responds quickly to various factors related to the child's health. However, it is recommended to measure both height and weight criteria in health care [9]. In children, three indices of weight-for-age, height-for-age, and body mass index-for-age (as z-scores) make it possible to compare a child or group of children with a reference population [10, 11].

In addition, such variables as life satisfaction also affect other parameters of child development, and the level of satisfaction is measured by the current situation of children's families. Life satisfaction is one of the most fundamental issues of life span, which is usually examined as living conditions and is expressed from the comparison of one's wishes in the current situation to actual access thereto . Among studies conducted in this field, energy-protein malnutrition in 342,000 Iranian children under 6 years of age was investigated by measuring height and weight in a descriptive study by Sayari et al. (1998). According to the findings of this study, 15.4% of children under 5 years of age suffer from moderate to severe nutritional height, and 4.9% have weight loss based on the weight index for height index among all children. Moreover, 10.9% of children under 5 years of age suffer from moderate and severe weight loss based on the weight index for age. They concluded that energy-protein malnutrition would continue to be a major problem in the country [12]. Karam Soltani and his colleagues (2007) studied obesity and food security in primary school children in Yazd. They found that the prevalence of obesity was 13.3% among all students and food insecurity was prevalent as 30.5% among students in the case group. The mean levels of energy and carbohydrate intake, percentage of energy intake from protein, and carbohydrate and the amount of energy and macronutrients received per kilogram of body weight were statistically significant between the two groups. A statistically significant relationship was observed between food security and obesity through fat control [13]. Based on a study by Ramakrishnan et al. (2009), despite significant advances in recent decades to reduce the prevalence of malnutrition, the prevalence of underweight and short stature has been doubled in the southern Sahara of Africa, and South Asia encompasses almost half of the malnourished children worldwide [14]. Basirat et al. (2011) presented evidence that the status of body mass index (BMI) was not significantly associated with other obesity-related variables in none of CDC, IOTF, WHO, and food insecurity criteria, either alone or after adjustment [15]. Kian et al. (2016) investigated the food security of 185 urban households in Alborz province and reported a significant relationship ($P = 0.01$) between food availability and food security in households [16]. Larson et al. (2011) conducted a review study on the food security situation of children and their families and generally found no significant association between food insecurity and children's weight status; their review demonstrated that the risk of weight gain might be increased in the long-term food aid programs [17]. According to the review of previous studies mentioned above, our country is one of the earthquake-prone regions of the world and the issue of food supply and distribution needed by the affected people has always been considered as one of the most important and fundamental problems. In this study, the growth status of children aged 2-5 years in the Kermanshah earthquake was compared using anthropometric indices to investigate the relationship between household economic status and food security with the growth rate and family life satisfaction of children aged 2-5 years in Kermanshah earthquake-stricken areas. The results of this study can be used in future studies in the field of child nutrition and food security of children and families, which is an important branch of nutrition science for the improvement of their health and the nutritional status of the country.

## Materials and Methods

In this retrospective-descriptive survey, inclusion criteria were an age range of 2-5 years, the satisfaction of children's families for participation, permanent residence in one of Sarpol-e Zahab and Thalas Babajani cities, prior child care for at least 4 months before the earthquake at health centers of Sarpol-e Zahab and Thalas Babajani, and physical health. There were 71 boys and 85 girls from a population size of 263 individuals, which was calculated based on the following formula [18]:

$$n = \frac{Nz^2pq}{Nd^2 + z^2pq} = \frac{263(1.96)^2(0.25)}{263(0.05)^2 + (1.96)(0.25)} = 156 \quad (1)$$

Therefore, the optimal sample size was equal to 156 children.

The following scales were used to collect data. A child anthropometry questionnaire and an 18-item food security scale, which was used in 1995 by the United States Department of Agriculture (USDA) as a valid global questionnaire for epidemiological studies, and was validated in previous studies in Iran [19, 20]. The Satisfaction With Life (SWL) scale for children's families is a 5-item scale that measures overall life satisfaction , and its validity was measured by convergent and differential methods, with an optimum reported reliability (Cronbach's alpha 85%). In this scale, the answers range in a seven-point Likert scale from completely satisfied (7) to completely dissatisfied (1) [21]. Finally, a questionnaire with 23

questions for the general and socioeconomic conditions of children's families, which was completed by interviewing and observation of household heads of the children.

The BMI profile of a child is calculated according to the conventional classification. Although the method of use is almost the same as that of adults, it provides a percentage for children to compare a child with children of the same age and gender. For adaptation, the z-scores of children or BMI scores fall into one of four groups:

Weight loss: below a z-score of 2

Normal weight: a z-score between 2 and 90

Overweight: a z-score between 91 and 97

Obese: a z-score of 98 or higher

Energy intake was calculated by 24-h (daily) calorie intake energy. The nutritional status of children was measured by the child growth percentile based on WHO indicators [22].

## Results

The results showed that out of 118 children living in Sarpol-e Zahab, 44.07%, 22.03%, 16.95%, and 16.95% were covered by base numbers 1, 2, 3, and 4 in Sarpol-e Zahab, respectively. In Thalas Babajani, 38 children were covered by the health center in this region. Most (53.2%) households of children were in ownership, rental, or down payment housing conditions. About 39.7% of household heads held a secondary school diploma. Most of the surveyed households (50%) lived in tents from the onset of the earthquake until the date of the visit by the researcher.

According to the results, the growth status of most studied children in terms of (weight for age) was normal before and after the earthquake with quorums of 56.4% and 63.5%, respectively. Out of 156 children, 4 (6.2%) and 21 (13.3%) children were very tall and tall, respectively, 84 (53.8%) children had normal growth, and 43 (27.6%) and 4 (2.6%) children were of short and severely short statures, respectively, before the earthquake . After the earthquake, 24 (15.4%) and 44 (28.2%) children were very tall and tall, respectively, 63 (40.4%) children had normal growth, and 19 (12.26%) and 6 (3.8%) children were of short and severely short statures out of 156 children. The growth status of most studied children was normal in terms of BMI-for age with quorums of 58.3% and 59.6% before the earthquake after the earthquake, respectively.

**Table 1. The relationship between socioeconomic status variables of children's households with levels of satisfaction with family life**

| Levels of the economic status variable | | Levels of satisfaction with family life variable | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Very dissatisfied | Dissatisfied | Relatively dissatisfied | Neutral | Relatively satisfied | Satisfied | Very Satisfied |
| Levels of the economic status variable | Low | 6 | 23 | 16 | 2 | 12 | 4 | 0 |
| | Medium | 9 | 6 | 13 | 2 | 19 | 6 | 3 |
| | Good | 2 | 8 | 4 | 1 | 11 | 6 | 2 |
| Chi-square test | | $X^2$ statistic | df | Sig. | Rejection of confirmation of the research hypothesis | | | |
| | | 21.405 | 12 | .045 | Confirmed | | | |

The results of the life satisfaction variable showed that among 156 respondents, 17 (10.9%), 37 (23.7%), and 33 (21.2%) individuals were very dissatisfied, dissatisfied, and relatively dissatisfied, respectively, and 5 (3.2%), 42 (26.9%), 17 (10.9%), and 5 (3.2%) individuals were neutral, relatively satisfied, satisfied, and very satisfied, respectively. The findings of the Chi-square test **(Table 1)** indicated a statistically significant ($P < 0.05$) relationship between the socioeconomic status of the households and the family life satisfaction variable of the studied children.

**Table 2. The relationship between the socioeconomic status variables and food security of children' households**

| | Levels of the economic status variable | Levels of the food security variable | | | | |
|---|---|---|---|---|---|---|
| | | Food security | Food insecurity | Food insecurity with moderate hunger | Food insecurity with severe hunger | Total |
| Levels of children's growth status variable (height-for-age) before the earthquake | Low | 0 | 23 | 23 | 17 | 63 |
| | Medium | 18 | 40 | 0 | 0 | 58 |
| | Good | 34 | 0 | 0 | 0 | 34 |
| Chi-square test | | $X^2$ statistic | df | Sig. | Rejection of confirmation of the research hypothesis | |
| | | a149.940 | 6 | .000 | Confirmed | |

The results showed that the rates of food insecurity and security were respectively 66% and 34% among 156 respondents of the study population. Concerning the prevalence of food insecurity **(Table 2)**, food insecurity, food insecurity without hunger,

food insecurity with moderate hunger, and insecure food with severe hunger were observed in 53 (34%), 63 (40.6%), 23 (14.7%), and 17 (10.9%) households of the respondents. The data of the Chi-square test **(Table 2)** showed a statistically significant relationship between the socio-economic conditions of the children's household and the food security variable of the studied children ($P < 0.05$).

**Table 3. Comparison of average energy intake in children with economic and food security variables**

| Level of variables | Groups | Frequency | Mean | SD | F value | Sig. |
|---|---|---|---|---|---|---|
| Economic status | Low | 58 | 705.913 | 356.61049 | 14.952 | 0.0146 |
| | Medium | 34 | 859.6536 | 425.40914 | | |
| | Good | 155 | 754.3675 | 368.08611 | | |
| Food security | Food security | 53 | 807.2368 | 389.47759 | 21.45 | 0.028 |
| | Food insecurity without hunger | 63 | 739.9083 | 382.84611 | | |
| | Food insecurity with moderate hunger | 23 | 724.4445 | 307.63397 | | |
| | Food insecurity with severe hunger | 17 | 729.0357 | 371.74931 | | |

According to **Table 3**, there is a significant relationship ($P = 0.01$) between energy intake with socioeconomic status and food security of children's households.

**Table 4. The relationship between food security and the growth status of children after the earthquake**

| Growth status dependent variable | Independent variable | OR (95%CI) | P-VALUE |
|---|---|---|---|
| BMI-for age | Food security | 45.63 | 0.015 |
| Weight-for age | Food security | 45.33 | 0.032 |
| Height-for age | Food security | 57.79 | 0.048 |

The measured relationship between the variables is shown in the multivariate regression Table. There is a statistically significant relationship ($P < 0.05$) between food security and children's growth status (BMI, weight, and height-for-age), which is positive in all the three z-scores. The results showed that the studied children in the food security group have more chance (49.58 times) than the food insecurity groups. **(Table 4)**

## Conclusion

The aim of this study was to investigate the relationship between economic status and food security of households with the growth rate and family life satisfaction of children aged 2-5 years in the earthquake-stricken areas of Kermanshah. The descriptive index used to describe the growth status of children before and after the earthquake revealed that the average growth variable of children (weight and height-for-age) before the earthquake was higher than that after the earthquake. Besides, the average growth variable of children (BMI-for age) before the earthquake was less than that measured after the earthquake. The present study corresponds to Yarparvar et al. (2004) who investigated the status of malnutrition and growth disorders in 500 children aged 6-59 months in Varzaqan after the earthquake. They reported that the prevalence of underweight-short stature and moderate to severe weight loss were 15.2-8.9% and 5.6%, respectively, in the studied children [23]. However, our findings are not in line with a study conducted by Ahmad Koosha et al. (2012) who examined the status of malnutrition and growth disorders in 128 children aged 6-59 months in Varzaqan city after 2 months of the earthquake. They observed stunted growth in 10 (7.8%) children before the earthquake, and 37 (28.9%), 14 (10.9%), 15 (11.7%), and 8 (6.25%) children had growth disorder, slow growth, stunted growth, and growth disorder, respectively, after the earthquake [24].

Our results showed a statistically significant relationship between the socioeconomic status of children's household and the variable of children's satisfaction with household life. This finding is in agreement with Akbarpour et al. (2016), who investigated food security and socioeconomic status among 500 urban and rural households selected randomly in Marvdasht city. They found the presence of food insecurity (8.73%), food insecurity without hunger (35%), and food insecurity with moderate and severe hunger (23% and 15.8%, respectively), and concluded that food insecurity in the society was related to some factors such as socioeconomic status and life satisfaction [25]. No inconsistent study was found in this regard.

Based on the present findings, a statistically significant relationship was observed between the socioeconomic status and the food security of children. This corresponds to Ramesh et al. (2009), who examined the prevalence of insecurity and the relationship between some socioeconomic factors in urban households in Shiraz. They reported that a prevalence rate of 44% for food insecurity, which was significantly correlated with low economic and livelihood status [26]. Our observation is also consistent with Abbasi et al. (2015), who conducted a study on the association between food security and socioeconomic status of 603 people from 190 rural households in the lowland villages of eastern Guilan province. Their results showed that food insecurity was 16% (food insecurity with severe hunger 1%, food insecurity with moderate hunger 9%, and food insecurity without hunger 3%) in all studied households, indicating that access to adequate and healthy food is a sign of health in any society. They believe that the achievement of sustainable food security is of particular importance, and that food insecurity and hunger can have psychosocial consequences in addition to their

impact on physical health. No inconsistent study was found in this regard.

The results showed that there were statistically significant relationships ($P < 0.05$) between the variables of growth status of children aged 2-5 years and the food security of their households in all three z-scores (percentiles) after the earthquake.

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**Conflict of interest:** The assimilation of my dissertation with the Kermanshah earthquake forced me to do my research in the study and evaluation of children in that area.

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## References

1. Sharafi H, Hassanzadeh SF, Raiesi N. Investigation of damages to reinforced concrete buildings and structures of Sarpol-e-Zahab city due to earthquake: Case study of the steel region, the 11th National Congress on Civil Engineering. Shiraz University: Shiraz, 2019.
2. Heidari S, Imam Quraishi F, Amini M. A study on the growth of children under two years of age in Jahrom and its comparison with NCHS criteria. Knowledge Horizon. 2005;11(3):42-8.
3. Webb P, Coates J, Frongillo EA, Rogers BL, Swindale A, Bilinsky P. Measuring household food insecurity: why it's so important and yet so difficult to do. J Nutr. 2006 May 1;136(5):1404S-8S.
4. Holben D. Position of the American Dietetic Association: food insecurity in the United States. J Am Diet Assoc. 2010 Sep 1;110(9):1368-77.
5. Mahan KL E. Stump, Food nutrition, and diet therapy, 10th ed, London, W.B Saunders Co. 2000: 241.
6. Wilson RE, Marshall RD, Murakami JM, Latner JD. Brief non-dieting intervention increases intuitive eating and reduces dieting intention, body image dissatisfaction, and anti-fat attitudes: A randomized controlled trial. Appetite. 2020 May 1;148:104556.
7. Esfarjani F, Salarkia N, Roustaee R, Abadi A. Anthropometric and breast feeding status in children under five years of age in mother-head families under the support of the Imam Khomeini Relief Foundation in Tehran and some affecting factors. Iran J Nutr Sci Food Ind. 2007;2(4):41-8.
8. WHO Expert Committee. Physical status: the use and interpretation of anthropometry. World Health Organ Tech Rep Ser. 1995;854:1-452.
9. Çelik İK, Civelek E, Metin A, Giniş T, Toyran M, Misirlioğlu ED, et al. Comparison of reference systems in the assessment of age-related serum immunoglobulin levels in pediatric patients. Turk J Med Sci. 2019 Feb 1;49(1):147-52.
10. De Onis M, Blössner M. The World Health Organization Global Database on Child Growth and Malnutrition: methodology and applications. Int J Epidemiol. 2003;32(4): p. 518-26.
11. Hakeem R, Shaikh AH, Asar F. Asar, Assessment of linear growth of affluent urban Pakistani adolescents according to CDC 2000 references. Ann Hum Biol. 2004;31(3):282-91.
12. Fang HY, Zhai Y, Zhao LY, Yu DM, Zhang Q, Ju LH, et al. Epidemiological characteristics of overweight and obesity in Chinese children and adolescents aged 6-17 years. Zhonghua Liu Xing Bing Xue Za Zhi. 2018 Jun 1;39(6):724-7.
13. Jopp DS, Park MK, Lehrfeld J, Paggi ME. Physical, cognitive, social and mental health in near-centenarians and centenarians living in New York City: findings from the Fordham Centenarian Study. BMC geriatrics. 2016 Dec;16(1):1-10.
14. Sayyary AA. Prevalence of malnutrition in children under 5 years of age in urban and rural areas of Iran in November 1998. Researcher. 2000;4(5):409-16.
15. Eshraghian MR, Siassi F, Jazayeri GH. Obesity and food security in Yazd primary school students. Tehran University Medical Journal TUMS Publications. 2007 Oct 10;65(7):68-76.
16. Ramakrishnan U, Nguyen P, Martorell R. Effects of micronutrients on growth of children under 5 y of age: meta-analyses of single and multiple nutrient interventions. Am J Clin Nutr. 2009 Jan 1;89(1):191-203.
17. Basirat R, Salehi Abargouei A, Esmaillzadeh A. The association between household food insecurity and childhood obesity among Iranian school-aged children in Farokhshahr. Koomesh. 2012 Jan 10;13(2):254-63.
18. Kian F, Farhadian H, Chobchian S. Food insecurity assess of urban household of Alborz province. Food Sci Technol. 2015 Sep 10;13(55):167-79.
19. Weatherspoon DD, Miller S, Ngabitsinze JC, Weatherspoon LJ, Oehmke JF. Stunting, food security, markets and food policy in Rwanda. BMC public health. 2019 Dec;19(1):882.
20. Nishi N, Yoshimura E, Ishikawa-Takata K, Tsuboyama-Kasaoka N, Kubota T, Miyachi M, et al. Relationship of living conditions with dietary patterns among survivors of the great East Japan earthquake. J Epidemiol. 2013 Sep 5;23(5):376-81.

21. Hakim S, Dorosty AR, Eshraghian MR. Association of food insecurity and household socio-economic status with the body mass index among urban women in Dezful. J Sch Public Health Instit of Public Health Res. 2010 Jul 1;8(2):55-66.
22. Ramesh T, Dorosti Motlagh A, Abdullahi M. Prevalence of food insecurity in households in Shiraz and its relationship between some socioeconomic and demographic factors in 2008. Iran J Nutr Sci Food Ind. 2008;4(4):6-53.
23. Adamczyk K, Trepanowski R, Celejewska A, Ganclerz M. Development of the Polish-Language Riverside Life Satisfaction Scale and Its Further Validation. J Pers Assess, 2019:1-16.
24. Van den Broeck J, Willie D, Younger N. The World Health Organization child growth standards: expected implications for clinical and epidemiological research. Eur J Pediatr. 2009;168(2):247-51.
25. Koosha A. Evaluation of malnutrition and growth disorders in children aged 6-59 months in Varzaqan city after the earthquake. National Conference on Pathology and Planning for the effects of the earthquake in August 12, 1991, in East Azarbayjan province. Payame Noor University, East Azerbaijan Province: Harris, 2012.
26. Akbarpoor M. The food security situation in Marvdasht city. Ecol Agric. 2016;6(1):1-10.