

# Assessment of food security status and its socio-economic factors in households of Kerman, Iran

## Abstract

**Background:** Food security at the individual, family, national, regional and global levels is achievable when all people at all times have the physical and economic access to adequate, healthy and nutritious food to meet their nutritional needs and priorities for a healthy and active life. The purpose of this study was to investigate the food security status and its related socio-economic factors in the households of Kerman province in 2019.

**Methods:** This descriptive cross-sectional study was performed on 702 households with health records in 3 health community sites located in three districts of Baft city. Subjects were randomly selected using a list of households covered by each center. The socio-economic questionnaires as well as a valid USDA 18-item food security questionnaire were completed.

**Results:** The mean of body weight was  $63.3 \pm 4.0$  kg, height of  $160.4 \pm 0.2$  cm and body mass index were  $24.6 \pm 0.1$ . Participants were divided into four levels of food security based on their scores. Most were classified as mild insecurity and lowest in food insecurity. Households with higher level of food security had higher levels of food security, vitamin and mineral supplements than other households. There was a significant relationship between the socio-economic factors studied (household size, home area and number of amenities) and food security level. There was a positive correlation between household dimension and food security level ( $R=0.142$  and  $p < 0.001$ ) and inverse relationship between food security level with home area and number of amenities ( $R=-0.093$  and  $p < 0.005$ ,  $R=-0.73$  and  $p < 0.001$ , respectively).

**Conclusion:** According to the present study, factors affecting food security in Kerman city women can provide appropriate operational strategies to improve food security in pre-crisis areas. The results of this study show that the Kerman is in a safe food zone before the crisis.

**Keywords:** food security, crisis, household, socio-economic factors

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## Introduction

Food is one of the fundamental needs of human society, whose provision lies in food security.<sup>1</sup> Achieving sustainable food supply and ensuring proper food security is one of the strategic priorities of each country.<sup>2</sup> Extensive research conducted over the last two decades demonstrates the scientific basis and empirical evidence to support the role of nutrition in health, increase efficiency, and its relationship to economic development.<sup>3</sup> On the eve of the new century, 840 million people are starving, 797 million of them in developing countries.<sup>4</sup> Also, about 24,000 children die of hunger every day. Increasing population growth is another important issue that exacerbates the problem of food shortages.<sup>5</sup> In a 2013 food insecurity report, the World Health Organization stated that between 2011 and 2013, 12.5 percent of the world's population or one in eight people in the world suffer from chronic hunger and have enough food to live a healthy and dynamic life. They didn't know that about 65 percent of them lived in different parts of Asia.<sup>6</sup> Population growth in Iran is one of the highest rates of population growth in the world. Iran's population is projected to reach over 100 million by 1400, while news reports have threatened the country's current food security, indicating that a large proportion of the country's population Not enough food.<sup>7</sup> Iran has been reported in the 2013 map as being at medium risk of food insecurity.<sup>8</sup> According to studies conducted in Iran from 2006 to 2013, the prevalence of household food insecurity in the country was 20–60%, which was

reported for female-headed households and low-income households, 75% and 86%, respectively. Examination of food consumption patterns in households indicates that in insecure households, more attention is paid to energy intake or, in other words, the abdominal satiety of family members. For this reason, the bread and potatoes and fats in these households increase as cheap sources of energy.<sup>9–11</sup> In contrast, there is a decrease in intake of essential micronutrients and protein due to reduced intake of rice, vegetables, fruits, red meat, milk and dairy products.<sup>11</sup> In other words, the diversity of food consumption in insecure households decreases.<sup>12</sup> Factors affecting food security are divided into two main parts: direct (production, consumption and trade) and indirect (war, disaster and community consumption patterns) factors.<sup>9</sup> Natural hazards such as earthquakes, floods, droughts and diseases cause thousands of deaths every year worldwide. Iran is the tenth most violent country in the world with the highest incidence of natural disasters.<sup>13,14</sup> So far, earthquakes in areas of Iran such as Kerman have caused irreparable damages and financial damages.<sup>15</sup> Experts have predicted that the costs of natural hazards will increase fivefold over the next 50 years due to population growth and climate change.<sup>16</sup> Therefore, it is necessary to adopt appropriate strategies to deal with these critical conditions and to ensure food and nutrition security at household level.<sup>17</sup> The issue of household food security is of paramount importance for growth and development for all households, especially in times of natural disasters where access to healthy and adequate food is reduced. Studies on food safety<sup>18</sup> in

Iran have so far been concentrated in urban centers and less on food insecurity in the high-risk city of Kerman.<sup>18</sup> Due to the lack of studies on food safety assessment and its related factors before the crisis in earthquake-prone areas and the importance of such a study, the present study aimed to assess the food security status and its related socio-economic factors in urban households of Kerman.

## Materials and methods

### Study type

The current study was a cross-sectional study conducted on 702 households recruited from three health-care units in Kerman province (Iran) in 2019.

### The sampling

Kerman has three health-care section including Beheshti, Imam Mohammad Bagher and Valiasr that covers the western and northern regions of the city (4125 households), southern (3930 households) and eastern (3400 households) regions of this city, respectively. The subjects were recruited to current study by simple random sampling. The sample size was assessed by the standard formula with a 95% confidence level and a 4% margin of error. Finally, the sample size was considered 638 households, by a 10% of nonresponse level.

### Inclusion criteria

The criteria included Iranian nationality, being non-immigrant, the presence of a non-pregnant, non-lactating woman of childbearing age, and willingness to sign a consent form to participate in the study.

### Study and study population

The study was conducted from January to March 2017. We invited the mothers to participate in current study, because they generally have more information about food intake, eating habits, and economic status of their households. It took 30 minutes to fill out the questionnaires by face-to-face interviews. At the baseline the aim of the study was explained by the interviewer. The protocol was approved by the ethical committee of Tabriz University of Medical Sciences, Tabriz, Iran (reference number: IR.TBZ.MED.REC.1396).

### Data collection

#### Demographic and socioeconomic questionnaire

Demographic and socioeconomic determinants including the age of mother and her spouse, number of the household members, number of children, level of education and employment status.

#### Food security questionnaire

US Department of Agriculture Food Security questionnaire (USDA) was reliable and valid in Iran; a study conducted on households from all sectors of Isfahan population showed that the USDA module provided an internally valid household level measure of food insecurity among adults and children. The USDA questionnaire has 18 items that was filled out by via interviewing with mothers. The questions were about the household's experiences with food insufficiency about the last 12-month. The food insecurity construct included 4 determinants: 1) quantity of food, 2) quality of food, 3) food anxiety, and 4) coping mechanisms taken by the household to augment food supplies. Moreover, households were divided into 4 levels consisted secure (0–2 points), insecure without hunger (3–7

points), insecure with moderate hunger (8–12 points) and insecure with severe hunger ( $\geq 13$  points).

### Anthropometric measurement

Body weight of the mothers was measured to the nearest 0.1 kg using a digital scale, with light clothing on and height was measured to the nearest 0.1 cm using a wall-mounted stadiometer. Moreover, body mass index (BMI) was calculated by dividing weight (Kg) of the individual by the square of the height (m<sup>2</sup>).

### Statistical analysis

The analysis was performed by SPSS 23.0 software. At the baseline the normality was considered by using Kolmogorov–Smirnov test. Chi-square test and Independent Sample T-test were used to evaluate differences between secure and insecure groups. Multivariate analysis using an enter logistic regression model was considered to evaluate the components of food security. P value  $<0.05$  was considered significant.

## Results

The current cross-sectional study was considered among 702 households of three health-care section in Kerman city, the aim of study was evaluating the food security level and its effective factors.

As table 1 demonstrated, the total prevalence of household food insecurity was 48.4% in the current study that 35.2% had food insecurity without hunger, 11.1% had insecurity with moderate hunger and 2.1%, had insecurity with sever hunger. The subjects with food insecure households were sum up together in continuous analysis due to the limitation amount in each groups.

**Table 1** Frequency of household food insecurity

Food security status	N	Percent
Food secure (Level 1)	360	51.4
Food insecure without hunger (Level 2)	247	35.2
Food insecure with moderate hunger (Level 3)	78	11.1
Food insecure with severe hunger (Level 4)	15	2.1

N: Number

Table 2 reported demographic and anthropometric parameters between secure and insecure groups. The mean  $\pm$  SD of women age in the current study was  $37.12 \pm 12.5$  and the spouse age was  $42.8 \pm 13.11$ . Also, the mean  $\pm$  SD of women age and spouses age were higher in insecure group versus to secure group ( $P=0.003$ ). However, there were no significant differences in BMI mothers between the secure compared to insecure groups ( $P=0.21$ ), there were significant difference in weight and height among the groups ( $P=0.003$ ). The size of households was significantly higher in insecure group compared to the secure group ( $P=0.003$ ). However, house area ( $P=0.013$ ) and welfare facilities ( $P=0.003$ ) were significant lower in insecure group versus to secure group ( $P$ ). Moreover, 175 Subjects in food secure groups and 268 Subject in food insecure groups had consumed dietary supplements that surprisingly it was higher than the food secure group ( $P=0.003$ ). The most households in the food insecure and secure group lived in region 1 and region 2, respectively ( $P=0.003$ ).

**Table 2** Comparison of variables between food secure and insecure groups (n=702). Data are described as mean±SD or n (%)

Variable		Total sample	Secure	Insecure	p-value
Age		37.12±12.5	36.10±12.4	40.3±12.5	0.003
Spouse age		42.8±13.11	41.7±13.7	44.8±14.5	0.003
Weight (kg)		66.6±14.6	67.58±14.4	64.22±14.4	0.003
Height (cm)		163.7±9.11	163.15±9.11	162.09±9.9	0.003
BMI		27.9±7.0	27.11±7.0	27.4±7.4	0.21
House area		124.9±58.4	127.12±62.6	117.12±48.7	0.013
Household size		6.12±4.7	6.10±7.6	7.4±4.8	0.003
Welfare facilities		6.8±4.8	6.9±4.7	5.8±4.8	0.003
Having a chronic disease	Yes	92	56	39	0.37
	No	616	410	209	
Employment status	Unemployed	612	393	221	0.021
	Xemployed	96	73	25	
Spouse employment status	Unemployed/labor/farmer	122	52	73	0.003
	Government employee	212	162	52	
Self employed		377	255	124	0.37
Education	Under diploma	198	91	110	0.022
	Diploma and more	510	375	136	
Spouse Education	Under diploma	219	103	119	0.001
	Diploma and more	489	363	127	
	I	249	122	128	
Region	2	232	214	21	0.003
	3	230	133	100	
Dietary Supplements intake	Yes	440	175	268	0.003
	No	268	196	75	
House Ownership	Owner	411	286	128	0.005
	Rent	245	153	94	
	Organizational/independent/shared	55	29	27	

Differences between study groups were based on independent sample T-test

Differences between study groups were based on Chi-square test

Table 3 demonstrated the Logistic regression to evaluate the household having food security. The current study reported that various factors have significant relation with food security such as lower household size (OR=0.87, CI: 0.76–0.10, P=0.05), higher

welfare facilities (OR=4.58, CI: 4.35–4.84, P=0.004), governmental employment (OR=4.88, CI: 3.17–5.12, P=0.04), educational levels of the mothers and their spouse and house ownership (rent) (OR=0.44, CI: 0.24–0.84, P=0.04).

**Table 3** Results of logistic regression predicting food security in study population

Variable		Odd ratio	95% confidence interval	P value
Household size		0.87	(0.76,0.10)	0.05
BMI		0.80	(0.49,4.32)	0.33
Age		3.36	(0.12,4.10)	0.10
Spouse age		3.33	(0.10,3.07)	0.73
Welfare facilities		4.58	(4.35,4.84)	0.004
Employment	unemployed	-	-	-
status	Employed	4.34	(0.59,3.84)	0.99
Spouse employment	Unemployment/labor/farmer	-	-	-
status	Governmental employee	4.88	(3.17,5.12)	0.04
Education	Self employed	0.71	(0.46,3.09)	0.08
	Under diploma	-	-	-
	Diploma and more	4.68	(0.99,5.56)	0.05
House ownership	Owner	-	-	-
	Rent	0.44	(0.24,0.84)	0.04
	Organizational/independent/shared	0.68	(0.36,4.30)	0.24
Having a chronic disease	Yes	-	-	-
	No	0.58	(0.07,9.68)	0.69

## Discussion

The total prevalence of household food insecurity was 48.4% in the current study that 35.2% had food insecurity without hunger, 11.1% had insecurity with moderate hunger and 2.1%, had insecurity with sever hunger.

In this study, there was a significant positive relationship between age and food security status. In a 2013 study by Nasrabadi et al., They found a significant positive relationship between age and food security status. North et al. also found a significant positive relationship between these two factors, which improved with age as food security improved.<sup>19</sup>

Also in line with the results of this study, Nasrabadi et al. observed a significant relationship between food insecurity and household head age in urban areas, which was not found in rural areas.<sup>20</sup> A study by Hakim et al. in Dezful city showed a significant relationship between food security status and parents' age, parental education, parental occupation.<sup>21</sup> In 2009, Mohammadzadeh et al. conducted a study to investigate the relationship between food insecurity in 580 households in Isfahan city. Food insecurity had a significant negative relationship with parent education and household occupation,<sup>22</sup> Laraia et al. Reported a significant association between food insecurity and age, which was inversely related, which could be attributed to the finding that mothers of lower ages usually had lower levels of education and occupation and have little ability to buy food.<sup>23</sup> According to these studies, it can be concluded that there is a significant and positive relationship between food security and age. It can be inferred that as people age, higher education and nutritional knowledge will increase. People will spend more time shopping and cooking healthy food,

leading to improved food security. Due to the low sample size of the discordant studies, further studies can be done in those areas to find the mentioned relationship. The results showed that there was a significant negative relationship between weight and food security level. Similarly in the study of Hakim et al. In 2008 in Dezful city, a significant relationship was found between food security status and body mass index.<sup>21</sup> A 2007 study by Isanaka et al. aimed to determine economic, social, and nutritional factors and their impact on children's food insecurity in Colombia. It is overweight.<sup>24</sup>

Incongruent studies have also been reported in this study in which Kaiser et al. found that food insecurity increased the likelihood of obesity.<sup>25</sup> A study by Townsend et al showed that the prevalence of food insecurity was higher among overweight women.<sup>26</sup> In a 2008 study by Lyons et al., The prevalence of obesity in the food insecurity group was higher.<sup>27</sup> In the 2003 study by Adams et al., Food insecurity increased the risk of obesity among women over 18 years of age in California.<sup>28</sup> In 2008, Olson et al conducted a study of the relationship between food insecurity and obesity in a healthy cohort of 622 women of childbearing age from the Bassett Mothers Health Project (BMHP) cohort study. The study was conducted in 10 New York City villages and follow-up from early pregnancy to 2 years postpartum. The results of the study showed that obesity at the beginning of pregnancy is associated with an increased risk of food insecurity at 2 years postpartum, and women with obesity and food insecurity at early pregnancy were more at risk for higher weight gain during pregnancy and postpartum.<sup>29</sup> In a 2008 study by Bhargava et al., Aimed at investigating the relationship between food security status with socioeconomic, environmental and behavioral factors among children, there was a positive and significant relationship between children's weight with food insecurity.<sup>30</sup>

In this study, a significant negative relationship was found between weight and food security level. Due to the improved income and economic status of people with higher food security status, their food choices will be better and healthier. In order to get a more nutritious diet one can expect to gain weight as well.

In this study, a significant and positive relationship was found between household dimension and food security level of the subjects so that as household dimension increased, food security level increased (food insecurity was increased). Homes also had a higher proportion of people with higher food security. With the increasing number of amenities, people were also on a safe level.

In the study of Laraia et al., There was a significant correlation between food insecurity and number of children. In fact, as the number of children increases, household spending increases and food availability decreases, resulting in an increase in the number and size of food given the poor households' food insecurity.<sup>23</sup> A 2008 study by Rhoe et al. In Kazakhstan, together with the present study, showed that as household size increased, poverty and welfare decreased, the food security status of individuals decreased.<sup>31</sup> Ajao et al. 2010 study of 423 mothers with children under the age of 5 found that household size had a significant impact on food and household security in Nigeria. The incidence of malnutrition increased fivefold as the number of households increased.<sup>32</sup> In general, as the economic and social situation of the household improves, it can be expected that people's attention to their nutritional status will be increased, and therefore food security will increase.

## Conclusion

The present study showed that people living in three areas were divided into three levels of food security based on their scores. Most people were at mild food insecurity and the least were at safe food levels. So it can be concluded that Kerman is in a high risk area before the crisis. Economic variables were influenced by food security status so that people with lower household size, higher number of amenities, more home ownership and home area were higher than other people. In general, by raising the level of awareness and improving their economic situation, one can prepare to improve the food security of the families in the city of Baft before any crisis occurs.

## References

1. Deb UK. Agriculture and Food Security. Routledge Handbook of Contemporary Bangladesh: Routledge; 2016. p. 144–158.
2. Nord M. What have we learned from two decades of research on household food security? *Public health nutrition*. 2014;17(1):2–4.
3. Akter S, Basher SA. The impacts of food price and income shocks on household food security and economic well-being: Evidence from rural Bangladesh. *Global Environmental Change*. 2014;25:150–162.
4. Carletto C, Zezza A, Banerjee R. Towards better measurement of household food security: Harmonizing indicators and the role of household surveys. *Global food security*. 2013;2(1):30–40.
5. Wheeler T, Von Braun J. Climate change impacts on global food security. *Science*. 2013;341(6145):508–513.
6. FAO. State of Food Insecurity in the World 2013: The Multiple Dimensions of Food Security: FAO; 2014.
7. Demeke M, Pangrazio G, Maetz M. Country responses to the food security crisis: Nature and preliminary implications of the policies pursued. 2009.
8. DAST GS, Mahboub S, Toutounchi H, et al. Determinants of food insecurity: a cross-sectional study in Tabriz. 2006.
9. Shariff ZM, Khor G. Obesity and household food insecurity: evidence from a sample of rural households in Malaysia. *Eur J Clin Nutr*. 2005;59(9):1049–1058.
10. Payab M, Dorosty Motlagh A, et al. The association between food insecurity, socio-economic factors and dietary intake in mothers having primary school children living in Ray 2010. *Iranian Journal of Nutrition Sciences & Food Technology*. 2012;7(1).
11. Ostad Ra, Mahboub S, Tootoonchi H, et al. Prevalence and intensity of food insecurity (hunger and hidden hunger aspects) in asadabadi region of tabriz. 2006.
12. Zerafati-Shoae N, Omidvar N, Ghazi-Tabatabaie M, et al. Is the adapted Radimer/Cornell questionnaire valid to measure food insecurity of urban households in Tehran, Iran? *Public Health Nutr*. 2007;10(8):855–861.
13. Hasan-Ghom M, Mirmiran P, Amiri Z, et al. The association of food security and dietary variety in subjects aged over 40 in district 13 of Tehran. *Iranian Journal of Endocrinology and Metabolism*. 2012;14(4).
14. HR Khankeh, R Mohammadi, F Ahmadi. Health care services at time of natural disasters: A Qualitative Study. *Iran Journal of Nursing*. 2007;20(51):85–96.
15. Khankeh HR, Mohammadi R, Ahmadi F. Health care services at time of natural disasters: a qualitative study. *Iran Journal of Nursing*. 2007;20(51):85–96.
16. Ardalan A, Masoumi G, Gouya Mm, et al. Disaster health management: Iran's progress and challenges. 2009.
17. De Haen H, Hemrich G. The economics of natural disasters: implications and challenges for food security. *Agricultural economics*. 2007;37:31–45.
18. Schnitzer JJ, Briggs SM. Earthquake relief—The US medical response in Bam, Iran. *New England Journal of Medicine*. 2004;350(12):1174–1176.
19. North I. Food insecurity in Canadian households. *Health reports*. 2001;12(4):11.
20. Mohammadi-Nasrabadi F, Omidvar N, Hoshyar-Rad A. The association between food security and weight status among Iranian adults. *Iranian Journal of Nutrition Sciences & Food Technology*. 2008;3(2):41–53.
21. Hakim S, Dorosty AR, Eshraghian M. Association of food insecurity and household socio-economic status with the body mass index among urban women in Dezful. *Journal of School of Public Health & Institute of Public Health Research*. 2010;8(2).
22. Mohammadzadeh A, Dorosty A, Eshraghian M. Household food security status and food consumption among high school students in Esfahan, Iran. *Iranian Journal of Epidemiology*. 2011;7(1):38–43.
23. Laraia BA, Siega-Riz AM, Gundersen C, et al. Psychosocial factors and socioeconomic indicators are associated with household food insecurity among pregnant women. *The Journal of nutrition*. 2006;136(1):177–182.
24. Isanaka S, Mora-Plazas M, Lopez-Arana S, et al. Food insecurity is highly prevalent and predicts underweight but not overweight in adults and school children from Bogota, Colombia. *J Nutr*. 2007;137(12):2747–2755.
25. Kaiser LL, Townsend MS, Melgar-Quiñonez HR, et al. Choice of instrument influences relations between food insecurity and obesity in Latino women. *The American journal of clinical nutrition*. 2004;80(5):1372–1378.
26. Townsend MS, Pearson J, Love B, et al. Food insecurity is positively related to overweight in women. *The Journal of nutrition*. 2001;131(6):1738–1745.

27. Lyons A-A, Park J, Nelson CH. Food insecurity and obesity: a comparison of self-reported and measured height and weight. *Am J Public Health*. 2008;98(4):751–757.
28. Adams EJ, Grummer-Strawn L, Chavez G. Food insecurity is associated with increased risk of obesity in California women. *J Nutr*. 2003;133(4):1070–1074.
29. Olson CM, Strawderman MS. The relationship between food insecurity and obesity in rural childbearing women. *The Journal of Rural Health*. 2008;24(1):60–66.
30. Bhargava A, Jolliffe D, Howard LL. Socio-economic, behavioural and environmental factors predicted body weights and household food insecurity scores in the Early Childhood Longitudinal Study-Kindergarten. *British Journal of Nutrition*. 2008;100(2):438–444.
31. Rhoe V, Babu S, Reidhead W. An analysis of food security and poverty in Central Asia—case study from Kazakhstan. *Journal of International Development: The Journal of the Development Studies Association*. 2008;20(4):452–465.
32. Ajao K, Ojofeitimi E, Adebayo A, et al. Influence of family size, household food security status, and child care practices on the nutritional status of under-five children in Ile-Ife, Nigeria. *African journal of reproductive health*. 2010;14(4).